Acknowledgements

The Arms of the University

Sidere mens eadem mutato
Though the constellations change, the mind is universal

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Official course information
Faculty handbooks and their respective online updates, along with the University of Sydney Calendar, form the official legal source of information relating to study at the University of Sydney. Please refer to the following websites:
sydney.edu.au/handbooks
sydney.edu.au/calendar

Amendments
All authorised amendments to this handbook can be found at sydney.edu.au/handbooks/handbooks_admin/updates2011

Resolutions
The Coursework Clause
Resolutions must be read in conjunction with the University of Sydney (Coursework) Rule 2000 (as amended), which sets out the requirements for all undergraduate courses, and the relevant resolutions of the Senate.

The Research Clause
All postgraduate research courses must be read in conjunction with the relevant rules and resolutions of the Senate and Academic Board, including but not limited to:
1. The University of Sydney (Amendment Act) Rule 1999 (as amended).
2. The University of Sydney (Doctor of Philosophy (PhD)) Rule 2004.
3. The resolutions of the Academic Board relating to the Examination Procedure for the Degree of Doctor of Philosophy.
4. The relevant faculty resolutions.

Disclaimers
1. The material in this handbook may contain references to persons who are deceased.
2. The information in this handbook was as accurate as possible at the time of printing. The University reserves the right to make changes to the information in this handbook, including prerequisites for units of study, as appropriate. Students should check with faculties for current, detailed information regarding units of study.

Price
The price of this handbook can be found on the back cover and is in Australian dollars. The price includes GST.

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For any enquiries relating to the handbook, please email the handbook editors at wpp.info@sydney.edu.au

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NSW 2006 Australia
Phone: +61 2 9351 2222
Website: sydney.edu.au

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### University semester and vacation dates for 2011

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<tr>
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<td>Begins: Monday 6 December 2010</td>
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<tr>
<td>Summer School - main program</td>
<td>Begins: Tuesday 4 January 2011</td>
</tr>
<tr>
<td>Summer School - late January program</td>
<td>Begins: Monday 17 January</td>
</tr>
<tr>
<td>Winter School - main program</td>
<td>Begins: Monday 27 June</td>
</tr>
<tr>
<td><strong>Semester One</strong></td>
<td></td>
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<tr>
<td>International student orientation (Semester One) - STABEX</td>
<td>Monday 14 February and Tuesday 15 February</td>
</tr>
<tr>
<td>International student orientation (Semester One) - full degree</td>
<td>Wednesday 16 February and Thursday 18 February</td>
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<tr>
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<td>Monday 28 February</td>
</tr>
<tr>
<td>AVCC Common Week/non-teaching Easter period</td>
<td>Friday 22 April to Friday 29 April</td>
</tr>
<tr>
<td>International application deadline (Semester Two) *</td>
<td>Thursday 29 April *</td>
</tr>
<tr>
<td>Last day of lectures</td>
<td>Friday 3 June</td>
</tr>
<tr>
<td>Study vacation</td>
<td>Monday 6 June to Friday 10 June</td>
</tr>
<tr>
<td>Examination period</td>
<td>Tuesday 14 June to Saturday 25 June</td>
</tr>
<tr>
<td>Semester ends</td>
<td>Saturday 25 June</td>
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<tr>
<td>AVCC Common Week/non-teaching period</td>
<td>Monday 4 July to Friday 8 July</td>
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<tr>
<td><strong>Semester Two</strong></td>
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<tr>
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<td>Monday 18 July and Tuesday 19 July</td>
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<tr>
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<tr>
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<td>Examination period</td>
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<td>Semester ends</td>
<td>Saturday 19 November</td>
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* Except for the faculties of Dentistry, Medicine and the Master of Pharmacy course. See www.acer.edu.au for details.

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<td>Friday 15 April</td>
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<td>Last to discontinue (Discontinued - Fail)</td>
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<td></td>
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<tr>
<td>Last day for withdrawal</td>
<td>Wednesday 31 August</td>
</tr>
<tr>
<td>Last day to discontinue without failure (DNF)*</td>
<td>Friday 9 September</td>
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<td>Last day to discontinue (Discontinued - Fail)</td>
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</tr>
<tr>
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The Sciences have a key role to play in the sustainable development of our planet and our society. Scientists are central to tackling the problems of conservation and the development of new and existing energy sources, scientists seek to prevent and cure diseases and are critical for understanding human behaviour, natural resources, and ecosystems.

Who could have foreseen the advances that have occurred during the last hundred years, the revolution in our understanding of such technologies as nanoscience and optics, of genetics and molecular biology. These have followed ongoing advances in atomic physics, chemistry, mathematics, and the geosciences. In the coming decades we will continue to see as yet unimaginable developments in these areas and new fields will come to light.

A training in the sciences involves you not only in the acquisition of this new knowledge, but also in applying findings to improve our world, and in the critical reasoning and problem-solving required to use knowledge wisely. It will equip you with the ability to contribute to new as yet unknown fields.

Well-trained, critical and creative scientists will be increasingly valued in our society. The University of Sydney is a world leader in scientific research and our research-led teaching programs are of the highest standard. We offer courses that cover a range of specialist options as well as broad science programs with in-built flexibility to suit you if you have not yet settled on your preferred area of interest. In either case, your first year will involve a broad-based introduction in which you will be encouraged to develop your own interests. This approach of combining a knowledge of fundamentals with later specialist training is recognised widely as the best available.

We also offer courses at a variety of levels to suit your needs – whether you wish to develop a basic foundation in the sciences or are seeking a challenge in our Advanced and Talented Student Programs (TSP). I hope you will choose to study in the sciences with us at the University of Sydney, in an institution that has wonderful staff, an outstanding teaching and research base, and many of the best courses available in Australia.

Trevor Hambley
Dean
In this handbook you will find a wealth of information about the Faculty of Science and the University. In particular, it will help you find out who the people are in your faculty, the requirements for degrees and the ways these can be satisfied.

Chapter 1 contains the Faculty resolutions common to all coursework awards. All students have an obligation to be familiar with these resolutions.

Chapter 2 contains faculty contact information, answers to the questions commonly asked by new undergraduate students, information on the Talented Student Program and international exchange opportunities.

Chapters 3 to 8 contain information on undergraduate degrees offered by the Faculty of Science. You will find enrolment guides and a degree planner to assist you to plan the structure of your degree.

Chapter 9 has descriptions of undergraduate units offered by the Faculty of Science, and some units offered by other faculties. If you want to know what a unit of study is and how it fits into your degree plan, this is the best place to look.

Chapter 10 provides information for honours students.

Chapters 11 to 26 are for postgraduate students. Each chapter contains enrolment advice, unit of study descriptions and resolutions for specific postgraduate degrees offered by the faculty.

The index is a useful reference tool for students who want to locate information on a particular unit of study.

Campus maps are included to help you locate lecture theatres, offices, libraries, cafes, and other student facilities.

Degree planner page is a handy tool to use when planning your degree.
1. Resolutions for coursework awards

Resolutions of the Faculty of Science for coursework awards

These resolutions apply to all undergraduate and postgraduate coursework award courses in the Faculty, unless specifically indicated otherwise. Students enrolled in postgraduate research awards should consult the resolutions for their course. These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the resolutions for the course of enrolment, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Part 1: Course enrolment

1 Enrolment restrictions

(1) Except with the permission of the Dean an undergraduate student may not enrol in units of study with a total value of more than 30 credit points in either semester one or two, 12 credit points in the summer session and 6 credit points in the winter session.

(2) Except with the permission of the Dean a postgraduate coursework student may not enrol in units of study with a total value of more than 24 credit points in either semester one or two, 12 credit points in the summer session and 6 credit points in the winter session.

2 Time Limits

(1) A student must complete all the requirements for a bachelor's degree (including combined degrees) or undergraduate advanced diploma within ten calendar years of first enrolment.

(2) Unless stated otherwise in the course resolutions:
   (a) a student must complete all the requirements for a graduate certificate within four consecutive semesters of first enrolment.
   (b) a student must complete all the requirements for a graduate diploma within eight consecutive semesters of first enrolment.
   (c) a student must complete all the requirements for a master's degree within twelve consecutive semesters of first enrolment.

(3) Periods of suspension, exclusion or lapsed candidature will be added to maximum completion times except that no completion time will exceed 10 years from first enrolment.

(4) Credit will not be granted for recognised prior learning older than ten years at the time of first enrolment for undergraduate courses or three years for postgraduate coursework.

(5) If a student is readmitted with credit, the Faculty will determine a reduced time limit for completion of the degree.

3 Credit for previous study

(1) Unless otherwise stated within the course resolutions, the provisions of the Coursework Rule apply to the granting of credit, except that, in undergraduate courses, all students must complete at least the senior Science units of study required for a major, at the University of Sydney.

(2) The maximum allowable credit granted toward an undergraduate degree is 96 credit points and the maximum allowable credit from a completed degree toward an undergraduate degree is 48 credit points. At the discretion of the Dean, the maximum allowable credit for an undergraduate degree may be varied for credit transfer within the University of Sydney.

(3) Credit is available in the articulated postgraduate courses for postgraduate study as long as it has been undertaken in these award courses within the previous six semesters. Unless otherwise stated, external credit is not available to students enrolled in postgraduate programs.

4 Course transfer

(1) Where the course resolutions allow students may apply direct to the Faculty. For all other applications students must apply through either UAC or the International office.

(2) Providing students satisfy the admission requirements for each stage of an articulated postgraduate coursework program, a student may apply to progress to the award of any of the courses within that sequence. Only the highest award completed will be conferred.

(3) A student enrolled in a postgraduate coursework masters may, with the approval of the Dean, elect to discontinue study and graduate with the graduate diploma from the embedded sequence provided the requirements of the graduate diploma have been met within the Faculty specified time limits of the Faculty.

(4) A student enrolled in a postgraduate coursework graduate diploma may, with the approval of the Dean, elect to discontinue study and graduate with the graduate certificate from the embedded sequence provided the requirements of the graduate certificate have been met within the Faculty specified time limits.

(5) All applications for transfer in a postgraduate coursework program must satisfy the Faculty specified time limits for application and transfer requests.

5 Re-enrolment after an absence

Unless otherwise stated within the course resolutions, the provisions of the Coursework Rule apply. A student who plans to re-enrol after a period of suspension must advise the Faculty in writing of their intention by the end of October for first semester of the following year or the end of May for second semester of the same year.

6 Suspension of candidature

(1) Unless otherwise stated within the course resolutions, the provisions of the Coursework Rule apply to all undergraduate courses.

(2) Suspension may be granted in a postgraduate coursework program for a maximum of two consecutive semesters.

7 Special permission

The Dean may, in certain circumstances permit exceptions to the requirements for a Faculty award. Applications must be made in writing.

Part 2: Unit of study enrolment

8 Details on Units of Study

(1) A candidate for a course shall proceed by completing units of study as prescribed by the Faculty.

(2) A unit of study shall consist of such lectures, seminars, tutorial instruction, essays, exercises, practical work, or project work as may be prescribed.
1. Resolutions for coursework awards

(3) In these resolutions, "to complete a unit of study" or any derivative expression means:
(a) to satisfy all requirements for that unit of study as determined by the School concerned, and
(b) to achieve a final mark of 50 or more in the unit of study.
(4) Not all units of study for a particular subject area may be available every semester.
(5) Where appropriate a table of units of study will be listed under each degree on offer.

9 Cross institutional study

(1) Provided the Dean's permission has been obtained in advance, a student may be permitted to complete a unit of study offered by another institution and have that unit credited to the student's course requirements, provided that:
(a) the unit of study content is not taught in any corresponding unit of study at the University; or
(b) the student is unable, for good reason, to attend a corresponding unit of study at the University.
(2) Cross-institutional study is regarded as another form of credit.
(3) Unless otherwise stated, cross-institutional study is not available to students enrolled in postgraduate programs.

10 International exchange

The Faculty encourages students to participate in international exchange programs, unless the resolutions for a particular course preclude this. For more information refer to the International Office.

Part 3: Studying and Assessment

11 Attendance

(1) Students are expected to attend a minimum of 80% of timetabled activities for a unit of study, unless granted exemption by the Dean or the Head of School concerned. The Dean or the Head of School most concerned may determine that a student has failed a unit of study because of inadequate attendance. Alternatively, at their discretion, they may set additional assessment items where attendance is lower than 80%.
(2) In some units of study, the minimum attendance requirement is greater than 80%. Students should read carefully the degree resolutions and the table of units of study listed under each degree.
(3) Students are required to be in attendance at the correct time and place of any formal or informal examinations. Non attendance on any grounds insufficient to claim special consideration will result in the forfeiture of marks associated with the assessment. Participation in a minimum number of assessment items may be included in the requirements specified for a unit of study.

12 Late submission policy

(1) It is expected that, unless an application for special consideration has been approved, students will submit all assessments for a unit of study on the due date specified. If the assessment is completed or submitted within the period of extension, no academic penalty will be applied to that piece of assessment.
(2) If an extension is either not sought, not granted, or is granted but work is submitted after the extended due date, the late submission of assessment may result in an academic penalty.

13 Concessional pass

In this Faculty the grade PCON (Concessional Pass) is not awarded.

14 Further examination

The Faculty does not offer opportunities for further examination or replacement assessment other than on the grounds of approved Special Consideration or Special Arrangements.

Part 4: Progression, Results, and Graduation

15 Satisfactory progress

(1) The Faculty will monitor students for satisfactory academic progress.
(2) In this Faculty a student shall not have made satisfactory progress in any semester if the student:
(a) fails to complete successfully 50% or more of the credit points in which the student was enrolled for that semester; and/or
(b) fails to complete successfully the second or later attempt of the same unit of study; and/or
(c) fails to complete successfully any compulsory or barrier unit(s) of study, field or clinical work, practicum, or professional experience; and/or
(d) is consequently unable to complete the degree within the maximum permitted time while carrying a normal student load.
(3) Students must also meet all progression requirements listed in specific course resolutions.
(4) A student in an undergraduate course who has not made satisfactory progress in any semester will be placed on the Faculty's Academic Register. Such students will be required to take action as outlined in the University Academic Progression Policy or as otherwise directed by the Faculty.
(5) Students who fail any unit of study in a postgraduate coursework program will be identified as not meeting academic progression requirements and become subject to the progression provisions of the Coursework Rule. Students who subsequently fail any unit of study will be excluded from the course if they cannot show good cause.
(6) These conditions for satisfactory progress will apply from 1 October 2010 and cannot be applied retrospectively.

16 Award of the bachelor degree with honours

(1) To qualify for admission to the bachelor degree with honours, an applicant must:
(2) have qualified for the award of a bachelor's degree from the Faculty of Science or equivalent qualification from another institution; and
(a) have completed a minimum of 24 credit points of senior units of study relevant to the intended honours course (or equivalent at another institution); and
(b) have achieved either:
   (i) a SCIWAM of at least 65 (or equivalent at another institution); or
   (ii) a credit average in 48 credit points in relevant intermediate and senior Science units of study as determined by the School concerned; or
(c) satisfy any additional criteria set by the Head of School concerned.
(3) General conditions of candidature include:
(a) Students must complete the requirements for the honours course full-time over two consecutive semesters. If the School is satisfied that a student is unable to attempt the honours course on a full-time basis and if the Dean so recommends, permission may be granted to undertake honours half-time over four consecutive semesters.
(b) An applicant who is qualified to enrol in two honours courses may either:
   (i) complete the honours courses in the two subject areas separately and in succession; or
   (ii) complete a joint honours course, equivalent to an honours course in a single subject area, in the two subject areas as agreed by the Dean and both Schools. A joint honours course shall comprise such
17 University Medal

A student with an honours mark of 90 or above and a minimum SCIWAM of 80 will be considered for the award of a University medal. The medal is awarded at the discretion of the Faculty to the highest achieving students who in the opinion of the Faculty have an outstanding academic record, in accordance with the Coursework Rule.

18 Weighted Average Mark (WAM) and Science Weighted Average Mark (SCIWAM)

(1) The University WAM is calculated using the following formula:

\[
\text{WAM} = \frac{\sum (Wc \times Mc)}{\sum Wc}
\]

where \( Wc \) is the unit of study credit points, \( x \) the unit weighting, and \( Mc \) is the mark achieved for the unit. The mark used for units with a grade AF is zero. Pass/fail units are not counted.

(2) The weight of a unit of study is assigned by the owning faculty. In this Faculty, junior units are weighted one, intermediate units are weighted two and senior units are weighted three.

(3) In this Faculty:

(a) A junior unit of study is a 1xxx or first-year stage unit.
(b) An intermediate unit of study is a 2xxx or second-year stage unit.
(c) A senior unit of study is a 3xxx or third-year stage unit.

(4) A SCIWAM is a Weighted Average Mark used by the Faculty of Science, calculated from the results of all intermediate and senior units of study with a weighting of two for intermediate units and three for senior units.

Part 5: Other

19 Talented Student Program

(1) The Talented Student Program (TSP) is a special program of study for students of exceptional merit who are enrolled in undergraduate degrees administered by the Faculty of Science or for the Science component of combined degrees.

(2) Entry to the TSP is by invitation from the Dean. Invitations are made each year, for that year. The following guidelines apply generally, although schools and departments may have additional (and more stringent) requirements for entry to the activities they offer in the program:

(a) To be considered for the program in their first year, students should normally have an ATAR (or equivalent) of 99.00 or higher and a result in band 6 in at least one HSC science subject area or a mark of 95 or better in HSC Mathematics Extension 2. The Dean may consider slight variations to these requirements where a student has demonstrated exceptional performance in scientific study (eg, at the level of membership of a team which represents Australia in an International Science or Mathematics Olympiad).

(b) To be considered for entry into the program in their second and third years, students should normally have AAMs of 85 or over and a high distinction grade in an appropriate Science subject area. Subsequent entry to TSP is available only to students who have been enrolled full-time in units of study totalling at least 48 credit points.

(3) Students who feel that they satisfy these criteria, but who have not received an invitation to participate in the TSP that year, should contact the Dean.

(4) The maximum TSP credit points that can be counted to a degree is normally 42.

20 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011, and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Students who commenced prior to 1 January, 2011, may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.

Important policies relating to undergraduate candidature

Results

For all junior, intermediate and senior units of study in the Bachelor of Science, Bachelor of Science and Technology, Bachelor of Medical Science, Bachelor of Liberal Arts and Sciences and Bachelor of Psychology degrees, the following mark ranges apply within the Faculty of Science:

<table>
<thead>
<tr>
<th>Mark</th>
<th>Description</th>
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<tbody>
<tr>
<td>HD</td>
<td>High Distinction</td>
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<td>D</td>
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<td>F</td>
<td>Fail</td>
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<tr>
<td>AF</td>
<td>Absent Fail</td>
</tr>
<tr>
<td>DF</td>
<td>Discontinued – Fail</td>
</tr>
<tr>
<td>DNF</td>
<td>Discontinued – not to count as failure</td>
</tr>
</tbody>
</table>

Below 46 or 50

65 – 74

75 – 84

85 – 100

Special Arrangements

Students who are experiencing difficulty in meeting their assessment requirements due to competing essential community commitments may apply for Special Arrangements for examination and assessment. More information can be found at: sydney.edu.au/science/cstudent/ug/forms.shtml

Special Consideration

Students who have a serious illness or who have experienced misadventure which may affect their academic performance in a course or unit of study may request that they be given Special Consideration in relation to the determination of their results. More information can be found at: http://sydney.edu.au/science/cstudent/ug/forms.shtml

Code of Conduct for Students

The University has clear expectations of students in respect of academic matters and personal behaviour.

Student Plagiarism: coursework Policy and Procedure

The University of Sydney expects high standards of academic honesty in all student work. In particular, the University is opposed to and will not tolerate plagiarism.
Faculty of Science intervention and support strategies

The Faculty of Science has always been concerned to develop policies that promote the welfare and well-being of its students. A number of University and faculty rules and policies require the faculty to intervene and support students who may be at risk of not meeting progression requirements. These policies are:

- Any Satisfactory Progress requirements that are found in the resolutions for particular degrees.
- The University’s progression policy.
- For international students, the National Code for Education Providers 2007.

An intervention is an action taken in relation to an individual student by the faculty in applying policies that deal with satisfactory progress. An intervention can take a number of forms, but is typically a referral to particular student support services or a direction in relation to a student's studies.

A support strategy is a plan or process to assist an individual student or group of students within the faculty to better achieve academic success.

All students should take advantage of the Faculty’s support strategies and the University's student support services. Do not wait until you are in severe difficulties to seek assistance!

The Faculty has a number of strategies and intervention possibilities in place. These include, but are not limited to, the following:

Making available information on degree requirements in the Faculty of Science
The Faculty publishes handbooks on an annual basis. Handbooks are available online, for purchase in hardcopy format from the Student Centre, and are available at many public libraries.

Provision of specialist administrative staff
Administrative staff are available at the Faculty of Science office counter and by email and by telephone to assist with queries relating to degree requirements and other administrative matters. For opening times and contact details, see sydney.edu.au/science.

Faculty of Science Transition Workshop
To enable new first year undergraduate students to study effectively and enjoy a positive student experience, the Faculty of Science offers a transition workshop each year. Workshops are held prior to the commencement of the academic year. Details on registration are available at enrolment sites or on the faculty web page at enrolment periods.

Faculty of Science website
The Faculty’s website is specifically for students enrolled in the Faculty of Science, and contains relevant information on degree requirements and many other things.

Implementing progression requirements

- The Faculty administers progression requirements for undergraduate specialist degrees on an annual basis in accordance with degree resolutions. Students who do not meet the progression requirements will be notified after second semester results become available that they have not fulfilled satisfactory progression requirements. Students will be notified of the intervention to be implemented.
- The Faculty administers progression requirements for postgraduate coursework degrees on a semester basis. Students who do not meet the progression requirements will be notified after semester results become available that they have not fulfilled satisfactory progression requirements. Students will be notified of the intervention to be implemented.
- The Faculty administers the University’s Progression Policy on a semester by semester basis. Students are notified in accordance with the progression policy.

Support Strategies
The Faculty supports students by:

- making information on degree requirements easily available
- making information on University student support services easily available
- offering a Transition Workshop
- offering the Talented Student Program to support the development of talented Science students
- providing specialist administrative staff to advise on faculty policy and procedures
- providing individual consultations, by appointment, with Associate Deans

Interventions
Interventions are made with regard to the particular policy or rule being applied. Interventions include:

- completion of a back on track survey by students in accordance with the Progression Policy
- requirement to attend at an information session to raise awareness of student services
- a referral to attend particular student services
- an interview with the Associate Dean or other course adviser
- recommendations on study patterns
- recommendation on suspension or withdrawal from study

Where a student has failed to make satisfactory progress as required, subsequent interventions include:

- transfer to a more appropriate degree program as provided in degree resolutions or as recommended by an Associate Dean
- transfer to a more appropriate stream in a degree as provided in degree resolutions or as recommended by an Associate Dean
- direction to move from full-time to part-time enrolment
- direction to suspend studies for a period
- mandatory attendance at specified Learning Centre courses
- case management on an individual student basis
- exclusion for a specified period from a degree
Contact Information

The Faculty of Science
Faculty and Student Information Office
Level 2, Carslaw Building, F07
University of Sydney NSW 2006

Counter hours
Monday to Thursday 10am to 4pm, Friday 10am to 1pm
Phone: +61 2 9351 3021
Fax: +61 2 9351 4846
Email: science.information@sydney.edu.au
Website: sydney.edu.au/science

Undergraduate degree advisers

BSc (Molecular Biology & Genetics)  Professor Iain Campbell
BSc (Molecular Biotechnology) A/ Prof Kevin Downard
BSc (Nutrition) A/ Prof Margaret Allman-Farinelli
B Medical Science Mrs Helen Agus
B Psychology A/ Prof Iain McGregor
B Liberal Arts & Science A/Prof David Livesey (sem 1)
Dr Fiona White (sem 2)

Sub Deans for Undergraduate Matters

Biology A/ Prof Peter McGee
Chemistry A/ Prof Brendan Kennedy
Geosciences A/ Prof William Pritchard
Mathematics A/ Prof David Easdown
MBB Mrs Jill Johnston
Medical Science Dr Meloni Muir
Physics Dr John O’Byrne
Psychology Dr Fiona Hibberd

Schools, Departments and Centres

Agriculture, Food and Natural Resources
Room 304, McMillan Building, A05
Phone: +61 2 9351 6926
Fax: +61 2 9351 2945
Email: Agriculture.generalenquiries@sydney.edu.au
Website: sydney.edu.au/agriculture/

Academic advisers

Undergraduate Dr Robert Caldwell
Honours Professor Ivan Kennedy
Graduate Dr Robert Caldwell

Soil Science

Intermediate year Dr Stephen Cattle
Senior A/Prof Balwant Singh
Honours Professor Alex McBratney
Graduate A/ Prof Balwant Singh

Discipline of Anatomy and Histology
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Phone: +61 2 9351 2497
Fax: +61 2 9351 2813
Email: enquiries@anatomy.usyd.edu.au
Website: sydney.edu.au/medicine/anatomy
Head of Department: Associate Professor Kevin Keay

Academic advisers

Anatomy
Undergraduate Dr Denise Donlon
Honours Dr Frank Lovicu
Graduate Dr Frank Lovicu

Histology
All years Professor Christopher R Murphy
Professor Maria Byrne

Neuroscience
Dr Karen Cullen

Bosch Institute
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Fax: +61 2 9036 3401
Email: kathleen.evans@bosch.org.au
Website: www.bosch.org.au
Director: Professor Nick Hunt

School of Biological Sciences
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Fax: +61 2 9351 2558
Email: biosci.genericadmin@sydney.edu.au
Website: sydney.edu.au/science/biology
Head of School: Professor Robyn Overall

Academic advisers

Junior year Dr Adele Pile
Intermediate year Dr Elizabeth May
Senior year Dr Elizabeth May
Honours year Dr Dieter Hochuli
Graduate adviser Dr Glenda Wardle
2. Faculty Information

Central Clinical School

**Immunology and Infectious Diseases**
Room 667, Blackburn Building, D06
Phone: +61 2 9351 2776
Fax: +61 2 9351 5319
Email: Peter.McMinn@sydney.edu.au
Email: Allison.Abendroth@sydney.edu.au
Email: Jamie.Triccas@sydney.edu.au
Website: www.infectiousdiseasesandimmunology.med.usyd.edu.au

**Academic adviser**

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunology</td>
<td>Dr Allison Abendroth</td>
</tr>
<tr>
<td>All years</td>
<td>Prof Peter McMinn</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>Dr Jamie Triccas</td>
</tr>
<tr>
<td>and Virology</td>
<td></td>
</tr>
</tbody>
</table>

School of Chemistry

School of Chemistry, F11
Phone: +61 2 9351 4504
Fax: +61 2 9351 3329
Email: enquiries@chem.usyd.edu.au
Website: sydney.edu.au/chemistry

Head of School: Professor G G Warr

**Academic advisers**

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>Junior year</td>
<td>Associate Professor Adam</td>
</tr>
<tr>
<td></td>
<td>Bridgeman</td>
</tr>
<tr>
<td>Intermediate year</td>
<td>Dr Peter Rutledge</td>
</tr>
<tr>
<td>Senior year</td>
<td>Associate Professor Lou</td>
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<tr>
<td></td>
<td>Rendina</td>
</tr>
<tr>
<td>Honours year</td>
<td>Dr Tim Schmidt</td>
</tr>
<tr>
<td>Graduate adviser</td>
<td>Dr Ron Clarke</td>
</tr>
</tbody>
</table>

Centre for Research on Ecological Impacts of Coastal Cities

Old Geology Building, A11
Phone: +61 2 9351 4835
Fax: +61 2 9351 6713
Email: eicc@bio.usyd.edu.au
Website: sydney.edu.au/science/bio/eicc

Director: Associate Professor Ross Coleman

**Academic adviser**

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
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<tbody>
<tr>
<td>Graduate</td>
<td>Associate Professor Ross</td>
</tr>
<tr>
<td></td>
<td>Coleman</td>
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</tbody>
</table>

Environmental Science

Admin: Room 435, Madsen Building, F09
Phone: +61 2 9351 4242
Fax: +61 2 9351 3644
Email: phil.mcmanus@sydney.edu.au
Website: sydney.edu.au/envsci

Program Coordinator: Dr Phil McManus

**Academic adviser:** Dr Phil McManus

**Academic advisers**

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate &amp; Graduate</td>
<td>A/Prof Phil McManus</td>
</tr>
</tbody>
</table>

Fruit Fly Research Laboratory

Botany Building, A12
Phone: +61 2 9351 2298
Fax: +61 2 9351 4771
Email: ffrc@bio.usyd.edu.au
Website: sydney.edu.au/science/biology/fruit_fly

School of Geosciences

Room 348, Madsen Building, F09
Phone: +61 2 9351 2912
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Email: nikki.montenegro@sydney.edu.au
Website: sydney.edu.au/science/geosciences

Head of School: Professor Jonathan Aitchison

**Academic advisers**

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>Junior year</td>
<td>Dr Kurt Iveson</td>
</tr>
<tr>
<td>Intermediate year</td>
<td>A/ Prof Gavin Birch</td>
</tr>
<tr>
<td>Senior year</td>
<td>Dr Stephen Gale</td>
</tr>
<tr>
<td>Honours year</td>
<td>A/ Prof Bill Pritchard</td>
</tr>
<tr>
<td>Graduate coursework adviser</td>
<td>Dr Derek Wyman</td>
</tr>
</tbody>
</table>

History and Philosophy of Science Unit

Room 441, Carslaw Building, F07
Phone: +61 2 9351 4226
Fax: +61 2 9351 4124
Email: hps.admin@sydney.edu.au
Website: sydney.edu.au/science/hps

Director: Dr Ofer Gal

**Academic advisers**

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>Dr Dean Rickles</td>
</tr>
<tr>
<td>Honours</td>
<td>Dr Dominic Murphy</td>
</tr>
<tr>
<td>Graduate</td>
<td>Dr Hans Pols</td>
</tr>
</tbody>
</table>

School of Information Technologies (Faculty of Engineering and Information Technologies)

School of IT Building, J12
1 Cleveland Street
Phone: +61 2 9351 3423
Fax: +61 2 9351 3838
Email: info@it.usyd.edu.au
Website: sydney.edu.au/engineering/it

Head of School: Associate Professor Sanjay Chawla

**Academic advisers**

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
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<tbody>
<tr>
<td>Undergraduate</td>
<td>Dr Josiah Poon</td>
</tr>
<tr>
<td>Honours</td>
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</tr>
<tr>
<td>Graduate coursework</td>
<td>Dr Uwe Roehm</td>
</tr>
<tr>
<td>Graduate research</td>
<td>Dr Bernhard Scholz</td>
</tr>
</tbody>
</table>
2. Faculty Information

University of Sydney Institute of Marine Science
Room 308, Madsen Building, F09
Phone: +61 2 9356 9246
Fax: +61 2 9351 3644
Email: marine.usims@sydney.edu.au
Website: http://sydney.edu.au/usims/
Director: Professor Doug Cato
Deputy Director: Associate Professor Ross Coleman
USIMS Coordinator: Dr Michelle Blewitt

Academic advisers

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>A/Prof Peter Cowell</th>
<th>A/Prof Ross Coleman</th>
</tr>
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<tbody>
<tr>
<td>First year</td>
<td>Mel Neave</td>
<td>Room 460, Madsen Building</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:gneave@geosci.usyd.edu.au">gneave@geosci.usyd.edu.au</a></td>
<td></td>
</tr>
<tr>
<td>Second year</td>
<td>Gavin Birch</td>
<td>Room 462, Madsen Building</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:gavin@geosci.usyd.edu.au">gavin@geosci.usyd.edu.au</a></td>
<td></td>
</tr>
<tr>
<td>Third year</td>
<td>Stephen Gale</td>
<td>Room 441, Madsen Building</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:sgale@mail.usyd.edu.au">sgale@mail.usyd.edu.au</a></td>
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<tr>
<td>Hons</td>
<td>A/Prof Bill Pritchard</td>
<td>Room 439, Madsen Building</td>
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<td><a href="mailto:pritchard@usyd.edu.au">pritchard@usyd.edu.au</a></td>
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<tr>
<td>Graduate</td>
<td>A/Prof Ross Coleman</td>
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</table>

School of Mathematics and Statistics
Carslaw Building, F07
Phone: +61 2 9351 4533
Fax: +61 2 9351 4534
Email: firstyear@maths.usyd.edu.au
Email: enq@maths.usyd.edu.au
Email: statenq@maths.usyd.edu.au
Email: pg-director@maths.usyd.edu.au
Website: sydney.edu.au/science/maths
Head of School: Professor Neville Weber

Academic advisers

<table>
<thead>
<tr>
<th>Junior year</th>
<th>Student Office, Carslaw 520</th>
</tr>
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<tbody>
<tr>
<td>Applied Maths</td>
<td>A/Prof Charlie Macaskill</td>
</tr>
<tr>
<td>Mathematical Statistics</td>
<td>Dr Jennifer Chan</td>
</tr>
<tr>
<td>Pure Maths</td>
<td>A/Prof Robert Howlett</td>
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<td>Senior year</td>
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<td>A/Prof David Ivers</td>
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<td>Dr Samuel Mueller</td>
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<td>Dr Adrian Nelson</td>
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<td>Dr Michael Stewart</td>
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<td>Pure Maths</td>
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<td>Dr Laurentiu Paunescu</td>
</tr>
<tr>
<td>Director PG studies</td>
<td>Dr Mary Myerscough</td>
</tr>
<tr>
<td>Deputy Director</td>
<td>Dr Shelton Peiris</td>
</tr>
<tr>
<td>Talented Students Program</td>
<td>Dr Daniel Daners</td>
</tr>
<tr>
<td>Credit Transfer</td>
<td>Dr Adrian Nelson</td>
</tr>
</tbody>
</table>

Australian Centre for Microscopy and Microanalysis
Room LG21, Madsen Building, F09
Phone: +61 2 9351 2351
Fax: +61 2 9351 7682
Email: acmm.info@sydney.edu.au
Website: sydney.edu.au/acmm
Director: Professor Simon Ringer

Academic adviser
Graduate     Dr Lilian Soon

School of Molecular Bioscience
Room 435, Biochemistry/Microbiology Building, G08
Phone: +61 2 9351 5417
Fax: +61 2 9351 5858
Email: mmb.admin@sydney.edu.au
Website: sydney.edu.au/science/molecular_bioscience
Head of School: Professor Iain Campbell

Academic advisers

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Dr Kim Bell-Anderson</th>
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<tbody>
<tr>
<td>Honours year</td>
<td>Dr Stuart Cordwell</td>
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Biochemistry
Intermediate year Biochemistry A/Prof Gareth Denyer A/Prof Charles Collyer
Junior and intermediate year Molecular Biology and Genetics Dr Dale Hancock Ms Vanessa Gysbers

Medical Science
Mrs Helen Agus
Senior year Mrs Jill Johnston
Honours year Dr Stuart Cordwell

Human Nutrition
Intermediate year Dr Kim Bell-Anderson
Senior year Ms Soumela Amanatidis
Honours year Ms Margaret Nicholson

Postgraduate A/Prof Margaret Allman-Farinelli (Clinical Training) A/Prof Samir Samman (Research Training)

Microbiology
Intermediate year Dr Andrew Holmes Ms Deborah Blanckenberg
Senior year Mrs Helen Agus A/Prof Dee Carter
Honours year and postgraduate Dr Stuart Cordwell Dr Andrew Holmes

Molecular Biotechnology
Intermediate year Dr Matthew Todd
Senior year Dr Neville Firth
Graduate adviser A/Prof Kevin Downard

Department of Pathology
Room 501, Blackburn Building, D06
Phone: +61 2 9351 2414/2600
Fax: +61 2 9351 3429
Email: pathdept@med.usyd.edu.au
Website: www.pathology.usyd.edu.au
Head of Department: Professor Nicholas King

Academic advisers

Pathology
Undergraduate Dr Bob Bao and Professor Nicholas King
Honours A/Prof Brett Hambly
Graduate Dr Roger Pamphlett
Discipline of Pharmacology
Room 301, Blackburn Building, D06
Phone: +61 2 9351 3819
Fax: +61 2 9351 3868
Email: beverly.hehir@sydney.edu.au
Website: sydney.edu.au/medicine/pharmacology

**Academic advisers**

<table>
<thead>
<tr>
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<tr>
<td>Intermediate year</td>
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<tr>
<td>Honours year</td>
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<tr>
<td>Graduate adviser</td>
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</tbody>
</table>

School of Physics
Student Support Office Room 202
School of Physics, A28
Phone: +61 2 9351 3037
Fax: +61 2 9351 7726
Email: physics.studentservices@sydney.edu.au
Website: sydney.edu.au/physics
Head of School: Professor Clive Baldock

**Academic advisers**

| Junior year | Dr Joe Khachan |
| Junior Deputy | Dr Richard Thompson |
| Intermediate year | A/Prof Manjula Sharma |
| Senior year | Professor Tim Bedding |
| Honours | Dr Stephen Bartlett and Dr Cathy Stampfli |
| Medical Physics program | Dr Zdenka Kuncic |
| Nuclear Science program | Dr Reza Hashemi-Nezhad |
| Photonics & Optical Science program | Dr Boris Kuhlmey |
| Graduate research adviser | A/ Prof Geraint Lewis and A/Prof Serdar Kuyucak |
| Computational science | Dr Pulin Gong |

Discipline of Physiology
Room E212, Anderson Stuart Building, F13
Phone: +61 2 9351 3478
Fax: +61 2 9351 8400
Email: liaison@physiol.usyd.edu.au
Website: www.physiol.usyd.edu.au
Head of Department: Associate Professor Rebecca Mason

**Academic advisers**

| Intermediate year | Dr Meloni Muir |
| Medical Science | To be advised |
| Senior year | Professor Roger Dampney |
| | Dr Bill Phillips |
| | Dr Cathy Learney |
| | Dr Dario Prtiti |
| Honours year | Professor David Allen |
| Graduate adviser | Dr Margot Day |

Key Centre for Polymer Colloids
Phone: +61 2 9351 3366
Fax: +61 2 9351 8651
Email: sebastien.perrier@sydney.edu.au
Website: sydney.edu.au/kcpc
Director: Associate Professor S Perrier
Sydney University Science Society (SCISOC)

As a student in the Faculty of Science you are a member of the Sydney University Science Society (SCISOC), the faculty society. SCISOC promotes activities of both an educational and a social nature.

The Society holds a number of activities throughout the year, including barbecues every two weeks and the highlight of the Science student year – the Annual Science ‘Bucky’ Ball. The Society appoints sports directors who help organise interfaculty sport.

The society runs a stall during orientation week, where t-shirts are sold and you can find out more about what the SCISOC does. The Aqua Regia (official publication of SCISOC) which heralds information concerning the activities of SCISOC and Science departmental societies, is produced weekly and can be found on official departmental noticeboards.

The postal address is Faculty of Science, Carslaw Building F07, University of Sydney, 2006.

The affairs of the society are governed by a council consisting of office bearers, delegate members from member societies, student members of faculty and nine members elected at the annual general meeting, at least three of whom are first year students. You are encouraged to attend the AGM (held in Semester 1) and to take an active part in the society and on council. Council meets regularly during term and all members are invited to attend the meetings. These are advertised in the Bull. Your attendance will ensure that SCISOC effectively meets the needs of science students on campus. For more information, visit the website at www.scisoc.org.au.

Member societies

A number of the departments within the Faculty of Science have departmental societies, for example the Alchemist’s Society, Biochemical Society, Biological Society, School of Geosciences Society (includes Geography, Geology, Environmental Science and Marine Science), Mathematical Society, Medical Science Society, Microbiology Society, Physics Society, and Psychological Society.

These societies organise talks, films, field trips and other activities relating to their particular discipline, as well as parties, wine and cheese evenings and other social activities. Most departmental societies have a stall during the orientation period.

First Year FAQs

What is a ‘major’?

A major is a specialisation in the senior year of your degree. Most degrees require a major; specialist degrees such as the Bachelor of Science (Molecular Biology and Genetics) and the Bachelor of Medical Science, however, do not. It is useful to have an idea of what major, or group of majors, interest you now, so that you can plan your junior and intermediate years properly.

The Bachelor of Science majors Neuroscience and Nanoscience and Technology require earlier planning than most others. If you are interested in these then read Table I (Bachelor of Science) carefully.

A Science major is usually defined as 24 credit points of study at the Senior level in a single Science Area and an Arts major is usually defined as 36 credit points of senior (2XXX or 3XXX) units. Neuroscience and Psychology both have additional requirements. Depending on the majors chosen, it is possible to complete more than one major in your degree.

How many credit points should I take per semester?

You should take 24 credit points each semester if you are a full-time student. There is an upper limit of 30 credit points per semester. If you take fewer than 18 credit points in each semester you will automatically become part-time.

To finish your degree in the recommended minimum time you will have to take 48 credit points per year, or 24 per semester. If you enrol part-time you can take as few credit points as you like. You must keep in mind however that you have a 10 year limit to finish your degree.

Students wishing to accelerate their degree programs may consider undertaking units offered at Summer School or undertaking up to 30 credit points each semester. The degree summaries and sample programs in this handbook assume you will enrol full-time.

Do I need to be full-time?

International Students must enrol full-time in a minimum of 24 credit points per semester unless there are exceptional circumstances. Failure to enrol in 24 credit points per semester may have serious ramifications for your visa.

Australian citizens and permanent residents are considered full-time if they are enrolled in 18 or more credit points per semester. Australian citizens and permanent residents who wish to receive a transport concession card must be full-time students.

If you receive any financial support, whether from a University scholarship or from the government, you may need to enrol as a full-time student. Check the terms and conditions of that support before going part-time.

Can I take units of study from other faculties?

Students in the Bachelor of Science can take units of study from other faculties however there are limits, and exclusions. You should refer to the degree resolutions for specific information about your particular degree. The Bachelor of Science allows for up to 48 credit points of Non-Science units of study to be included in the 3-year program. Junior Econometrics (ECMT units) and General Statistical Methods (STAT units) are specifically excluded from the BSc. Students in specialist programs and combined degrees may have less flexibility.

Can I get credit for previous tertiary study?

Yes. The amount of credit you may receive depends on your individual circumstances, but in general the total amount of credit granted may not be greater than 96 credit points and may not include more than 48 credit points from degrees that have been completed.

On the day that you enrol you must lodge an application for credit from previous study. Because of the large numbers of applications received at enrolment there can be a considerable delay in processing your application, but all credit offers from on-time applications will be sent to students well in advance of the last day to add a unit of study for the semester in which they enrol.

The faculty must see originals of your academic transcripts, as well as detailed descriptions of prior units of study completed, as at the time of completion of the units. Descriptions will normally be an extract from a Handbook or a unit of study syllabus/outline, and should include the credit point value, learning outcomes, assessment details, texts and references, and contact details for each unit of study. You must bring this information with you on the day that you enrol.

On enrolment day you will have to make unit of study choices as if you have had no previous university study. Alternatively, you may be able to obtain special permission to enrol in Intermediate or Senior units of study by taking a copy of your transcript and unit of study descriptions to Academic advisers for each individual unit of study. Unit of study Academic advisers are listed under unit of study descriptions in this Handbook.

Information on the current application process for credit, including the application form, is available from the Faculty of Science website.

Are there any bridging courses available?

There are bridging courses in Biology, Chemistry, Mathematics and Physics, designed to cover the assumed knowledge that students would normally cover in the HSC. They run in February each year after enrolment and are recommended for students who either did not take a subject at the HSC or feel they need some revision.
Who can enrol in Advanced Science units of study?
Advanced units of study are available to those students enrolled in any program in the Faculty of Science who have performed at a high level in science subjects in the HSC or who perform well in their studies at the University.

Students should consult the unit of study tables for assumed and prerequisite marks in the HSC required to enrol in advanced units of study.

For students in an Advanced degree it is recommended that you enrol in no more than 24 credit points of advanced units of study in a year. Advanced units of study are very demanding and students are required to perform at a higher standard than in the normal units of study.
Talented Student Program

Overview
The Talented Student Program (TSP) is a special program of science study intended for students 'of exceptional merit' who are enrolled in degrees administered by the Faculty of Science (BSc, BMedSc, BPsych, BLAS and their specialist streams or combined degrees).

The aim of the program is to offer students of exceptional merit additional challenging material to enable them to maximise their intellectual growth and potential.

A major benefit of participation in the Talented Student Program is that students receive special supervision by academic staff and often engage in studies with small numbers of fellow students, all of whom have particular interest in the subject. In general, the TSP caters for students whose talent is broad-based across science.

There are two main aspects of a student's involvement in the TSP. Students have greater flexibility in their choice of study (beyond that normally allowed by degree rules), and they have a mentor, a member of the academic staff who assists them in choosing from the great range of possibilities. Participation in the Talented Student Program is recorded separately on the student's academic transcript, as are TSP units of study, so that all potential employers are aware that the student has completed challenging courses of study.

Further information on the operation of the Talented Student Program may be obtained from the departmental coordinators listed below.

Selection
Entry to the Talented Student Program is by invitation from the Dean. Invitations to participate in the TSP are made each year for that year.

The following guidelines apply generally, although departments may have additional (and more stringent) requirements for entry to the activities they offer in the program:

- To be considered for the program in their first year, students should normally have a ATAR (or equivalent) of 99.00 or higher and a result in band 6 in at least one HSC science subject area or a mark of 95 or better in HSC Mathematics Extension 2. The Dean may consider slight variations to these requirements where a student has demonstrated exceptional performance in scientific study (eg, at the level of membership of a team which represents Australia in an International Science or Mathematics Olympiad).

- To be considered for entry into the program in their second and third years, students should normally have AMAs of 85 or over and a high distinction grade in a subject in an appropriate Science subject area. Intermediate level entry to TSP is available only to students who have been enrolled full-time in units of study totalling at least 48 credit points.

Students who feel that they satisfy these criteria, but who have not received an invitation to participate in the TSP that year, should contact the Dean's office.

Range of TSP structures
The relevant Faculty Resolutions authorise the Dean to give approval for students of exceptional merit to enrol in units of study or in combinations of units of study not normally available within the degree.

In very exceptional cases, particularly for students who have excelled in Olympiad programs, application of these Resolutions may permit accelerated progress toward the completion of the BSc degree. Students will arrange a suitable pattern of study for the year, in consultation with their mentor (who will also consider the entire degree program). TSP studies may be in a single discipline, several disciplines or may include inter-disciplinary activities. Some TSP activities are in addition to normal coursework, whilst others replace the prescribed work.

Many disciplines have an organised activity for a whole group of TSP students studying that field, such as a weekly seminar or group project.

In other disciplines, TSP activity involves participation by each TSP student in a research group of staff and postgraduates. Every student is treated individually; however, there are some common patterns that we describe below. For many TSP students who are interested in several fields, (especially if they aren't really sure about their eventual direction), a suitable arrangement might be for them to join in separate TSP activities of each discipline. Students might elect to study a broader range of fields than usual, by studying more than the normal load of 24 credit points per semester.

Another pattern is to accelerate a student who (say through Olympiad participation) may be familiar with the topics in the usual first-year units in a discipline. Such a student can go directly to second year study in that field and in related fields, when they begin their degree. By studying more than the usual workload each semester, they may be able to complete their honours degree in less than 4 years full-time.

Constraints on TSP structure
When a TSP activity replaces normal activity within a unit of study, the student will enrol in that unit, but the transcript will be annotated to reflect the TSP activity. When a TSP activity differs from the normal workload, the student will be enrolled in specially designated TSP units.

The maximum number of credit points from TSP activities that can be credited towards the degree is normally 42 credit points designated as TSP units of study that are not listed in the faculty handbook. This 42-credit point total covers all three years of study, and perhaps several different disciplines, so it is important to plan carefully to leave enough TSP possibilities in later years. It is also important that the student meets all the usual degree requirements, involving numbers of credit points at various levels and in a range of disciplines.

Each TSP activity is assigned a number of credit points, a level (Junior, Intermediate or Senior) and a Discipline area, so it can contribute to meeting the degree requirements.

The TSP process
At the start of each year, the Dean chooses students to be invited to participate in the TSP. A welcome is held in Orientation week, and at that time, each student who is new to the TSP will meet briefly with the faculty TSP coordinator, who assigns a mentor for the student.

The mentor is usually a departmental TSP coordinator, from a department closest to the student's interest(s). The mentor and the student then plan special activities for the year, covering all fields (this may involve discussions with coordinators from other departments). A proposal is put to the Dean, who can approve enrolment in special TSP units of study. During the year the student will meet several times with the mentor, to make sure that everything is going well. Assessment will be through the mentor and the staff involved in the activities. At the end of the semester the TSP coordinator will report results.

TSP coordinators

Faculty of Science
Coordinator: Associate Professor Anthony Masters

Senior Agricultural Chemistry
Coordinator: Dr Robert Caldwell
Students may undertake, in addition to normal coursework, a special research project directly supervised by a member of the academic staff.

Anatomy and Histology
Coordinator: Dr Vladimir Balcar
The Department of Anatomy and Histology offers individual projects related to research in the department (for example Neuroscience,
Developmental Biology, Forensic Anatomy, Structure and Function of Muscle Tissue) as well as a more structured program in cooperation with other departments in the School of Medical Sciences.

**Biological Sciences**

Coordinator: Dr Jan Marc

Students may undertake additional seminars and/or special project work.

**Chemistry**

Coordinator: Professor Scott Kable

The Chemistry School offers Junior TSP students a challenging program based on the 'Chemistry 1 (Special Studies Program)'. The program comprises the Junior Chemistry (Advanced) lecture series, special tutorials, and special project-based laboratory exercises. Admission to Chemistry 1 (SSP) is by invitation only, and is limited to 40 students each year. Intermediate and senior Chemistry students may undertake a special research project.

**Electron Microscope Unit**

Coordinator: Dr Lillian Soon

The department will make special arrangements for individual students. Interested students should contact the TSP coordinator as soon as possible.

**Geosciences**

**Intermediate Geography**

Coordinator: Professor Phil Hirsch

_In lieu_ of some of the normal coursework, students may undertake special project work on an environmental problem. Particular emphasis will be given to the enhancement of student capabilities in the areas of problem identification, problem formulation, data gathering, and analysis and reporting.

**Geology and Geophysics**

Coordinator: Dr Derek Wyman

Students will be offered extra seminars and/or special project work.

**History and Philosophy of Science**

Coordinator: Dr Charles Wolfe

The unit will make special arrangements for individual students. Interested students should contact the TSP coordinator as soon as possible. Topics offered include History, Philosophy, and Sociology of Science; Science and Ethics; and Public Communication / Understanding of Science.

From first year onwards TSP students may enrol in advanced HPS for entry into the HPS Honours program. A 'distinction' grade in one advanced Intermediate unit of study, one Senior unit of study and HPS4104 is required. Students who successfully complete the requirements will be awarded a special certificate from the school of HPS.

**Immunology**

Coordinator: Dr Allison Abendroth

Students may undertake a special research project.

**Information Technologies**

Coordinator: Dr James Curran

The department will make special arrangements for individual students. Interested students should contact the TSP coordinator as soon as possible.

**Mathematics and Statistics**

Coordinator: Dr Daniel Daners

Students admitted to the program have the following options:

- First-year students in the Talented Student Program are invited to apply for entry to the Mathematics Special Studies Program. In addition to covering standard material, students in the Special Studies Program will participate in their own seminars on specially chosen advanced topics.
- Students in the Talented Student Program have access to Mathematics units of study in higher years. For example, a first-year student may take selected second or even third-year units. Second and third-year students have access to special projects, which can be inter-disciplinary, according to the interests of the individual student. Second and third-year students are encouraged to tailor their own programs, in consultation with the coordinators.

**Medical Science**

Coordinator: Dr Brent McParland

**Molecular Bioscience**

_**Biochemistry, Molecular Biology and Genetics, Molecular Biotechnology and Microbiology**_

Coordinator: Dr Andrew Holmes

A special program of study will be developed for individual students enrolled in Intermediate and Senior Biochemistry, Molecular Biology and Genetics, Molecular Biotechnology and Microbiology.

**Pathology**

Coordinator: Dr Bob Bao

**Pharmacology**

Coordinator: Dr Brent McParland

The department will make special arrangements for individual students throughout their studies.

**Physics**

Coordinator: Professor Dick Hunstead

The Physics TSP program extends the physics course by special seminars and project work, together with an excursion to locations of interest in the July semester break. The special project work in the July semester replaces part of the laboratory program and is available to first and second year TSP students. It introduces students to the diversity of research activities in the School. The aim is to broaden students’ knowledge of physics, and give an insight into how physicists think and how a real research project is tackled.

**Physiology**

Coordinator: Dr Margot Day

Students may undertake, in addition to normal coursework, a special research project.

**Psychology**

Coordinator: Dr Irina Harris

The program is available in Intermediate and Senior Psychology. Students admitted to the program have the following options, or various combinations of these options, available to them:

- additional options in Psychology either in lieu of, or in addition to, other units of study in Science
- a combination of additional Psychology options combined with special studies in another science discipline (for example, Biochemistry, Computer Science, Mathematics and Statistics)
- a special research project in lieu of, or in addition to, normal practical or classwork components.

**Senior Soil Science**

Coordinator: Dr Balwant Singh

Students may undertake, in addition to normal coursework, a special research project.
Outbound Exchange - Information for students

This information is intended for students in the Faculty of Science who wish to take up the opportunity to study overseas at an exchange-partner institution for part of their University of Sydney degree.

The University of Sydney has exchange agreements with universities throughout the Asia Pacific, Europe, Canada, the USA and South America. Each year a number of students in the Faculty of Science choose to participate in Exchange programs and have found them to be an exciting and challenging way of globalising their academic experience and enriching their personal experience in different environments and cultures.

When a student is on exchange they are enrolled full-time at the University of Sydney and pay all relevant fees to the University of Sydney (i.e. Commonwealth Supported). Students from Sydney may be required to pay some minimal administrative charges and health insurance; however they are not normally required to pay any other tuition fees to the host institution.

Eligibility

All students should check their degree resolutions to ensure there are no restrictions on their program of study before applying for the exchange. If there are none, the following eligibility criteria normally apply for the University-wide student exchange programs:

• Undergraduate students must have completed 48 credit points at the University of Sydney at the time of application (you can apply in the second semester of first year to depart in the second semester of second year). Students who have transferred from another university and received credit for previous study must have completed at least one semester of full-time (24 credit points) study at the University of Sydney before they can apply for the exchange program.

• Postgraduate coursework students will usually need to have completed one semester of full-time postgraduate study at the University of Sydney at the time of application.

• Postgraduate research students must have completed one semester of full-time postgraduate study before they can go on exchange.

• You must have achieved at least a credit average (65 per cent or higher) over your academic record at the University of Sydney and should have passed all subjects. A failure may be overlooked if you can demonstrate extenuating circumstances.

• You must be enrolled as a full-time student at the University of Sydney while away on exchange taking classes that will count as credit towards your normal Sydney enrolment i.e. you cannot study classes overseas for recreation or personal interest.

• You must have sufficient funding for the exchange period.

• Exchange programs are not available to honours students.

Applying to go on Exchange

The deadlines for collecting application forms are 15 May for programs commencing in the first half of the following year and 15 October for programs commencing in the second half of the following year. The deadline for the submission of completed applications is 31 May or 31 October.

Please note that the application is quite complex and it is essential that you plan to commence the process 4 to 6 weeks before the deadline. Details on the application process, as well as information about scholarships and loans, can be obtained from the International Study Abroad and Exchange Office at the University of Sydney or on the University of Sydney website.

Students enrolled in combined degree programs are required to get endorsement from both faculties. All students must submit their exchange paperwork to their administering/home faculty regardless of which units are being taken overseas.

Students are required to obtain the following academic information prior to lodging the application at the Study Abroad and Exchange Office:

• Academic Study Plan: University of Sydney unit of study equivalences for all of the possible subjects of choice – for your three preferred exchange destinations to be submitted (one form per destination). These forms are available from the International Study Abroad and Exchange Office. These Academic Study Plans are a guide to what you intend to study overseas but do not guarantee credit at this stage. These are used by the International Office to assess the viability of your destination choices based on your proposed areas of study. While there is no need to seek approval for the Academic Study Plans from the faculty at this stage of the process, you may wish to consult with your school for guidance about suitable units of study to meet the requirements of your major.

• Faculty Permission: This approval needs to be recorded on the faculty endorsement of exchange study plan provided by the International Study Abroad and Exchange Office

The Academic Study Plans are submitted to the International Office along with all other application documentation by the submission deadlines at the end of May and October. If your application is successful, you will then be required to complete the Academic Approval for Nominated Exchange Student form which will require official written approval from the Faculty of Science. This form is provided by the International Study Abroad and Exchange Office and should be completed by contacting the nominated Exchange Unit of Study coordinator in each school of interest. You will need to provide course outlines from the overseas institution. Completed Academic Approval for Nominated Exchange Student forms must be submitted to the International Office to confirm your place in the International Exchange Program. These forms confirm the credit arrangements you will receive for your exchange units of study.

Students need to ensure that a copy of the final approval is lodged at the Faculty of Science prior to departure.

In many instances the unit of study availability at the overseas institution can vary, particularly once you have arrived at the host institution. Students need to ensure that the University of Sydney enrolment correctly reflects the enrolment at the overseas institution. If units of study at the overseas institution become unavailable, students are required to obtain written equivalents and faculty approval for any subsequent changes prior to the HECS census dates each semester.

Results

After completion of the exchange semester(s), your original transcript will be forwarded to the Faculty of Science office (via the International Study Abroad and Exchange Office). Exchange results appear on your University of Sydney transcript on a pass/fail basis.
3. Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS

Bachelor of Science
Bachelor of Science (Honours)
Bachelor of Science (Advanced)
Bachelor of Science (Advanced Mathematics)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

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<th>Code</th>
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<td>LH000</td>
<td>Bachelor of Science</td>
<td>Bachelor of Science (Advanced), Bachelor of Science (Advanced Mathematics)</td>
</tr>
<tr>
<td>LH040</td>
<td>Bachelor of Science (Honours)</td>
<td>Bachelor of Science (Advanced) (Honours), Bachelor of Science (Advanced Mathematics) (Honours)</td>
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2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Streams

(1) The Bachelor of Science is available in the following streams:
   (a) Advanced
   (b) Advanced Mathematics
(2) Students will apply for, and be enrolled in, either the Bachelor of Science or one of its streams. Students, who have completed at least 48 credit points, may be permitted to transfer to either the Bachelor of Science (Advanced) or (Advanced Mathematics) stream from the Bachelor of Science if they:
   (a) achieved an average mark of 75 or greater over all units of study attempted; and
   (b) are able to enrol in the required number of Advanced level units or Talented Student Program (TSP) units.
(3) Students wishing to transfer between streams should contact the Faculty office.

4 Admission to candidature

Admission to undergraduate courses at the University of Sydney is competitive on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Rule), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

5 Requirements for award

(1) The Dean may permit a student of exceptional merit who is admitted to the Talented Student Program to undertake a unit or units of study within the Faculty other than those specified in tables.
(2) The units of study that may be taken for the Bachelor of Science, Bachelor of Science (Advanced) and Bachelor of Science (Advanced Mathematics) are listed in Table 1.
(3) Bachelor of Science
   (a) To qualify for the award of the Bachelor of Science, a student must successfully complete 144 credit points, comprising:
      (i) a major from Science subject areas listed in Table 1; and
      (ii) a minimum of 12 credit points from the Science subject areas of Mathematics and Statistics; and
      (iii) a minimum of 24 credit points of Junior units of study from at least two Science subject areas other than Mathematics and Statistics;
   (b) and ensure:
      (i) a minimum of 96 credit points from Science subject areas; and
      (ii) no more than 60 credit points from junior units of study;
   (c) and
      (i) a minimum of 12 credit points of intermediate units of study at either the advanced level or as Talented Student Program (TSP) units in Science subject areas; and
      (ii) a minimum of 48 credit points of senior units of study of which at least 24 credit points are completed at the advanced level or as TSP units in a single Science subject area.
(4) Bachelor of Science (Advanced)
To qualify for the award of the Bachelor of Science (Advanced) stream, a student must successfully complete 144 credit points specified in the Bachelor of Science above, include no more than 48 credit points from junior units of study, and ensure:
   (i) a minimum of 12 credit points of intermediate units of study at either the advanced level or as TSP units in Science subject areas; and
   (ii) a minimum of 48 credit points of senior units of study of which at least 24 credit points are completed at the advanced level or as TSP units in a single Science subject area.
(5) Bachelor of Science (Advanced Mathematics)
To qualify for the award of the Bachelor of Science (Advanced Mathematics) stream, a student must successfully complete 144 credit points specified in the Bachelor of Science above, include no more than 48 credit points from junior units of study, and ensure:
   (i) a minimum of 12 credit points of intermediate units of study at either the advanced level or as TSP units in Science subject areas of Mathematics and Statistics; and
   (ii) a major in Mathematics, Statistics or Financial Mathematics and Statistics; and
   (iii) at least 48 credit points of senior units of study of which at least 24 credit points are completed at the advanced level or as TSP units in the Science subject areas of Mathematics and Statistics.

6 Majors

(1) Completion of a major is a requirement of the Bachelor of Science, Bachelor of Science (Advanced) and Bachelor of Science (Advanced Mathematics). Students have the option of completing up to two majors. A major requires the completion of 24 senior credit points chosen from units of study listed in the table for that major, except for a
Psychology major. A Psychology major requires 48 credit points across Intermediate and Senior units of study as specified in Table 1. Units of study counted towards one major may not count towards any other major. The majors available are:

(a) Agricultural Chemistry
(b) Anatomy and Histology
(c) Biochemistry *
(d) Bioinformatics
(e) Biology *
(f) Cell Pathology
(g) Chemistry *
(h) Computational Science *
(i) Computer Science *
(j) Environmental Studies
(k) Financial Mathematics and Statistics*
(l) Geography *
(m) Geology & Geophysics *
(n) History and Philosophy of Science
(o) Immunobiology
(p) Information Systems
(q) Marine Biology
(r) Marine Geoscience
(s) Marine Science
(t) Mathematics *
(u) Medicinal Chemistry *
(v) Microbiology *
(w) Nanoscience and Technology
(x) Neuroscience *
(y) Pharmacology *
(z) Physics *
(aa) Physiology *
(bb) Plant Science *
(cc) Psychology (additional requirements apply)
(dd) Soil Science
(ee) Statistics*
* indicates a major in this area is also available at the advanced level.

7 Progression rules

(1) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) are required to maintain a minimum average mark of 65 in all intermediate and senior units of study in Science subject areas in each year of enrolment. Failure to maintain the required average will result in candidates being transferred to the Bachelor of Science in their next year of enrolment with full credit for the units of study completed.

(2) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) who fail to achieve an average mark of 65 across all Science units of study attempted in their final year but have otherwise completed all the requirements of the degree will be awarded the Bachelor of Science.

(3) Candidates enrolled in the Bachelor of Science (Molecular Biology and Genetics) who fail to maintain a minimum average mark of 65 in units of study in Science subject areas in each year of enrolment will be transferred to the Bachelor of Science.

8 Requirements for the Honours degree

(1) Honours is available to meritorious candidates who complete an additional year of full time study, after the completion of the pass degree. Candidates must complete the requirements for the honours course full-time over two consecutive semesters. If the School is satisfied that a student is unable to attempt honours course on a full time basis and if the Dean so recommends, permission may be granted to undertake honours part-time over four consecutive semesters.

(2) Admission, requirements and award of honours are according to the Resolutions of the Faculty of Science.

(3) The honours subject areas and units of study for the Bachelor of Science (Honours) and Bachelor of Science (Advanced) (Honours) and Bachelor of Science (Advanced Mathematics) (Honours) are listed in Table VI.

9 Award of the degree

(1) The Bachelor of Science, Bachelor of Science (Advanced) and Bachelor of Science (Advanced Mathematics) are awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science.

(2) Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree merited.

10 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.
Bachelor of Science (Advanced)/Bachelor of Medicine and Bachelor of Surgery

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

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<td>LH033</td>
<td>Bachelor of Science (Advanced)/Bachelor of Medicine and Bachelor of Surgery</td>
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</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Cross faculty management

(1) Candidates in this combined degree will be under the general supervision of the Faculty of Science until the end of the semester in which they complete the requirements for the Bachelor of Science (Advanced). They will then be under the supervision of the Faculty of Medicine (Sydney Medical School).

(2) The Deans of the Faculty of Science and the Faculty of Medicine shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

4 Admission to candidature

(1) Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents) leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Applicants are ranked by merit and offers for available places are issued according to the ranking. Eligible Indigenous or Torres Strait Islander applicants who submit additional information may improve their ranking by participating in the University’s access and equity schemes. Details of admission policies are found in the Coursework Rule.

(2) In addition, admission to this course requires the applicant to participate in a semi structured interview. The results of this interview will form part of the ranking of applicants.

5 Requirements for award

(1) The units of study that may be taken for the course are set out in:
(a) Table 1 for the Bachelor of Science (Advanced) from the Faculty of Science; and
(b) The table of units of study for the Bachelor of Medicine and Bachelor of Surgery from the Faculty of Medicine.

(2) The Dean of the Faculty of Science may permit a candidate of exceptional merit who is admitted to the Talented Student Program (TSP) to undertake a unit or units of study within the Faculty other than those specified in Table 1.

(3) To qualify for the award of both degrees a candidate must successfully complete 336 credit points, comprising:
(a) 144 credit points to qualify for the award of the Bachelor of Science (Advanced) as required by the Bachelor of Science resolutions; and
(b) 192 credit points to qualify for the award of the Bachelor of Medicine and Bachelor of Surgery as required by the resolutions for the Bachelor of Medicine and Bachelor of Surgery, and
(c) one zero credit point Medicine unit of study in the first three years of the program.

6 Majors

(1) Completion of a major is a requirement of the Bachelor of Science (Advanced) in this combined degree. Candidates have the option of completing up to two majors.

(2) The list of majors available in the Bachelor of Science (Advanced) is specified in the course resolutions for the Bachelor of Science.

7 Progression rules

(1) Candidates must complete all requirements for the degree Bachelor of Science (Advanced) in minimum time and must maintain a minimum average mark of 65 in all units of study in the Bachelor of Science (Advanced), this being the minimum achievement required for admission to candidature for the Bachelor of Medicine and Bachelor of Surgery.

(2) Failure to maintain required progression and minimum result requirements will result in candidates being transferred from the combined degree program to the Bachelor of Science with full credit for the units of study completed.

8 Requirements for the Honours degree

(1) Honours is available to meritorious candidates, in either or both the Bachelor of Science (Advanced) or Bachelor of Medicine and Bachelor of Surgery.

(2) Honours in the Bachelor of Science (Advanced) requires completion of an additional year of full time study. Candidates must complete the requirements for the honours course full-time over two consecutive semesters.

(3) Candidates who enrol in the honours year at the completion of the Bachelor of Science (Advanced) will suspend enrolment in the combined degree and transfer to the Bachelor of Science honours candidature and enrol in fourth year units of study, before returning to complete the combined award. Honours can also be attempted at the completion of the combined pass program.

(4) Admission and award requirements for honours in the Bachelor of Science (Advanced) are described in the resolutions of the Faculty of Science.

(5) Honours in the Bachelor of Medicine and Bachelor of Surgery requires successful completion of an alternative set of units completed within the normal timeframe of the pass degree. Admission and award requirements for honours are listed in the Course Resolutions of the Bachelor of Medicine and Bachelor of Surgery.

9 Award of the degree

(1) The Bachelor of Science (Advanced) is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the conditions specified in the resolutions of the Faculty of Science.

(2) The Bachelor of Medicine and Bachelor of Surgery is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Second Class (Division 2) according to the conditions specified in the course resolution relating to the Bachelor of Medicine and Bachelor of Surgery.

(3) Candidates for the award of either Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the relevant pass degree.

10 Credit Transfer

It is not possible for candidates enrolled in the Bachelor of Science (Advanced)/Bachelor of Medicine and Bachelor of Surgery to obtain credit for previous studies.
11 Course transfer

A candidate may abandon the combined program and elect to complete the Bachelor of Science (Advanced) in accordance with the resolutions governing that degree. Completion of the Bachelor of Medicine and Bachelor of Surgery in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.

12 Transitional provisions

(1) These resolutions apply to students who commenced their candidature after 1 January, 2011 and students who commenced their candidature prior to 1 January, 2011 who formally elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may elect to complete the requirements in accordance with the resolutions in force at the time of their commencement.

Enrolment guide by major

The following information is for first year students. Listed below are the essential and recommended combinations of junior units of study if you are intending to complete a major in a particular Science Subject Area. Students should also consult Table I (Bachelor of Science: at the end of this chapter) and school/department advisers for further information on major requirements.

**Mathematics requirements for all Science degrees**

In addition to the specific requirements for each major all science degrees require a minimum of 12 credit points of Mathematics and Statistics units of any level and a minimum of 24 credit points of other Junior Science to complete.

**Planning for an Agricultural Chemistry major**

*Essential:* 12 credit points of Junior Chemistry.

**Planning for an Anatomy and Histology major**

*Essential:* 12 credit points of Junior Biology or 12 credit points of Junior Psychology.

**Planning for a Biochemistry major**

*Essential:* 12 credit points of Junior units of study in Mathematics and Genetics Intro; MBLG1001/1901.

*Recommended:* 6 credit points of Junior Biology

**Planning for a Bioinformatics major**

*Essential:* 12 credit points of Junior units of study in Mathematics and Statistics (including MATH1015/1005/1905), 12 credit points of Junior units of study in Biology (including MBLG1001/1901), 12 credit points of Junior units of study in Chemistry, and 12 credit points from Junior units of study in Information Technologies (ie, INFO1103/1903 and INFO1105/1905).

**Planning for a Biology major**

*Essential:* 12 credit points of Junior Biology/ Molecular Biology & Genetics and 12 credit points of Junior Chemistry are needed to enrol in Intermediate units of study in Biology.

*Recommended:* BIOL(1001 or 1901) and BIOL(1002 or 1902) and 12 credit points of Junior Chemistry and 12 credit points of Junior Mathematics and 6 credit points of MBLG(1001 or 1901). Students who have not completed HSC or equivalent Biology are strongly recommended to take the Biology Bridging Course in February. Details are available from www-secure.cce.usyd.edu.au.

**Planning for a Cell Pathology major**

*Recommended:* a combination of MBLG, Junior Biology, Junior Chemistry and Junior Psychology.

**Planning for a Chemistry major**

*Essential:* 12 credit points of Junior Chemistry and 6 credit points of Junior Mathematics are needed to enrol in Intermediate units of study in Chemistry.

*Recommended:* 12 credit points of CHEM(1101 or 1901 or 1903) and CHEM(1102 or 1902 or 1904) and 12 credit points of Junior Mathematics and 24 credit points from other areas of study selected in consultation with an adviser.

**Planning for a Computational Science major**

Computational Science is an interdisciplinary major comprising core and elective units of study at the Senior level offered by several Schools and Departments in the Faculty of Science (see Table I).

*Recommended:* COSC1001 and COSC1002 and INFO1103 and INFO1105 and 12 credit points of Junior Mathematics and 18 credit points selected in consultation with an adviser.

**Planning for a Computer Science major**

*Essential:* 12 credit points of Junior Computer Science Units.

*Recommended:* INFO1103 and INFO1105 and 12 credit points of Junior Mathematics and 24 credit points of electives including PHIL1012 and INFO1003.

**Planning for an Environmental Studies major**

*Essential:* 12 credit points of Junior Geosciences units. If you wish to take the second year units ENV1211 and GEOS2121, or GEOS2921, you must include 12 credit points of Junior Biology and 12 credit points of Junior Chemistry or Physics units respectively as part of your first year program.

**Planning for a Financial Mathematics and Statistics major**

*Essential:* 12 credit points of Junior MATH.

*Recommended:* MATH1001 and MATH1002 and MATH1003 and MATH1005 and 24 credit points of other Junior units of study. Each of the above units of study may be replaced by the corresponding Advanced unit of study.

**Planning for a Geography major**

*Recommended:* GEOS(1001 or 1901) and GEOS(1002 or 1902) and 12 credit points of other Junior units of study.

**Planning for a Geology and Geophysics major**

*Recommended:* GEOS(1001 or 1901) and GEOS(1003 or 1903) and 12 credit points of other Junior units of study.

**Planning for a History and Philosophy of Science major**

*Essential:* 24 credit points of Junior study are required to enrol in Intermediate units of study in the History and Philosophy of Science.

*Recommended:* HPSC(1000 or 1900) and 12 credit points of elective units of study from History, Philosophy, Gender Studies, Physics, Psychology, or other related areas of study in arts or science in consultation with the Unit for History and Philosophy of Science. A major in HPS consists of 24 credit points of HPS Units of Study (which must include the compulsory unit HPSC3022). Most of our senior Units of Study have the following prerequisite: EITHER (both HPSC(2100 or 2900) and HPSC2101 or 2910) OR a CR or above in either (HPSC (2100 or 2900) or HPSC(2101 or 2910)).

**Planning an Immunobiology major**

*Recommended:* A combination of Junior Biology, MBLG and Junior Chemistry.

**Planning an Information Systems major**

*Essential:* 12 credit points of Junior Information Systems units.

*Recommended:* INFO1003 and INFO1103 and 12 credit points of Junior Mathematics including MATH (1015 or 1005 or 1905) and 24 credit points of electives including PHIL1012 and INFO1105 and a language unit (ENGL1005 or LING1001/1002/ 1005).
Planning for a Marine Biology major
Recommended: To complete a Marine Biology major the minimum requirement is 24 credit points of BIOL units listed under Table 1 for marine science. It is recommended to prepare for this that a student complete 12 credit points of Junior Biology, 12 credit points of Junior Chemistry and 12 credit points of Junior Geosciences.

Planning for a Marine Geoscience major
Essential: 24 credit points of Junior Science study.
Recommended: To complete a Marine Geoscience major the minimum requirement is 24 credit points of GEOS units listed under Table 1 for marine science. It is recommended to prepare for this that a student complete 12 credit points of Junior Biology, 12 credit points of Junior Chemistry and 12 credit points of Junior Geosciences.

Planning for a Marine Science major
Essential: 24 credit points of Junior Science study.
Recommended: To complete a Marine Science major the minimum requirement is 24 credit points of GEOS or BIOL units listed under Table 1 for marine science which must include one senior BIOL unit and one senior GEOS unit. It is recommended to prepare for this that a student complete 12 credit points of Junior Biology, 12 credit points of Junior Chemistry and 12 credit points of Junior Geosciences.

Planning for a Mathematics major
12 credit points of Junior Mathematics are generally needed to enrol in Intermediate units of study in Mathematics. Students intending to major in Mathematics should take at least 12 credit points of Intermediate Mathematics. Recommended: MATH(1001 or 1901 or 1006) and MATH(1002 or 1902) and MATH(1003 or 1903 or 1907) and MATH(1004 or 1005/1905) and 36 other Junior credit points.

Mathematics in other majors
Statistics majors: must include MATH(1015 or 1005 or 1905) and MATH(1003 or 1903).
Computer Science majors: Should include MATH(1005 or 1905).
Biological and other Life Science majors: should include MATH(1015 or 1005 or 1905).

Planning for a Medicinal Chemistry major
Essential: 12 credit points of Junior Chemistry and 6 credit points of Junior BIOL or MBLG.

Planning for a Microbiology major
Essential: 6 credit points of Junior BIOL, MBLG1001 and 6 credit points of Junior Chemistry.

Planning for a Nanoscience and Technology major
Recommended: A combination of Junior Physics, Junior Chemistry and Junior Mathematics

Planning for a Neuroscience major
Recommended: A combination of Junior Biology, MBLG, Junior Psychology and Junior Chemistry.

Planning for a Pharmacology major
Essential: 6 credit points of Junior BIOL/MBLG1001/MBLG1901 and 6 credit points of Junior Chemistry.

Planning for a Physics major
Essential: 12 credit points of Junior Physics are needed to enrol in Intermediate units of study in Physics. Recommended: 12 credit points of Junior units of study in each of Physics and Mathematics (MATH1001/1901 and MATH 1002/1902 and MATH1003/1903 and 1005/1905) and 24 credit points of other Junior units of study selected in consultation with an adviser.

Students interested in Astronomy may enrol in PHYS1500. However, it should be noted that it is a general interest course and cannot be counted towards progression into Intermediate Physics.

Planning for a Physiology major
Essential: 6 credit points of Junior Chemistry and 30 credit points of Junior study from the areas of MATH, BIOL, PSYC, CHEM and PHYS.
Recommended: 12 credit points of Junior Mathematics units and 6 credit points of MBLG(1001 or 1901).

Planning a Plant Science major
Essential: 12 credit points of Junior Chemistry and 12 credit points of Junior Biology.
Recommended: 6 credit points of BIOL(1002 or 1902). Students wishing to enrol in Intermediate PLNT using BIOL(1003 or 1903) will need to do some preparatory reading.

Planning for a Psychology major
Essential: 12 credit points of Junior Psychology (PSYC1001 and PSYC1002).
Recommended: PSYC1001 and PSYC1002 and 12 credit points of Junior units of study in Mathematics including MATH1015 or 1005 or 1905 (statistics) and 12 credit points of Junior Science electives and 12 credit points of Junior electives.

Planning a major in Soil Science
Essential: 6 credit points of Junior Geoscience units.
Recommended: 6 credit points of GEOS1001 or GEOS1002.

Planning for a Statistics major
The Junior Mathematics units, MATH1005/1905 and MATH1001/1901/1906, are needed to enrol in Intermediate units of study in Statistics and one of: MATH1003/1903/1907 is required to complete a major in Statistics. Students intending to major in Statistics should take 12 credit points of Intermediate Statistics.

Statistics in other majors
Computer Science majors: Should include MATH1005/1905.
Biological and other Life Science majors: should include MATH1015/1005/1905.

3. Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS
Bachelor of Science (BSc) Sample Structure

Degree code: LH000

Enrolment guide
In your junior year you should complete:
• 12 credit points from the Science subject areas of Mathematics and Statistics
• 24 credit points of Junior units of study from at least two Science subject areas other than Mathematics and Statistics
• 12 credit points of elective units of study from Science, Arts, Economics and Business, Engineering and Information Technologies or other faculties.

Sample Bachelor of Science

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Total credit points: 144

Require: 144cp total, one major. Minimum 96cp Science, min. 36cp Junior Science incl. 12cp Maths, max. 60cp Junior.

Bachelor of Science (Advanced) Sample Structure

Degree code: LH000, Stream: 4

Enrolment guide
In your junior year you should complete:
• 12 credit points from the Science subject areas of Mathematics and Statistics.
• 24 credit points of Junior units of study from at least two Science subject areas other than Mathematics and Statistics.
• 12 credit points of elective units of study from Science, Arts, Economics and Business, Engineering and Information Technologies or other faculties.
• No more than 48 credit points from Junior units of study.

Sample Bachelor of Science (Advanced)

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Total credit points: 144

Require: 144cp total, min. 96cp Science, max. 48cp Junior, min 36cp Junior Science incl. 12cp Maths, min. 48cp Senior, min. 12cp Intermediate Advanced and/or TSP, min. 24cp Senior Advanced and/or TSP major.
Bachelor of Science (Advanced Mathematics) Sample Structure
Degree code: LH000, Stream: 9

Enrolment guide
In your junior year you should complete:

- 12 credit points from Junior Advanced Mathematics and Statistics units of study.
- 24 credit points of Junior units of study from at least two Science subject areas other than Mathematics and Statistics.

Advanced students usually take 24 credit points of the above at the Advanced level.

Sample Bachelor of Science (Advanced Mathematics)

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<td>MATH 1XXX</td>
<td>Science elective A 1XXX/19XX</td>
<td>Science elective B 1XXX/19XX</td>
<td>Elective</td>
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<td>24</td>
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<tr>
<td>Year 3</td>
<td>MATH 29XX</td>
<td>MATH 29XX</td>
<td>Intermediate or Senior elective</td>
<td>Intermediate or Senior elective</td>
<td></td>
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<td>6</td>
<td>24</td>
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<tr>
<td>Year 2</td>
<td>MATH 29XX</td>
<td>MATH 29XX</td>
<td>Intermediate or Senior elective</td>
<td>Intermediate or Senior elective</td>
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<tr>
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<td>6</td>
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<td>6</td>
<td>24</td>
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</tr>
<tr>
<td>Year 3</td>
<td>MATH 39XX</td>
<td>MATH 39XX</td>
<td>Major 2 or elective 3XXX</td>
<td>Major 2 or elective 3XXX</td>
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<tr>
<td>Year 2</td>
<td>MATH 39XX</td>
<td>MATH 39XX</td>
<td>Major 2 or elective 3XXX</td>
<td>Major 2 or elective 3XXX</td>
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<tr>
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<td>6</td>
<td>6</td>
<td>6</td>
<td>24</td>
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</tbody>
</table>

Total credit points: 144

Combined Science/Medicine degrees - Sample Structure
Degree codes: LH033/LH034

Enrolment guide
To qualify for the award of the degrees a student shall complete units of study to a total value of at least 336 credit points including:

- Satisfactorily completing three SMTP units in the first three years of the program;
- Meeting the requirements of the BSc (Adv) or BMedSc degree outlined above.
- Completing 192 credit points towards the MBBS degree as required by the Resolutions of the Faculty of Medicine.

Special permission
You should note that the faculty can, in certain circumstances, permit exceptions to the normal requirements for a degree. Applications should be made in writing to the Associate Dean (Undergraduate).

See the Bachelor of Science sample table to plan your degree structure.
Table 1: Bachelor of Science

Table 1 lists units of study available to students in the Bachelor of Science and combined degrees. The units are available to students enrolled in other degrees in accordance with their degree resolutions.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Chemistry</strong></td>
<td></td>
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</tr>
<tr>
<td>For a major in Agricultural Chemistry: AGCH3025 and AGCH3026; and either (AGCH3032 and SOIL3010); or (BCHM3X72 and BCHM3X82); or 12 credit points of senior Chemistry</td>
<td></td>
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</tr>
<tr>
<td><strong>Intermediate units of study</strong></td>
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</tr>
<tr>
<td>AGCH2004 Agricultural Chemistry</td>
<td>6</td>
<td>P AGCH2003, PLNT2001</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>Senior units of study (compulsory for a major in Agricultural Chemistry)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>AGCH3025 Chemistry and Biochemistry of Foods</td>
<td>6</td>
<td>P AGCH2004 or BCHM2071 or BCHM2971 or BCHM2072 or BCHM2972 or PLNT2001 or 6 credit points of Intermediate units in Chemistry</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>AGCH3026 Food Biotechnology</td>
<td>6</td>
<td>P AGCH2004 or BCHM2071 or BCHM2971 or BCHM2072 or BCHM2972 or PLNT2001 or 6 credit points of Intermediate units in Chemistry</td>
<td></td>
<td>C AGCH3025</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>Senior unit of study (counts towards the major when taken with SOIL3010)</strong></td>
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</tr>
<tr>
<td>AGCH3032 Land and Water Ecochemistry</td>
<td>6</td>
<td>P AGCH2003 or AGCH2004 or PLNT2001 or CHEM24XX or BCHM2XXX or ENVI2001</td>
<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Note: Department permission required for enrolment</td>
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<td></td>
</tr>
<tr>
<td><strong>Anatomy and Histology</strong></td>
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</tr>
<tr>
<td>For a major in Anatomy and Histology, the minimum requirement is 24 credit points from any ANAT, HSTO, EMHU or NEUR Senior units of study.</td>
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</tr>
<tr>
<td><strong>Intermediate units of study</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANAT2008 Principles of Histology</td>
<td>6</td>
<td>A General concepts in human biology</td>
<td>P 6 credit points of Junior biology or psychology or molecular biology</td>
<td>N ANAT2001</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ANAT2009 Comparative Primate Anatomy</td>
<td>6</td>
<td>A Knowledge of basic vertebrate biology</td>
<td>P 36 credit points, including 12 credit points of Junior Biology (BIOL) or Junior Psychology or Junior Archaeology.</td>
<td>N ANAT2002</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ANAT2010 Concepts of Neuroanatomy</td>
<td>6</td>
<td>A Background in basic cell biology and basic mammalian biology.</td>
<td>P BICL (1003 or 1903) and one of: ANAT2008 or BICL (1002 or 1902) or MBLG(1001 or 1901 or 2071 or 2971) or PSYC (1001 and 1002). Students must have a grade of credit in at least one of the prerequisite units.</td>
<td>N ANAT2003</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>Senior units of study</strong></td>
<td></td>
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<tr>
<td>ANAT3006 Forensic Osteology</td>
<td>6</td>
<td>A An understanding of basic musculoskeletal anatomy.</td>
<td>P ANAT2008 and a credit in ANAT2009 or in ANAT2002. Note: Department permission required for enrolment</td>
<td>The completion of 6 credit points of MBLG is highly recommended.</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ANAT3007 Visceral Anatomy</td>
<td>6</td>
<td>A General knowledge of biology.</td>
<td>P ANAT2009 or ANAT2010.</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HSTO3001 Microscopy &amp; Histochemistry Theory</td>
<td>6</td>
<td>P Credit or better grade in ANAT2008. For BMedSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805</td>
<td>C HSTO3002</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HSTO3002 Microscopy &amp; Histochemistry Practical</td>
<td>6</td>
<td>P Credit grade or better in ANAT2008. For BMedSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805</td>
<td>C HSTO3002</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>NEUR3001 Neuroscience: Special Senses</td>
<td>6</td>
<td>A It is strongly recommended that students also take unit NEUR3002, PHSI2005 and ANAT2010</td>
<td>are assumed knowledge.</td>
<td>P For BMedSc students: BMED(2801 or 2503) and BMED(2806 or 2505) For other students: (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG.</td>
<td>N PHSI3001, NEUR3901</td>
<td>Semester 1</td>
</tr>
<tr>
<td>NEUR3002 Neuroscience: Special Senses (Advanced)</td>
<td>6</td>
<td>A PHSI2005 and ANAT2010</td>
<td>P For BMedSc students: Credit average in BMED(2801 or 2503) and BMED(2806 or 2505) For other students: Credit average in (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG.</td>
<td>N NEUR3001, PHSI3001, PHSI3901</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>NEUR3002 Neuroscience: Motor Systems &amp; Behaviour</td>
<td>6</td>
<td>A It is strongly recommended that students also take unit NEUR3001, ANAT2010 and PHSI2005</td>
<td>is assumed knowledge.</td>
<td>P For BMedSc students: BMED2801 and BMED2806 For other students: (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG.</td>
<td>N PHSI3001, NEUR3902</td>
<td>Semester 1</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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</tr>
<tr>
<td>NEUR3902 Neuroscience: Motor Systems &amp; Behav. Adv</td>
<td>6</td>
<td>A ANAT2010 and PHSI2005 is assumed knowledge.</td>
<td>P For BMEdSc students: Credit average in BMED2801 and BMED2806 For other students: Credit average in (PHSI(2191 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG.</td>
<td>N NEUR3902, PHSI3902</td>
<td>Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3901 or NEUR3902.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>ANAT3004 Cranial and Cervical Anatomy</td>
<td>6</td>
<td>A General knowledge of biology.</td>
<td>P ANAT2009 or ANAT2201 For BMEdSc students: 42 credit points of BMED intermediate units including BMED(2803 or 2804 or 2805 or 2806).</td>
<td>N ANAT3904</td>
<td>The completion of 6 credit points of MBLG is highly recommended.</td>
<td>Semester 2</td>
</tr>
<tr>
<td>ANAT3904 Cranial &amp; Cervical Anatomy (Advanced)</td>
<td>6</td>
<td>P Available to BSc students only. By invitation only. Requires a credit average in ANAT3007 plus a demonstrated aptitude for practical work. Emphasis in selecting for invitation is placed on results in practical performance, marks and quizzes in ANAT3007.</td>
<td>N ANAT3004</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>ANAT3008 Musculoskeletal Anatomy</td>
<td>6</td>
<td>A A knowledge of the subject of anatomy, including practical class experience, and some knowledge of basic mammalian biology.</td>
<td>P ANAT2009 or ANAT2002 (for students who completed Intermediate study before 2005), For BMEdSc students: 42 credit points of BMED intermediate units including BMED(2803 or 2804 or 2805 or 2806).</td>
<td>N ANAT3905</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>EMHU3001 Electron Microscopy and imaging/Theory</td>
<td>6</td>
<td>A General concepts in Biology, and in Biochemistry or in Chemistry.</td>
<td>P At least 12 cp of Intermediate Science units from any of the following: Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Mathematics, Microbiology, Molecular Biology &amp; Genetics, Pharmacology, Physics, Physiology or Statistics. For BMEdSc students: 42 cp of BMED Intermediate units (2801, 2802, 2803 &amp; 2806)</td>
<td>N ANAT3005</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>EMHU3002 Electron Microscopy and Imaging/Prac</td>
<td>6</td>
<td>A (i) An understanding of the basic structure of vertebrates; (ii) An understanding of elementary biochemistry and genetics.</td>
<td>P For BSc students: ANAT2008 For BMEdSc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2803, BMED2805, EMHU3001</td>
<td>C EMHU3001</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HSTO3002 Cells and Development: Theory</td>
<td>6</td>
<td>P Unless special permission is granted from the course coordinator, this advanced unit of study is only available to select students who have achieved a mark of 65 or above in the following prerequisite units of study. For BSc students: ANAT2008, For BMEdSc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2803, BMED2805.</td>
<td>C HSTO3003</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>NEUR3003 Cellular and Developmental Neuroscience</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain.</td>
<td>P For BMEdSc: 42 credit points of Intermediate BMED units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics.</td>
<td>N NEUR3903, PHSI3902, PHSI3902</td>
<td>Enrolment in NEUR3004 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NEUR3903 Cellular &amp; Developmental Neurosci. (Adv)</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain.</td>
<td>P For BMEdSc: 42 credit points of Intermediate BMED units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001, NEUR3002 and NEUR3003/3902.</td>
<td>N NEUR3003, PHSI3902</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NEUR3004 Integrative Neuroscience</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain.</td>
<td>P For BMEdSc: 42 credit points of Intermediate BMED units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics.</td>
<td>N NEUR3904, PHSI3902, PHSI3902</td>
<td>Enrolment in NEUR3003 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NEUR3904 Integrative Neuroscience (Advanced)</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain.</td>
<td>P For BMEdSc: 42 credit points of Intermediate BMED units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001, NEUR3002 and NEUR3003/3902.</td>
<td>N NEUR3004, PHSI3902</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

For other NEUR units, see the Physiology subject area entry in this table.
Bioinformatics

For a major in Bioinformatics, students must complete a minimum of 24 credit points from senior units of study in the Life Sciences, Statistics, and Information Technologies, including:

- At least one of STAT3012 or STAT3912 or STAT3014 or STAT3914
- (C) COMP3456

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS</strong></td>
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<tr>
<td><strong>Junior units of study</strong></td>
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<tr>
<td>MBLG1001 Molecular Biology and Genetics (Intro)</td>
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<td>Semester 2</td>
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<tr>
<td>MBLG1901 Molecular Biology and Genetics (Adv)</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td><strong>Intermediate units of study</strong></td>
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<tr>
<td><strong>Biochemistry</strong></td>
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<tr>
<td>For a major in Biochemistry, the minimum requirement is 24 credit points from senior units of study listed in this subject area.</td>
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<tr>
<td><strong>Senior units of study</strong></td>
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<tr>
<td>BCHM2071 Protein Biochemistry</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>BCHM2071 Protein Biochemistry (Advanced)</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>BCHM2072 Human Biochemistry</td>
<td>6</td>
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<tr>
<td>BCHM2072 Human Biochemistry (Advanced)</td>
<td>6</td>
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<tr>
<td><strong>Bioinformatics</strong></td>
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<tr>
<td>For a major in Bioinformatics, students must complete a minimum of 24 credit points from senior units of study in the Life Sciences, Statistics, and Information Technologies, including:</td>
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</tr>
<tr>
<td>(A) At least one of BIOL3027 or BIOL3927 or BCOM3092 or BCOM3992</td>
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<tr>
<td>(B) At least one of STAT3012 or STAT3912 or STAT3014 or STAT3914</td>
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</tr>
<tr>
<td>(C) COMP3456</td>
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</tr>
</tbody>
</table>
Unit of study | Credit points | A: Assumed knowledge | P: Prerequisites | C: Corequisites | N: Prohibition | Session
--- | --- | --- | --- | --- | --- | ---
(D) BINF3101

For further information on how to prepare for a major in Bioinformatics, please consult the Faculty of Science’s web page
(http://www.science.usyd.edu.au/fstudent/undergrad/course/)

**Bioinformatics major (A) units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOI3027 Bioinformatics and Genomics</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSc students: 36 credit points of Intermediate BMED units including BMED 2602.</td>
<td>Semester 1</td>
<td>N BIOL3927</td>
<td></td>
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</tr>
<tr>
<td>BIOI3927 Bioinformatics and Genomics (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSc students: 36 credit points of Intermediate BMED units including Distinction in BMED2802.</td>
<td>Semester 1</td>
<td>N BIOL3927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3092 Proteomics and Functional Genomics</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BMCH2071/2971 or BMCH2072/2972) or 42CP of Intermediate BMED units, including BMED2802 and BMED2804.</td>
<td>Semester 2</td>
<td>N BIOL3027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3992 Proteomics and Functional Genomics (Adv)</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BMCH2071/2971 or BMCH2072/2972) or 42CP of Intermediate BMED units, with Distinction in BMED2802 and BMED2804.</td>
<td>Semester 2</td>
<td>N BIOL3027</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bioinformatics major (B) units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3012 Applied Linear Models</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2004) and MATH1002 or 1014 or 1902).</td>
<td>Semester 1</td>
<td>N STAT3912, STAT3302, STAT3902, STAT3004, STAT3904</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3912 Applied Linear Models (Advanced)</td>
<td>6</td>
<td>P, (STAT2912 or Credit in STAT2004 or Credit in STAT2012) and MATH2061 or 2961 or 1902).</td>
<td>Semester 1</td>
<td>N STAT3012, STAT3302, STAT3902, STAT3004, STAT3904</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3914 Applied Statistics Advanced</td>
<td>6</td>
<td>A STAT3912</td>
<td>Semester 2</td>
<td>P STAT2912 or credit or better in (STAT2004 or STAT2012).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bioinformatics major (C) unit of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP3456 Computational Methods for Life Sciences</td>
<td>6</td>
<td>P INF1015 and (COMP2007 or INFO2120) and 6 credit points from BIOL or MBLG</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bioinformatics major (D) unit of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF3101 Bioinformatics Project</td>
<td>6</td>
<td>P 12 credit points from Intermediate Biology, Molecular Biology and Genetics, Biochemistry, Microbiology, Pharmacology</td>
<td>Semester 2</td>
<td>N COMP3206, BINF3001, INFO3600, SOFT3300, SOFT3600, SOFT3200, SOFT3700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Biology**

For a major in Biology, the minimum requirement is 24 credit points from senior BIOL units of study listed in this subject area. Senior PLNT units and BIOL3008/3909, 3017/3917 may be counted towards a major in Biology or Plant science, not both

**Junior units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOI1001 Concepts in Biology</td>
<td>6</td>
<td>A None. However, semester 1 students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February).</td>
<td>Semester 1</td>
<td>N BIOL1911</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOI1911 Concepts in Biology (Advanced)</td>
<td>6</td>
<td>P 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit, or by invitation.</td>
<td>Semester 1</td>
<td>N BIOL1911</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOI1003 Human Biology</td>
<td>6</td>
<td>A HSC 2-unit Biology. Semester 1 students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February).</td>
<td>Semester 1</td>
<td>N BIOL1953</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOI1903 Human Biology (Advanced)</td>
<td>6</td>
<td>P UAI (orATAR equivalent) of at least 83 and HSC Biology result in the 90+, or Distinction or better in a University level Biology unit, or by invitation.</td>
<td>Semester 1</td>
<td>N BIOL1903</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOI1002 Living Systems</td>
<td>6</td>
<td>A HSC 2-unit Biology. Students who have not completed HSC biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February).</td>
<td>Semester 2</td>
<td>N BIOL1952</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOI1902 Living Systems (Advanced)</td>
<td>6</td>
<td>P UAI (orATAR equivalent) of at least 83 and HSC Biology result in the 90+, or Distinction or better in a University level Biology unit, or by invitation.</td>
<td>Semester 2</td>
<td>N BIOL1902</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBLG1001 Molecular Biology and Genetics (Intro)</td>
<td>6</td>
<td>A 6 credit points of Junior Biology and 6 cp of Junior Chemistry</td>
<td>Semester 2</td>
<td>N AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2971, MBLG1901</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3. Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS

**Unit of study** | **Credit points** | **A: Assumed knowledge** | **P: Prerequisites** | **C: Corequisites** | **N: Prohibition** | **Session**
---|---|---|---|---|---|---
MBLG1901 Molecular Biology and Genetics (Adv) | 6 | A HSC Chemistry and Biology OR 6 credit points of Junior Biology and 6 cp of Junior Chemistry | P UAI (or ATAR equivalent) of 95 or minimum Band 5 in HSC chemistry and biology or by invitation | N AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2871, MBLG1001 | Semester 2

**Intermediate units of study**

The completion of 6 credit points of MBLG units of study is highly recommended.

**BIOL2011 Invertebrate Zoology** | 6 | A BIOL (1002 or 1902); P BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. | N BIOL2911 | Semester 1

**BIOL2911 Invertebrate Zoology (Advanced)** | 6 | A BIOL (1002 or 1902); P Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. These requirements may be varied and students with lower averages should consult the Unit Executive Officer | N BIOL2011 | Semester 1

**BIOL2016 Cell Biology** | 6 | P 12 credit points of Junior Biology, e.g. any combination of 2 units made from the following options, BIOL (1001 or 1911), BIOL (1002 or 1902), BIOL (1003 or 1903), MBLG (1001 or 1911), EDUH1016, and 12 credit points of Junior Chemistry. | N BIOL2916 | Semester 1

**BIOL2916 Cell Biology (Advanced)** | 6 | P Distinction average in 12 credit points of Junior Biology or equivalent, e.g. any combination 12 credit points of Junior Biology, e.g. any combination of 2 units made from the following options, BIOL (1001 or 1911), BIOL (1002 or 1902), BIOL (1003 or 1903), MBLG (1001 or 1901), EDUH1016, and 12 credit points of Junior Chemistry. | N BIOL2016 | Semester 1

**PLNT2001 Plant Biochemistry and Molecular Biology** | 6 | P 12 Junior credit points from Chemistry and Biology (or with the Dean's permission BIOL1201 and BIOL1202) | N PLNT2901, AGCH2004 | Semester 1

**PLNT2901 Plant Biochem & Molecular Biology (Adv)** | 6 | P Distinction average in 12 Junior credit points from Chemistry and Biology (or with the Dean's permission BIOL1201 and BIOL1202) | N PLNT2001, AGCH2004 | Semester 1

**PLNT2002 Aust Flora: Ecology and Conservation** | 6 | P 6 credit points of a Junior unit of study | N PLNT2902 | Semester 1

**PLNT2902 Aust Flora: Ecology & Conservation (Adv)** | 6 | A The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in this unit of study should consult the Unit Executive Officer. P Distinction average in 6 credit points of Junior units of study | N PLNT2002 | Semester 1

**ENVI2111 Conservation Biology and Applied Ecology** | 6 | P BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. | N ENVI2911 | Semester 1

**ENVI2911 Conservation Biol & Applied Ecology Adv** | 6 | P Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. | N ENVI2111 | Semester 1

**BIOL2012 Vertebrates and their Origins** | 6 | A The content of BIOL (1002 or 1902) is assumed knowledge and students who have not completed BIOL (1002 or 1902) will need to do some preparatory reading. P BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. | N BIOL2912 | Semester 2

**BIOL2912 Vertebrates and their Origins (Advanced)** | 6 | A The content of BIOL (1002 or 1902) is assumed knowledge and students who have not completed BIOL (1002 or 1902) will need to do some preparatory reading. P Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry. | N BIOL2012 | Semester 2

**BIOL2017 Entomology** | 6 | A Although not a prerequisite, knowledge obtained from BIOL (2011 or 2911) is recommended. P BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH) | N BIOL2917 | Semester 2

**BIOL2917 Entomology (Advanced)** | 6 | A Although not a prerequisite, knowledge obtained from BIOL (2011 or 2911) is recommended. P Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). These requirements may be varied and students with lower averages should consult the Unit Executive Officer. | N BIOL2017 | Semester 2

**BIOL2018 Introduction to Marine Biology** | 6 | A 12 credit points of Junior Biology. P BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). | N BIOL2918 | Semester 2
### Unit of study | Credit points | A: Assumed knowledge | P: Prerequisites | C: Corequisites | N: Prohibition | Session
---|---|---|---|---|---|---
BIOL2918 Introduction to Marine Biology (Adv) | 6 | A: 12 credit points of Junior Biology. | P: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH), 12 credit points of Junior Chemistry or for BSc (Marine Science) students 6 credit points of Junior Chemistry and either an additional 6 credit points of Junior Chemistry or 6 credit points of Junior Physics. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. | N: BIOL2018, MARS2006, MARS2606, MARS2907, MARS2907. Entry is restricted and selection is made from applicants on the basis of previous performance. | | Semester 2

PLNT2003 Plant Form and Function | 6 | A: 12 credit points of Junior Biology, or equivalent eg BIOL (1001 or 1101 or 1901 or 1911) and BIOL (1002 or 1902 or 1003 or 1903) | N: PLNT2903, BIOL2003, BIOL2903, CROP2001 | | Semester 2

PLNT2903 Plant Form and Function (Advanced) | 6 | A: 12 credit points of Junior Biology, or equivalent eg BIOL (1001 or 1101 or 1901 or 1911) and BIOL (1002 or 1902 or 1003 or 1903) | N: PLNT2003, BIOL2003, BIOL2903, CROP2001 | | Semester 2

### Senior units of study

**BIOL3010 Tropical Wildlife Biology and Management** | 6 | A: None, although BIOL2012/2912 (Vertebrates and their Origins) would be useful. | P: 12 credit points of Intermediate Biology (BIOL/ENVI/PLNT), or equivalent. | N: BIOL3910 | | S1 Intensive

Note: Department permission required for enrolment Dates: 13 February - 18 February 2011 Northern Territory, followed by tutorials and practical classes at the University of Sydney 21 February - 25 February 2011.

**BIOL3910 Tropical Wildlife Biol & Management Adv** | 6 | A: None, although BIOL2012/2912 (Vertebrates and their Origins) would be useful. | P: Distinction average in 12 credit points of Intermediate Biology (BIOL/ENVI/PLNT). | N: BIOL3910 | | S1 Intensive

Note: Department permission required for enrolment Dates: 13 - 18 February 2011 Northern Territory followed by tutorials and practical classes at the University of Sydney 21 - 25 February 2011.

**BIOL3016 Coral Reef Biology** | 6 | P: 12 credit points from Intermediate science units of study which must include at least 6 credit points of BIOL units; or 6 credit points of BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | | N: BIOL3916, NTMP3001 | S2 Intensive

Note: Department permission required for enrolment 9-15 July 2011

**BIOL3916 Coral Reef Biology (Advanced)** | 6 | A: BIOL2018 or GEOS2115 | P: Distinction average in 12 credit point from Intermediate science units of study which must include at least 6 credit points of Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | N: BIOL3916, NTMP3001 | S2 Intensive

Note: Department permission required for enrolment 9-15 July 2011

**BIOL3017 Fungi in the Environment** | 6 | P: 12 credit points of Intermediate Biology or Plant Science, or 6 credit points of Intermediate Biology, or Plant Science, and 6 Intermediate credit points of either Microbiology or Geography. | | N: BIOL3917 | | S1 Intensive

Dates: 14-25 February 2011. The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3917 Fungi in the Environment (Advanced)** | 6 | P: Distinction average in 12 credit points of Intermediate Biology and Plant Science, or 6 credit points of Intermediate Microbiology or Geography. | | N: BIOL3917 | S1 Intensive

The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3006 Ecological Methods** | 6 | A: BIOL (2011 or 2111 or 2012 or 2912) or PLNT (2002 or 2902). | P: 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | N: BIOL3906 | | Semester 1

| A: BIOL (2011 or 2111 or 2012 or 2912) or PLNT (2002 or 2902). | P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | | | | Semester 1

**BIOL3906 Ecological Methods (Advanced)** | 6 | A: BIOL (2011 or 2111 or 2012 or 2912) or PLNT (2002 or 2902). | P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915). These requirements may be varied and students with lower averages should consult the Unit Executive Officer. | N: BIOL3906 | | Semester 1

**BIOL3011 Ecophysiology** | 6 | A: BIOL (2012 or 2912 or 2016 or 2916) or PLNT (2002 or 2903). | P: 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | N: BIOL3911 | | Semester 1

The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3911 Ecophysiology (Advanced)** | 6 | A: BIOL (2012 or 2912 or 2016 or 2916) or PLNT (2002 or 2903). | P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915). These requirements may be varied and students with lower averages should consult the Unit Executive Officer. | N: BIOL3911 | | Semester 1

The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3012 Animal Physiology** | 6 | P: 12 credit points of Intermediate Biology. | | N: BIOL3912 | | Semester 1

The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3912 Animal Physiology (Advanced)** | 6 | P: Distinction average in 12 credit points of Intermediate Biology. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. | | N: BIOL3912 | | Semester 1

**BIOL3013 Marine Biology** | 6 | A: BIOL2018 or GEOS2115. | P: 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | N: BIOL3913 | | Semester 1

The completion of 6 credit points of MBLG units is highly recommended.

**BIOL3913 Marine Biology (Advanced)** | 6 | A: BIOL2018 or GEOS2115. | P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). | N: BIOL3913 | | Semester 1

The completion of 6 credit points of MBLG units is highly recommended.

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Note: Department permission required for enrolment Dates: 14-25 February 2011. The completion of 6 credit points of MBLG units is highly recommended.

Note: Department permission required for enrolment Dates: 13 - 18 February 2011 Northern Territory followed by tutorials and practical classes at the University of Sydney 21 - 25 February 2011.

Note: Department permission required for enrolment

Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). These requirements may be varied and students with lower averages should consult the Unit Executive Officer.

Distinction average in 12 credit points of Intermediate Biology. These requirements may be varied and students with lower averages should consult the Unit Executive Officer.

Note: Department permission required for enrolment 9-15 July 2011

Note: Department permission required for enrolment 9-15 July 2011

Note: Department permission required for enrolment

Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).

The completion of 6 credit points of MBLG units is highly recommended.

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### Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS

#### Unit of study

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<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
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<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3018 Applications of Recombinant DNA Tech</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units.</td>
<td>For BMEDsc students: 36 credit points of Intermediate BMED units including BMED 2802.</td>
<td>N BIOL3918</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3918 Applications of Recombinant DNA Tech Adv</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMEDsc students: 36 credit points of Intermediate BMED units including Distinction in BMED2802.</td>
<td>N BIOL3918</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3027 Bioinformatics and Genomics</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units.</td>
<td>For BMEDsc students: 36 credit points of Intermediate BMED units including BMED 2802.</td>
<td>N BIOL3927</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3927 Bioinformatics and Genomics (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMEDsc students: 36 credit points of Intermediate BMED units including Distinction in BMED2802.</td>
<td>N BIOL3927</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>CPAT3201 Pathogenesis of Human Disease 1</td>
<td>6</td>
<td>P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC</td>
<td>Semester 2 or MICR or PCOL or PHSI, or as the head of department determines.</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>CPAT3202 Pathogenesis of Human Disease 2</td>
<td>6</td>
<td>P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC</td>
<td>Semester 2 or MICR or PCOL or PHSI, or as the head of department determines.</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

#### Cell Pathology

For a major in Cell Pathology, the minimum requirement is 24 credit points from:

(i) CPAT3201 and CPAT3202; and

(ii) any two of the listed senior units of study

#### Senior units of study

The completion of 6 credit points of MBLG units of study is highly recommended.

- **CPAT3201 Pathogenesis of Human Disease 1**
  - 6 credit points
  - P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC
  - Semester 2 or MICR or PCOL or PHSI, or as the head of department determines.

- **CPAT3202 Pathogenesis of Human Disease 2**
  - 6 credit points
  - P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC
  - Semester 2 or MICR or PCOL or PHSI, or as the head of department determines.
<table>
<thead>
<tr>
<th>Unit of study</th>
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<th>A: Assumed knowledge</th>
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<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSTO3001 Microscopy &amp; Histochemistry Theory</td>
<td>6</td>
<td>P Credit or better grade in ANAT2008. For BMSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805</td>
<td>C HSTO3002</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSTO3002 Microscopy &amp; Histochemistry Practical</td>
<td>6</td>
<td>P Credit or better grade in ANAT2008. For BMSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805</td>
<td>C HSTO3001</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSTO3003 Cells and Development: Theory</td>
<td>6</td>
<td>A (i) An understanding of the basic structure of vertebrates; (ii) An understanding of elementary biochemistry and genetics.</td>
<td>P For BMSc students: ANAT2008 For BMSc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2805.</td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>HSTO3004 Cells and Development: Practical (Adv)</td>
<td>6</td>
<td>P Unless special permission is granted from the course coordinator, this advanced unit of study is only available to select students who have achieved a mark of 65 or above in the following prerequisite units of study. For BMSc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2805.</td>
<td>C HSTO3003</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3071 Molecular Biology &amp; Biochemistry- Genes</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, including BMED2804, BMED2802</td>
<td>N BCHM3971, BCHM3001, BCHM3901</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3072 Human Molecular Cell Biology</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3071, BCHM3001, BCHM3901, BCHM3902, BCHM3004, BCHM3904</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3072 Human Molecular Cell Biology (Advanced)</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3072, BCHM3001, BCHM3904, BCHM3004, BCHM3904</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3072 Human Molecular Cell Biology</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3981, BCHM3001, BCHM3901</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3073 Human Molecular Cell Biology (Advanced)</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3073, BCHM3001, BCHM3904, BCHM3004, BCHM3904</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3082 Medical and Metabolic Biochemistry</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, including BMED2802 and BMED2804.</td>
<td>N BCHM3082, BCHM3001, BCHM3004, BCHM3904</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM3082 Medical and Metabolic Biochemistry (Adv)</td>
<td>6</td>
<td>P MBLLG (1001 or 1001) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3082, BCHM3001, BCHM3004, BCHM3904</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIRC3011 Microbes in Infection</td>
<td>6</td>
<td>P At least 6 credit points of MBLLG units and (MIRC2022 or MIRC2092 or MIRC2002 or MIRC2092). For BMSc students: 42 credit points of Intermediate BMED units including: BMED2807 and BMED2808.</td>
<td>N MIRC3911, MIRC3001, MIRC3901</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIRC3011 Microbes in Infection (Advanced)</td>
<td>6</td>
<td>P At least 6 credit points of MBLLG units and Distinction in MIRC (2022 or 2022 or 2022 or 2022). For BMSc students: 42 credit points of Intermediate BMED units including BMED (2007 or 2008) with a Distinction in one of these two. For BMSc students: PLNT (2001 or 2901) and MIRC (2022 or 2922) including one Distinction.</td>
<td>N MIRC3011, MIRC3001, MIRC3901</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIRC3032 Molecular Microbiology Concepts (Adv)</td>
<td>6</td>
<td>A MIRC2021 or equivalent introductory microbiology.</td>
<td>P At least 6 credit points of MBLLG units and MIRC (2022 or 2022 or 2022 or 2022). For BMSc students: 42 credit points of Intermediate BMED units including BMED (2002 or 2002 or 2002 or 2002). For BMSc students: 42 credit points of Intermediate BMED units including BMED (2002 or 2002 or 2002 or 2002).</td>
<td>N MIRC3032</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MIRC3042 Molecular Microbiology Research Skills</td>
<td>6</td>
<td>A MIRC2021 or equivalent introductory microbiology.</td>
<td>P At least 6 credit points of MBLLG units and MIRC (2022 or 2022 or 2022 or 2022). For BMSc students: 42 credit points of Intermediate BMED units including BMED (2002 or 2002 or 2002 or 2002). For BMSc students: 42 credit points of Intermediate BMED units including BMED (2002 or 2002 or 2002 or 2002).</td>
<td>N MIRC3042</td>
<td>Semester 2</td>
<td></td>
</tr>
</tbody>
</table>
### Unit of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICR3942 Molecular Micro Research Skills (Adv)</td>
<td>6</td>
<td>A MICR2021 or equivalent introductory microbiology. P A total of 6 credit points of MBGL units and Distinction in MICR (2002 or 2002 or 2002 or 2002). For BMEDSc students: 4 credit points of Intermediate BMED units including BMED (2002 or 2002 or 2002) with a Distinction in one of these three. For BScAgr students: PLNT (2001 or 2001) and MICR2024 including one Distinction. C MICR33X2. N MICR3304, MICR3302, MICR3322.</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHSI3005 Human Cellular Physiology: Theory</td>
<td>6</td>
<td>A 6 credit points of MBGL P Except for BMEdSc students: PHSI (2005 or 2005) and PHSI (2006 or 2006) or BMED (2801 and 2802). N PHSI3005, PHSI3004, PHSI3304. Note: Department permission required for enrolment. It is highly recommended that this unit of study be taken in conjunction with PHSI3306.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHSI3905 Human Cellular Physiology (Adv): Theory</td>
<td>6</td>
<td>A 6 credit points of MBGL P Credit average in PHSI (2005 or 2005) and PHSI (2006 or 2006) or in BMED (2801 and 2802). Students enrolling in this unit should have a WAM of at least 70. N PHSI3905, PHSI3004, PHSI3304. Note: Department permission required for enrolment.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHSI3006 Human Cellular Physiology: Research</td>
<td>6</td>
<td>A 6 credit points of MBGL P Except for BMEdSc students: PHSI (2005 or 2005) and PHSI (2006 or 2006) or BMED (2801 and 2802). C PHSI3005. N PHSI3306, PHSI3004, PHSI3304. Note: Department permission required for enrolment.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHSI3906 Human Cellular Physiology (Adv): Research</td>
<td>6</td>
<td>A 6 credit points of MBGL P PHSI (2005 or 2005) and PHSI (2006 or 2006) or in BMED (2801 and 2802). Students enrolling in this unit should have a WAM of at least 70. C PHSI3905. N PHSI3306, PHSI3004, PHSI3304. Note: Department permission required for enrolment.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information on the above units may be found under the relevant teaching department entries.

### Chemistry

For a major in chemistry, the minimum requirement is 24 credit points from senior units of study listed in this subject area, which must include the associated laboratory units.

#### Junior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Assumed knowledge</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM1001 Fundamentals of Chemistry 1A</td>
<td>6</td>
<td>A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM1101, CHEM1901, CHEM1109, CHEM1903.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1002 Fundamentals of Chemistry 1B</td>
<td>6</td>
<td>P CHEM (1001 or 1101) or equivalent N CHEM1102, CHEM1108, CHEM1902, CHEM1904.</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1101 Chemistry 1A</td>
<td>6</td>
<td>A HSC Chemistry and Mathematics C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM1001, CHEM1109, CHEM1903.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1102 Chemistry 1B</td>
<td>6</td>
<td>P CHEM (1101 or 1901) or a Distinction in CHEM1001 or equivalent N CHEM1002, CHEM1108, CHEM1902, CHEM1904.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1901 Chemistry 1A (Advanced)</td>
<td>6</td>
<td>P ATAR of at least 95.4 and HSC Chemistry result in band 3 or 6, or by invitation. C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM1001, CHEM1109, CHEM1903. Note: Department permission required for enrolment.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1902 Chemistry 1B (Advanced)</td>
<td>6</td>
<td>P CHEM (1901 or 1903) or Distinction in CHEM1101 or equivalent C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM1002, CHEM1108, CHEM1904. Note: Department permission required for enrolment.</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1903 Chemistry 1A (Special Studies Program)</td>
<td>6</td>
<td>P ATAR of at least 9.9 and HSC Chemistry result in Band 6 or by invitation. C Recommended concurrent unit of study: 6 credit points of Junior Mathematics. N CHEM1001, CHEM1109, CHEM1901. Note: Department permission required for enrolment. Entry is by invitation. This unit of study is deemed to be an Advanced unit of study.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM1904 Chemistry 1B (Special Studies Program)</td>
<td>6</td>
<td>P Distinction in CHEM1903 C Recommended concurrent units of study: 6 credit points of Junior Mathematics. N CHEM1002, CHEM1109, CHEM1902. Note: Department permission required for enrolment. Entry is by invitation. This unit of study is deemed to be an Advanced unit of study.</td>
<td>Semester 2</td>
<td></td>
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</tr>
</tbody>
</table>

#### Intermediate units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Assumed knowledge</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM2401 Molecular Reactivity and Spectroscopy</td>
<td>6</td>
<td>P CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. N CHEM2001, CHEM2101, CHEM2301, CHEM2311, CHEM2502, CHEM2901, CHEM2903, CHEM2911, CHEM2915. This is a required chemistry unit of study for students intending to major in chemistry. Students who have passed CHEM1001 or 1907 or 1908 or 1108) and CHEM (1002 or 1901 or 1109) may enrol in this unit after obtaining Departmental permission.</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM2911 Molecular Reactivity &amp; Spectroscopy Adv</td>
<td>6</td>
<td>P Credit average or better in CHEM1 (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904). 6 credit points of Junior Mathematics. N CHEM2001, CHEM2101, CHEM2301, CHEM2311, CHEM2401, CHEM2502, CHEM2901, CHEM2903, CHEM2915.</td>
<td>Semester 1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CHEM2915 Molecular Reactivity &amp; Spectroscopy SSP</td>
<td>6</td>
<td>P By invitation. High WAM and a Distinction average in CHEM (1101 or 1901) and CHEM (1102 or 1902 or 1904). 6 credit points of Junior Mathematics. N CHEM2001, CHEM2101, CHEM2301, CHEM2311, CHEM2401, CHEM2502, CHEM2901, CHEM2903, CHEM2915. Note: Department permission required for enrolment. The number of places in this unit of study is strictly limited and entry is by invitation only. Enrolment is conditional upon available places.</td>
<td>Semester 1</td>
<td></td>
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</tr>
</tbody>
</table>
### Senior units of study

#### CHEM3110
Biomolecules: Properties and Reactions
- Credit points: 6
- Assumed knowledge: N CHEM3910
- Prerequisites: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Corequisites: 6 credit points of Junior Mathematics.
- Prohibition: N CHEM3910
- Session: Semester 1

#### CHEM3910
Biomolecules: Properties & Reactions (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3110
- Corequisites: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prohibition: N CHEM3110
- Session: Semester 1

#### CHEM3111
Organic Structure and Reactivity
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3911
- Corequisites: N CHEM3111
- Prohibition: N CHEM3111
- Session: Semester 1

#### CHEM3911
Organic Structure and Reactivity (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3111
- Corequisites: N CHEM3111
- Prohibition: N CHEM3111
- Session: Semester 1

#### CHEM3112
Materials Chemistry
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3912
- Corequisites: N CHEM3912
- Prohibition: N CHEM3912
- Session: Semester 1

#### CHEM3912
Materials Chemistry (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3112
- Corequisites: N CHEM3112
- Prohibition: N CHEM3112
- Session: Semester 1

#### CHEM3113
Catalysis and Sustainable Processes
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3913
- Corequisites: N CHEM3113
- Prohibition: N CHEM3113
- Session: Semester 1

#### CHEM3913
Catalysis and Sustainable Process (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3113
- Corequisites: N CHEM3113
- Prohibition: N CHEM3113
- Session: Semester 1

#### CHEM3114
Metal Complexes: Medicine and Materials
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3914
- Corequisites: N CHEM3914
- Prohibition: N CHEM3914
- Session: Semester 2

#### CHEM3914
Metal Complexes: Medic. & Mater. (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3114
- Corequisites: N CHEM3114
- Prohibition: N CHEM3114
- Session: Semester 2

#### CHEM3115
Synthetic Medicinal Chemistry
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3915
- Corequisites: N CHEM3915
- Prohibition: N CHEM3915
- Session: Semester 2

#### CHEM3915
Synthetic Medicinal Chemistry (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916), 6 credit points of Junior Chemistry.
- Prerequisites: N CHEM3115
- Corequisites: N CHEM3115
- Prohibition: N CHEM3115
- Session: Semester 2

#### CHEM3116
Membranes, Self Assembly and Surfaces
- Credit points: 6
- Assumed knowledge: P CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916).
- Prerequisites: N CHEM3916
- Corequisites: N CHEM3916
- Prohibition: N CHEM3916
- Session: Semester 2

#### CHEM3917
Mol. Spectroscopy & Quantum Theory (Adv)
- Credit points: 6
- Assumed knowledge: P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916).
- Prerequisites: N CHEM3117
- Corequisites: N CHEM3117
- Prohibition: N CHEM3117
- Session: Semester 2

### Computational Science

For a major in Computational Science the minimum requirement is 24 credit points chosen from the core or elective senior units of study listed for this subject area, of which at least 12 credit points are from the core senior units of study.

#### Junior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Assumed knowledge</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSC1001 Computational Science in Matlab</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N COSC1901</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COSC1901 Computational Science in Matlab (Adv)</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>P UAI (or ATAR equivalent) of at least 90, or COSC1902, or a distinction or better in COSC1002, INFO1003 or INFO1903</td>
<td>N COSC1001</td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>
3. Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS

### Unit of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSC1002 Computational Science in C</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N COSC1902</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COSC1902 Computational Science in C (Adv)</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>P UAI (or ATAR equivalent) of at least 90, or COSC1901, INFO1003 or INFO1903.</td>
<td>N COSC1002</td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

### Senior core units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Programming experience in MATLAB.</th>
<th>P: 12 credit points chosen from Junior Mathematics and Statistics, 12 credit points of Intermediate units in Science subject areas.</th>
<th>N: COSC3911, COSC3001, COSC3901, PHYS3301, PHYS3901</th>
<th></th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSC3911 Scientific Computing</td>
<td>6</td>
<td>A Programming experience in MATLAB.</td>
<td>P 12 credit points chosen from Junior Mathematics and Statistics, 12 credit points of Intermediate units in Science subject areas with a credit average.</td>
<td>N COSC3901, COSC39001, PHYS3301, PHYS3901</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH3076 Mathematical Computing</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics and one of MATH(1001 or 1003 or 1901 or 1903 or 1906 or 1907)</td>
<td>MATH3076, MATH3016, MATH3916</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH3976 Mathematical Computing (Advanced)</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics and one of MATH(1903 or 1907)</td>
<td>Credit in MATH1003</td>
<td>N MATH3076, MATH3016, MATH3916</td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Senior elective units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: INF02110 and (INFO1003 or INFO1903)</th>
<th>P: 12 credit points from Intermediate Biology, Molecular Biology and Genetics, Biochemistry, Microbiology, Pharmacology</th>
<th>N: COMP3206, BINF3001, INFO3600, SOFT3300, SOFT3600, SOFT3200, SOFT3700</th>
<th></th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINF3101 Bioinformatics Project</td>
<td>6</td>
<td>A BIOL (2011 or 2012 or 2911 or 2912) or PLNT (2002 or 2002).</td>
<td>P 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3006</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3006 Ecological Methods</td>
<td>6</td>
<td>A BIOL (2011 or 2012 or 2911 or 2912) or PLNT (2002 or 2002).</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3927</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3906 Ecological Methods (Advanced)</td>
<td>6</td>
<td>A BIOL (2011 or 2012 or 2911 or 2912) or PLNT (2002 or 2002).</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3927</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3027 Bioinformatics and Genomics</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units.</td>
<td>For BMedSc students: 36 credit points of Intermediate BMED units including BMED 2802.</td>
<td>N: BIOL3927</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3927 Bioinformatics and Genomics (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units.</td>
<td>For BMedSc students: 36 credit points of Intermediate BMED units including Distinction in BMED2802.</td>
<td>N: BIOL3927</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3308 Introduction to Artificial Intelligence</td>
<td>6</td>
<td>A COMP2007</td>
<td>N COMP3608, COMP3002, COMP3902</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3608 Intro. to Artificial Intelligence (Adv)</td>
<td>6</td>
<td>P Distinction-level results in some 2nd year COMP or MATH or SOFT units.</td>
<td>N COMP3308, COMP3002, COMP3902</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3455 Computational Methods for Life Sciences</td>
<td>6</td>
<td>P INFO105 and (COMP2007 or INFO2120) and 6 credit points from BIOL or MBLG</td>
<td>N COMP3308, COMP3002, COMP3902</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH3063 Differential Equations and Biomaths</td>
<td>6</td>
<td>A MATH2061</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>MATH3025, MATH3920, MATH3003, MATH3923, MATH3963</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH3963 Differential Equations &amp; Biomaths (Adv)</td>
<td>6</td>
<td>A MATH2961</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>MATH3025, MATH3920, MATH3003, MATH3923, MATH3963</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH3078 PDEs and Waves</td>
<td>6</td>
<td>A MATH2061(2961) and MATH(2065/2965)</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>MATH3078, MATH3018, MATH3921</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH3978 PDEs and Waves (Advanced)</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965)</td>
<td>P 12 credit points of Intermediate Mathematics with at least Credit average</td>
<td>MATH3078, MATH3018, MATH3921</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>STAT3011 Stochastic Processes and Time Series</td>
<td>6</td>
<td>P STAT (2011 or 2911 or 2001 or 2901) and MATH (1003 or 1903 or 1907).</td>
<td>N STAT3911, STAT3003, STAT3903, STAT3005, STAT3905</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>STAT3911 Stochastic Processes and Time Series (Adv)</td>
<td>6</td>
<td>P (STAT2911 or STAT3003) and MATH(1003 or 1903 or 1907).</td>
<td>N STAT3011, STAT3003, STAT3903, STAT3005, STAT3905</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>STAT3012 Applied Linear Models</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2004) and MATH(1002 or 1014 or 1902).</td>
<td>N STAT3912, STAT3002, STAT3902, STAT3904, STAT3904</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>STAT3912 Applied Linear Models (Advanced)</td>
<td>6</td>
<td>P STAT(2912 or Credit in STAT2004 or Credit in STAT2012) and MATH(2061 or 2961 or 1902).</td>
<td>N STAT3012, STAT3002, STAT3902, STAT3904, STAT3904</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Computer Science

For a major in Computer Science the minimum requirement is 24 credit points chosen from the senior units of study listed for this subject area.

Students enrolled in non-IT degrees or majors, are eligible (upon application) for a Minor in Information Technology if they complete at least 18 credit points of intermediate or above units of study offered by the School of IT, within a completed degree. For further information, please refer to:

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC1601 Foundations of Computer Systems</td>
<td>6</td>
<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO1003 Foundations of Information Technology</td>
<td>6</td>
<td>A HSC Mathematics extension 1 or 2</td>
<td>N INFO1000 or INF51000</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1103 Introduction to Programming</td>
<td>6</td>
<td>A HSC Mathematics</td>
<td>N SOFT (1001 or 1001) or COMP (1001 or 1901) or DECO2011</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1003 Informatics (Advanced)</td>
<td>6</td>
<td>A HSC Mathematics</td>
<td>P ATAR sufficient to enter BCST(Adv), BIT or BSc(Adv), or portfolio of work suitable for entry</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1105 Data Structures</td>
<td>6</td>
<td>A Programming, as for INFO1103 or INFO1903</td>
<td>N INFO1905 or SOFT (1002 or 1902) or COMP (1002 or 1902 or 2160 or 2860 or 2111 or 2811 or 2002 or 2902)</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO1905 Data Structures (Advanced)</td>
<td>6</td>
<td>P 75% or greater in INFO1103 or INFO1903</td>
<td>N INFO1105 or SOFT (1002 or 1902) or COMP (1002 or 1902)</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Intermediate units of study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP2007 Algorithms and Complexity</td>
<td>6</td>
<td>A INFO1105, MATH1004 or MATH1904</td>
<td>N COMP2907, COMP3903, COMP3609, COMP3111, COMP3811</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2007 Algorithms and Complexity (Advanced)</td>
<td>6</td>
<td>A INFO1905, MATH1904</td>
<td>P Distinction level result in INFO1103 or INFO1903 or SOFT1002 or SOFT1902</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2121 Distributed Systems &amp; Network Principles</td>
<td>6</td>
<td>P (INFO1103 or INFO1903) AND (INFO1105 or INFO1905)</td>
<td>C (COMP2007 OR COMP2907)</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2129 Operating Systems and Machine Principles</td>
<td>6</td>
<td>A Programming, as from INFO1103 or INFO1903</td>
<td>N SOFT2130, SOFT2830, SOFT2004, SOFT2904, COMP2004, COMP2904</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO2110 Systems Analysis and Modelling</td>
<td>6</td>
<td>A Experience with a data model as in INFO1003 or INFO1103 or INF51003</td>
<td>N INFO2810, INFO2900, INFO2900</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO2120 Database Systems 1</td>
<td>6</td>
<td>A Some experience with programming and some familiarity with database model concepts such as SQL and the relational model, and to have some programming experience</td>
<td>N COMP2902, COMP3902</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>INFO2820 Database Systems 1 (Advanced)</td>
<td>6</td>
<td>P Distinction-level result in INFO1103 or INFO1105 or INFO1903</td>
<td>N INFO2120, INFO2905, INFO2905</td>
<td></td>
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<td>Semester 1</td>
</tr>
<tr>
<td>INFO2215 Introduction to IT Security</td>
<td>6</td>
<td>A Computer literacy</td>
<td>N NETS3305, NETS3605, NETS3016, NETS3916, ELEC5610, ELEC5616</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Senior units of study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ELEC3006 Data Communications and the Internet</td>
<td>6</td>
<td></td>
<td>N NETS2150, NETS2809, NETS2909, NETS3007, NETS3907, ELEC3504, ELEC4501</td>
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<td>Semester 2</td>
</tr>
<tr>
<td>ELEC3009 Internet Software Platforms</td>
<td>6</td>
<td>P INFO1103, INFO2110, INFO2120</td>
<td>N EBUS4501</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ELEC3610 E-Business Analysis and Design</td>
<td>6</td>
<td>P INFO2120</td>
<td>N EBUS3003, EBUS3001</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3109 Programming Languages and Paradigms</td>
<td>6</td>
<td>A COMP2007</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP3007 Introduction to Artificial Intelligence</td>
<td>6</td>
<td>A COMP2007</td>
<td>N COMP3608, COMP3002, COMP3902</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3008 Introduction to Artificial Intelligence (Adv)</td>
<td>6</td>
<td>P Distinction-level results in some 2nd year COMP or MATH or SOFT units.</td>
<td>N COMP3308, COMP3002, COMP3902</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3419 Graphics and Multimedia</td>
<td>6</td>
<td>A COMP2007, MATH1002</td>
<td>N MULT3306, MULT3606, MULT3019, MULT3919, MULT3004, MULT3904, COMP3004, COMP3904</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3456 Computational Methods for Life Sciences</td>
<td>6</td>
<td>P INFO1105 and (COMP2007 or INFO2120) and 6 credit points from BIOL or MBLG</td>
<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP3520 Operating Systems Internals</td>
<td>6</td>
<td>A COMP2129, INFO1105</td>
<td>N NETS3304, NETS3604, NETS3009, NETS3909, COMP3009, COMP3909</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>COMP3615 Software Development Project</td>
<td>6</td>
<td>P INFO3402</td>
<td>N INFO3600, SOFT3300, SOFT3600, SOFT3200, SOFT3700</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3220 Object Oriented Design</td>
<td>6</td>
<td>A INFO2110, INFO1105</td>
<td>N SOFT3301, SOFT3601, SOFT3101, SOFT3801, COMP3008, COMP3908</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3315 Human-Computer Interaction</td>
<td>6</td>
<td>A INFO2110</td>
<td>N MULT3307, MULT3607, MULT3018, MULT3918, SOFT3102, SOFT3802, COMP3102, COMP3902</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3402 Management of IT Projects and Systems</td>
<td>6</td>
<td>A INFO2000, INFO2110, INFO2810, INFO2900</td>
<td>N ISYS3000, ISYS3012, ELEC3606</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3404 Database Systems 2</td>
<td>6</td>
<td>A Introductory database study such as INFO2120 or INFO2820 or INFO2005 or INFO2905. Students are expected to be familiar with SQL and the relational data model, and to have some programming experience.</td>
<td>N INFO3504, INFO3005, INFO3905, COMP3005, COMP3905</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>
### Environmental Studies

For a major in Environmental Studies, students are required to complete a minimum of 24 credit points from Senior units of study listed below, including at least 12 credit points from Senior ENVI units.

#### Junior units of study

Students are recommended to take at least one of the following units of study:

- GEOS1901, GEOS1901, GEOS1902, GEOS1902, GEOS1903

#### Intermediate units of study

The completion at least one of the following units of study is highly recommended:

- ENVI2111 Conservation Biology and Applied Ecology
  - A: Assumed knowledge: BIOS1001 and 6 additional credit points of Intermediate Biology
  - P: 12 credit points of Intermediate Chemistry
  - Session: Semester 1

- GEOS2121 Environmental and Resource Management
  - A: Assumed knowledge: BIOL (1001 or 1911) and 6 additional credit points of Intermediate Biology
  - P: 12 credit points of Intermediate Chemistry
  - Session: Semester 2

- GEOS2122 Urban Geography
  - A: Assumed knowledge: BIOL (1001 or 1911) and 6 additional credit points of Intermediate Biology
  - P: 12 credit points of Intermediate Chemistry
  - Session: Semester 2

- GEOS3211 Environmental and Resource Management Adv
  - A: Assumed knowledge: BIOL (1001 or 1911) and 6 additional credit points of Intermediate Biology
  - P: 12 credit points of Intermediate Chemistry
  - Session: Semester 2

- GEOS3222 Urban Geography (Advanced)
  - A: Assumed knowledge: BIOL (1001 or 1911) and 6 additional credit points of Intermediate Biology
  - P: 12 credit points of Intermediate Chemistry
  - Session: Semester 2

#### Senior units of study

- ENVI3111 Environmental Law and Ethics
  - A: Intermediate Environmental Science
  - P: 12 credit points of Intermediate Science or Agriculture units
  - N: ENVI3001, ENVI3002
  - Session: Semester 1

- ENVI3112 Environmental Assessment
  - A: Intermediate Environmental Science
  - P: 12 credit points of Intermediate Science or Agriculture units
  - N: ENVI3002, ENVI3004
  - Session: Semester 2

- ENVI3114 Energy and the Environment
  - A: Junior Physics or Intermediate Environmental Science
  - P: 12 credit points of Intermediate Science or Agriculture units
  - N: ENVI3001, PHYS3600
  - Session: Semester 2

- GEOS3014 GIS in Coastal Management
  - A: Assumed knowledge: MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience units
  - P: 12 credit points of Intermediate Geoscience or in ECOP1001 or ECOP1002
  - N: GEOS3292, GEOS3293
  - Session: Summer Late

- GEOS3018 Rivers: Science, Policy and Management
  - A: Assumed knowledge: MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience units
  - P: 12 credit points of Intermediate Geoscience or in ECOP1001 or ECOP1002
  - N: GEOS3018
  - Session: Semester 1

- GEOS3033 Regional Development and Environment
  - A: Assumed knowledge: MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience units
  - P: 12 credit points of Intermediate Geoscience or in ECOP1001 or ECOP1002
  - N: GEOS3018, GEOS3511, GEOS3911, GEOS3913
  - Session: Semester 1

- GEOS3034 Regional Development & Environment (Adv)
  - A: Assumed knowledge: MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience units
  - P: 12 credit points of Intermediate Geoscience or in ECOP1001 or ECOP1002
  - N: GEOS3018, GEOS3511, GEOS3911, GEOS3913
  - Session: Semester 1

- GEOS3900 Major Project
  - A: Assumed knowledge: MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience units
  - P: 12 credit points of Intermediate Geoscience or in ECOP1001 or ECOP1002
  - N: GEOS3018, GEOS3511, GEOS3911, GEOS3913
  - Session: Summer Late
### Financial Mathematics and Statistics

For a major in Financial Mathematics and Statistics, students are required to complete:

#### Junior units of study

At least 12 credit points of junior units of study from the Science Subject Area of Mathematics including:

1. **Mathematics and Statistics (Adv)**

- MATH1001, MATH1013, MATH1903, MATH1907

2. **Linear Algebra (Advanced)**

- MATH1002, MATH1012, MATH1014

3. **Probability and Statistical Models**

- MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

4. **Statistics (Advanced)**

- MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Core intermediate units of study

18 credit points from the following units of study:

1. **Mathematics and Statistics**

   - MATH1001, MATH1013, MATH1903, MATH1907

   - MATH1002, MATH1012, MATH1014

2. **Linear Algebra (Advanced)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

3. **Statistics (Advanced)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Senior units of study

At least 24 credit points comprising the following units of study:

1. **Mathematics and Statistics**

   - MATH1001, MATH1013, MATH1903, MATH1907

   - MATH1002, MATH1012, MATH1014

2. **Probability and Statistical Models (Adv)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS3914 GIS in Coastal Management (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points of Intermediate geography or geology units or GEOS</td>
<td>N GEOS3014, MARS3104</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2 (2115 or 2915) and BIOL (2018 or 2918), Department permission required for enrolment</td>
<td>Winter</td>
</tr>
<tr>
<td>GEOS3918 Rivers: Science and Management (Adv)</td>
<td>6</td>
<td>P Distinction average in 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience(GEOS or GEOG) units of study</td>
<td>N GEOS3018</td>
<td>Semester 1</td>
<td></td>
<td>Winter</td>
</tr>
<tr>
<td>Financial Mathematics and Statistics</td>
<td></td>
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</tr>
</tbody>
</table>

For a major in Financial Mathematics and Statistics, students are required to complete:

#### Junior units of study

At least 12 credit points of junior units of study from the Science Subject Area of Mathematics including:

1. **Mathematics and Statistics (Adv)**

   - MATH1001, MATH1013, MATH1903, MATH1907

   - MATH1002, MATH1012, MATH1014

2. **Probability and Statistical Models**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

3. **Statistics (Advanced)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Core intermediate units of study

18 credit points from the following units of study:

1. **Mathematics and Statistics**

   - MATH1001, MATH1013, MATH1903, MATH1907

   - MATH1002, MATH1012, MATH1014

2. **Probability and Statistical Models (Adv)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

3. **Statistics (Advanced)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Senior units of study

At least 24 credit points comprising the following units of study:

1. **Mathematics and Statistics**

   - MATH1001, MATH1013, MATH1903, MATH1907

   - MATH1002, MATH1012, MATH1014

2. **Probability and Statistical Models (Adv)**

   - MATH1005, MATH1015, STAT1021, STAT1022, ECMT1010

#### Note

- Students may enrol in both MATH2970 and MATH3975 in the same semester
- Students may enrol in both MATH2070 and MATH3075 in the same semester
- HSC Mathematics Extension 2. This requirement may be varied.
- Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.
- Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition
<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3012 Applied Linear Models</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2004) and MATH1002 or 1014 or 1902). N STAT1912, STAT3002, STAT3002, STAT3004, STAT3904</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3912 Applied Linear Models (Advanced)</td>
<td>6</td>
<td>P (STAT2912 or Credit in STAT2004 or Credit in STAT2012) and MATH(2061 or 2961 or 1902). N STAT3012, STAT3002, STAT3002, STAT3004, STAT3904</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3013 Statistical Inference</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2903) and STAT (2011 or 2911) N STAT3913, STAT3001, STAT3901</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3913 Statistical Inference Advanced</td>
<td>6</td>
<td>P STAT(2911 or 2903). N STAT3013, STAT3001, STAT3901</td>
<td>It is advisable to have also completed STAT2912</td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>STAT3014 Applied Statistics</td>
<td>6</td>
<td>A STAT(2012 or 3912), P STAT(2012 or 2912 or 2004). N STAT3914, STAT3002, STAT3902, STAT3006</td>
<td>Semester 2</td>
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<td></td>
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<tr>
<td>STAT3914 Applied Statistics Advanced</td>
<td>6</td>
<td>A STAT3912 P STAT2912 or credit or better in (STAT2004 or STAT2012). N STAT3004, STAT3002, STAT3902, STAT3006, STAT3907</td>
<td>Semester 2</td>
<td></td>
<td></td>
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<tr>
<td>MATH3067 Information and Coding Theory</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics N MATH3007, MATH3010</td>
<td>Semester 2</td>
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<tr>
<td>MATH3969 Measure Theory &amp; Fourier Analysis (Adv)</td>
<td>6</td>
<td>A At least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level P 12 credit points Intermediate Mathematics N MATH3909</td>
<td>Semester 2</td>
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<tr>
<td>MATH3974 Fluid Dynamics (Advanced)</td>
<td>6</td>
<td>A MATH2961, MATH2965 P 12 credit points of Intermediate Mathematics with average grade of at least Credit N MATH3914</td>
<td>Semester 1</td>
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<tr>
<td>MATH3976 Mathematical Computing</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics and one of MATH(1001 or 1003 or 1901 or 1903 or 1906 or 1907). N MATH3976, MATH3016, MATH3916</td>
<td>Semester 1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MATH3978 Mathematical Computing (Advanced)</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics and one of MATH(1903 or 1907) Credit in MATH1003 N MATH3007, MATH3016, MATH3916</td>
<td>Semester 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3078 PDEs and Waves</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965) P 12 credit points of Intermediate Mathematics N MATH3978, MATH3016, MATH3921</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3978 PDEs and Waves (Advanced)</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965) P 12 credit points of Intermediate Mathematics with at least Credit average N MATH3007, MATH3018, MATH3921</td>
<td>Semester 2</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>INFO3404 Database Systems 2</td>
<td>6</td>
<td>A Introductory database study such as INFO2120 or INFO2820 or INFO2005 or INFO2905. Students are expected to be familiar with SQL and the relational data model, and to have some programming experience. N INFO3004, INFO3005, INFO3905, COMP3005, COMP3905</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFO3504 Database Systems 2 (Adv)</td>
<td>6</td>
<td>P Distinction-level result in INFO2120 or INFO2820 or COMP2007 or COMP2907 N INFO3004, INFO3005, INFO3905, COMP3005, COMP3905</td>
<td>Semester 2</td>
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</tr>
</tbody>
</table>

### Geography

For a major in Geography, the minimum requirement is 24 credit points from senior units of study listed below which must include GEOS3513/3913 OR GEOS3053/3953 OR GEOG3521/3921

#### Junior units of study

| GEOS1001 Earth, Environment and Society           | 6             | N GEOS1901, GEOG1001, GEOL1002, GEOL1001, GEOL1002, GEOL1902 | Semester 1 |
| GEOS1002 Introductory Geography                  | 6             | N GEOS1902, GEOG1001, GEOL1002 | Semester 2 |
| GEOS1901 Earth, Environment and Society Advanced | 6             | P Departmental permission is required for enrolment. An ATAR above 93 is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator. N GEOS1001, GEOG1001, GEOL1002, GEOL1001, GEOL1002, GEOL1902 | Semester 1 |

**Note:** Departmental permission required for enrolment

#### Intermediate units of study

<p>| GEOS2221 Fluvial and Groundwater Geomorphology    | 6             | P 24 credit points of Junior units of study including 6 credit points of Junior Geoscience. Students in the BEnSys should have ENSY1001, 12 credit points of Chemistry, 6 credit points of Biology, BIOM1003 or ENVX2001 | Semester 2 |
| GEOS2112 Economic Geography of Global Development | 6             | P 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOOP1001 or ECOOP1002 N GEOS2912, GEOS2911 | Semester 1 |
| GEOS2115 Oceans, Coasts and Climate Change        | 6             | A At least one of (GEOG1001, GEOL1001, GEOL1002, GEOS1003, GEOS1903, ENV1002, GEOL1902, GEOL1901) P 48 credit points from Junior Units of Study N GEOS2915, MAR5206 | Semester 1 |</p>
<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS2121 Environmental and Resource Management</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421, GEO2202, GEOS2921</td>
<td></td>
</tr>
<tr>
<td>GEOS2122 Urban Geography</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002.</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2922, GEO2521</td>
<td></td>
</tr>
<tr>
<td>GEOS2915 Oceans, Coasts and Climate Change (Adv)</td>
<td>6</td>
<td>P Distinction average in 48 credit points from Junior units of study</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2115, MARS2006</td>
<td></td>
</tr>
<tr>
<td>GEOS2912 Economic Geography of Global Dev. Adv.</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including a distinction in 6 credit points of Junior Geoscience or in ECOP1001 or ECOP1002</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2112, GEO2511</td>
<td></td>
</tr>
<tr>
<td>GEOS2921 Environmental &amp; Resource Management Adv</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including a distinction in 6 credit points of Junior Geoscience or in ECOP1001 or ECOP1002. This requirement may be varied and students should consult the unit of study coordinator.</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421, GEO2202, GEOS2921</td>
<td></td>
</tr>
<tr>
<td>GEOS2922 Urban Geography (Advanced)</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including a distinction in 6 credit points of Junior Geoscience or in ECOP1001 or ECOP1002</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2122</td>
<td></td>
</tr>
<tr>
<td>Senior units of study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOS3009 Coastal Environments and Processes</td>
<td>6</td>
<td>P (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421, MARS3003, MARS3015</td>
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<tr>
<td></td>
<td></td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
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</tr>
<tr>
<td>GEOS3009 Coastal Environments and Processes (Adv)</td>
<td>6</td>
<td>P Distinction average in 6 credit points of Intermediate Geoscience* units and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421, MARS3003, MARS3015</td>
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<tr>
<td></td>
<td></td>
<td>A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</td>
<td></td>
</tr>
<tr>
<td>GEOS3014 GIS in Coastal Management</td>
<td>6</td>
<td>P MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience* units, or (GEOS(2115 or 2915) and BIOL(2018 or 2918))</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421, MARS3014, MARS3015</td>
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<tr>
<td></td>
<td></td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
<td></td>
</tr>
<tr>
<td>GEOS3014 GIS in Coastal Management (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points of Intermediate geography or geology units or GEOS (2115 or 2915) and BIOL (2018 or 2918), Department permission required for enrolment</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2114, MARS3014, MARS3015</td>
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<td>Note: Department permission required for enrolment</td>
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<tr>
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<td></td>
<td>A distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</td>
<td></td>
</tr>
<tr>
<td>GEOS3018 Rivers: Science, Policy and Management</td>
<td>6</td>
<td>P 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience (GEOG or GEOS) units of study</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421</td>
<td></td>
</tr>
<tr>
<td>GEOS3018 Rivers: Science and Management (Adv)</td>
<td>6</td>
<td>P Distinction average in 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience(GEOS or GEOG) units of study</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N GEO2421</td>
<td></td>
</tr>
<tr>
<td>GEOS3053 Asia-Pacific Field School-Assessment A</td>
<td>6</td>
<td>P 6 credit points of Intermediate units of study in Geography, Department permission is required for enrolment.</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C GEO2421, GEO2511, GEO2521, MARS3014, MARS3015</td>
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<td>Note: Department permission required for enrolment</td>
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<td></td>
<td>Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.</td>
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</tr>
<tr>
<td>GEOS3053 Asia-Pacific Field School-A (Adv)</td>
<td>6</td>
<td>P 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment.</td>
<td>Semester 2</td>
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<tr>
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<td></td>
<td>C GEO2421, GEO2511, GEO2521, MARS3014, MARS3015</td>
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<td>Note: Department permission required for enrolment</td>
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<td>Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.</td>
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</tr>
<tr>
<td>GEOS3054 Asia-Pacific Field School-Assessment B</td>
<td>6</td>
<td>P 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment.</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C GEO2421, GEO2511, GEO2521, MARS3014, MARS3015</td>
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<td></td>
<td>Note: Department permission required for enrolment</td>
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<td>Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.</td>
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</tr>
<tr>
<td>GEOS3954 Asia-Pacific Field School-B (Adv)</td>
<td>6</td>
<td>P 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment.</td>
<td>Semester 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C GEO2421, GEO2511, GEO2521, MARS3014, MARS3015</td>
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<td>Note: Department permission required for enrolment</td>
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<td></td>
<td>Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.</td>
<td></td>
</tr>
<tr>
<td>GEOS3513 Regional Development and Environment</td>
<td>6</td>
<td>P 24 credit points of intermediate and/or senior units of study including 6 credit points of Intermediate units of study in Geography.</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N ENV3113, GEO3511, GEO3911, GEO3913</td>
<td></td>
</tr>
<tr>
<td>GEOS3913 Regional Development &amp; Environment (Adv)</td>
<td>6</td>
<td>P 24 credit points of intermediate and/or senior units of study including 6 credit points of Intermediate units of study in Geography with a grade of Credit or better</td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N ENV3113, GEO3511, GEO3513, GEO3911</td>
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</tbody>
</table>
### Geology & Geophysics

For a major in Geology & Geophysics, the minimum requirement is 24 credit points from Senior units listed in this subject area, which must include GEOS(3008 or 3908) and GEOS(3101 or 3801).

### Senior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS3921 Sustainable Urban Environments (Adv)</td>
<td>6</td>
<td>P 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience</td>
<td>N GEOS3921, GEOS3202</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOS3921 Sustainable Urban Environments (Adv)</td>
<td>6</td>
<td>P Distinction average 24 credit points of Intermediate Units of study including 6 credit points of Intermediate Geography units of study.</td>
<td>N GEOS3921, GEOS3202</td>
<td>Semester 2</td>
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</tr>
</tbody>
</table>

### Intermediate units

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS2114 Volcanoes, Hot Rocks and Minerals</td>
<td>6</td>
<td>One of (GEOS1001, GEOL1001, GEOL1002, GEOS1003, GEOS1903, ENV1002, GEOL1902, GEOL1501) and 24 credit points of Junior Science units of study.</td>
<td>GEOL2111, GEOL2911, GEOS2914</td>
<td>Semester 1</td>
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</tr>
<tr>
<td>GEOS2121 Environmental and Resource Management</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002</td>
<td>N GEOS2421, GEOL2202, GEOS2921</td>
<td>Semester 2</td>
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</tr>
<tr>
<td>GEOS2124 Fossils and Tectonics</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including GEOS1003 or GEOS1903 or GEOL1002 or GEOL1902</td>
<td>GEOS2924, GEOL2123, GEOL2124</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOS2115 Oceans, Coasts and Climate Change</td>
<td>6</td>
<td>At least one of (GEOS1001, GEOL1001, GEOL1002, GEOS1003, GEOS1903, ENV1002, GEOL1902, GEOL1501)</td>
<td>P 48 credit points from Junior Units of Study</td>
<td>N GEOS2915, MARS2006</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS2915 Oceans, Coasts and Climate Change (Adv)</td>
<td>6</td>
<td>A (GEOS1001, GEOL1001, GEOL1002, GEOS1003, GEOS1903, ENV1002, GEOL1902, GEOL1501)</td>
<td>P Distinction average in 48 credit points from Junior units of study</td>
<td>N GEOS2115, MARS2006</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS2914 Volcanoes, Hot Rocks and Minerals Adv</td>
<td>6</td>
<td>P 24 credit points of Junior Science units of study and Distinction in one of GEOL1002 or GEOS1002 or GEOL1501 or GEOL1902 or GEOS1903 or GEOS1903.</td>
<td>This requirement may be varied and students should consult the unit of study coordinator.</td>
<td>N GEOL2001, GEOS2114</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS2921 Environmental &amp; Resource Management Adv</td>
<td>6</td>
<td>P 24 credit points of Junior units of study, including a distinction in 6 credit points of Junior Geoscience or in ECOP1001 or ECOP1002.</td>
<td>This requirement may be varied and students should consult the unit of study coordinator.</td>
<td>N GEOS2421, GEOL2202, GEOS2121</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS2924 Fossils and Tectonics (Advanced)</td>
<td>6</td>
<td>P Distinction in GEOS1003 or Distinction average in 12 credit points of Junior Geoscience units (Geoscience is the disciplines of Geography, Geology and Geophysics)</td>
<td>GEOS2124, GEOL2123, GEOL2124</td>
<td>Semester 2</td>
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</tbody>
</table>

### Senior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS3008 Field Geology and Geophysics</td>
<td>6</td>
<td>P GEOS2124 or GEOS2924</td>
<td>GEOL3103, GEOL3908</td>
<td>Semester 2a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOS3101 Earth's Structure and Evolution</td>
<td>6</td>
<td>A GEOS2114, GEOS2124</td>
<td>P GEOS(2114 or 2914) and GEOS(2124 or 2924); or 24 credit points of Intermediate Science units of study and GEOS1003 with permission of the Head of School</td>
<td>N GEOS3801, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3006, GEOS3906, GEOS3017, GEOS3917</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3102 Global Energy and Resources</td>
<td>6</td>
<td>A GEOS2114 and GEOS2124</td>
<td>P GEOS(2114 or 2914) and GEOS(2124 or 2924); or 24 credit points of Intermediate Science units of study and GEOS1003 with permission of the Head of School</td>
<td>N GEOS3921, GEOS3202</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3103 Environmental and Sedimentary Geology</td>
<td>6</td>
<td>A GEOS1003, GEOS2124</td>
<td>P GEOS(2124 or 2924) and GEOS(2111 or 2911 or 2114 or 2914 or 2113 or 2913); or GEOS(1003 or 1003) and 24 credit points of Intermediate Science units of study with permission of the Head of School</td>
<td>N GEOS3903</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS3104 Geophysical Methods</td>
<td>6</td>
<td>P 24 credit points of Intermediate Science units of study or (GEOS(2114/2914) and GEOS(2124/2924))</td>
<td>N GEOS3004, GEOS3804, GEOS3903, GEOS3006, GEOS3906, GEOS3016, GEOS3916, GEOS3917</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOS3908 Field Geology and Geophysics (Advanced)</td>
<td>6</td>
<td>P GEOS2124 or GEOS2924 with a mark of 65% or greater</td>
<td>GEOS3008</td>
<td>N GEOS3008</td>
<td>Semester 2a</td>
<td></td>
</tr>
</tbody>
</table>
**Unit of study** | **Credit points** | **A: Assumed knowledge** | **P: Prerequisites** | **C: Corequisites** | **N: Prohibition** | **Session**
--- | --- | --- | --- | --- | --- | ---
GEOS3801 Earth’s Structure and Evolutions (Adv) | 6 | A GEOSS114, GEOSS2124 | **P** Distinctions in GEOS(2114/2914) and GEOSS(2124/2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School | N GEOSS301, GEOSS3003, GEOSS3002, GEOSS3004, GEOSS3006, GEOSS3006, GEOSS3107, GEOSS3917 |  | Semester 1
GEOS3802 Global Energy and Resources (Adv) | 6 | A GEOSS114 and GEOSS2124 | **P** Distinctions in GEOS(2114 or 2914) and GEOSS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School | N GEOSS301, GEOSS3003, GEOSS3002, GEOSS3004, GEOSS3006, GEOSS3006, GEOSS3107, GEOSS3917 |  | Semester 1
GEOS3803 Environmental & Sedimentary Geology (Adv) | 6 | A GEOSS103, GEOSS2124 | **P** Distinctions in GEOS(2114 or 2914) and GEOSS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School | N GEOSS3103 |  | Semester 2
GEOS3804 Geophysical Methods (Advanced) | 6 | **P** Distinction in GEOS(2114 or GEOSS2124 and GEOSS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School | N GEOSS3104, GEOSS3003, GEOSS3903, GEOSS3006, GEOSS3006, GEOSS3016, GEOSS3916, GEOSS3017, GEOSS3917 |  | Semester 2

**History and Philosophy of Science**

For a major in History and Philosophy of Science, the minimum requirement is 24 credit points from senior units of study listed in this subject area. Students must include the core unit of HPSC3022 Science and Society (6cp) or HPSC3003 social Relations of Science (4cp) (last offered in 2003 and now superseded by HPSC3022).

**Junior units of study**

<table>
<thead>
<tr>
<th><strong>Unit of Study</strong></th>
<th><strong>Credit Points</strong></th>
<th><strong>A: Assumed Knowledge</strong></th>
<th><strong>P: Prerequisites</strong></th>
<th><strong>C: Corequisites</strong></th>
<th><strong>N: Prohibition</strong></th>
<th><strong>Session</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSC1000 Bioethics</td>
<td>6</td>
<td>N HPSC1900</td>
<td></td>
<td></td>
<td><strong>P</strong> Prerequisites in HPS majors.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC1900 Bioethics (Advanced)</td>
<td>6</td>
<td>N HPSC1000</td>
<td></td>
<td></td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

**Intermediate units of study**

<table>
<thead>
<tr>
<th><strong>Unit of Study</strong></th>
<th><strong>Credit Points</strong></th>
<th><strong>A: Assumed Knowledge</strong></th>
<th><strong>P: Prerequisites</strong></th>
<th><strong>C: Corequisites</strong></th>
<th><strong>N: Prohibition</strong></th>
<th><strong>Session</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSC2100 The Birth of Modern Science</td>
<td>6</td>
<td>P 24 credit points of Junior units of study</td>
<td>N HPSC2002, HPSC2900</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC2900 The Birth of Modern Science (Advanced)</td>
<td>6</td>
<td>P Enrolment in the Talented Student Program or 24 credit points of Junior study with a Distinction average</td>
<td>N HPSC2002, HPSC2900</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC2101 What Is This Thing Called Science?</td>
<td>6</td>
<td>P 24 credit points of Junior units of study</td>
<td>N HPSC2001, HPSC2901</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC2901 What Is This Thing Called Science? (Adv)</td>
<td>6</td>
<td>P Enrolment in the Talented Student Program or 24 credit points of Junior study with a Distinction average</td>
<td>N HPSC2002, HPSC2900</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 2</td>
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</table>

**Senior units of study**

<table>
<thead>
<tr>
<th><strong>Unit of Study</strong></th>
<th><strong>Credit Points</strong></th>
<th><strong>A: Assumed Knowledge</strong></th>
<th><strong>P: Prerequisites</strong></th>
<th><strong>C: Corequisites</strong></th>
<th><strong>N: Prohibition</strong></th>
<th><strong>Session</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSC3002 History of Biological/Medical Sciences</td>
<td>6</td>
<td>P HPSC(2100 or 2900) and HPSC(2101 or 2901)</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC3016 The Scientific Revolution</td>
<td>6</td>
<td>P HPSC(2100 or 2900) and HPSC(2101 or 2901)</td>
<td>N HPSC3001, HPSC3106</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC3022 Science and Society</td>
<td>6</td>
<td>P HPSC(2100 or 2900) and HPSC(2101 or 2901)</td>
<td>N HPSC3003</td>
<td>This unit is a requirement for HPS majors.</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC3023 Psychology &amp; Psychiatry: History &amp; Phil</td>
<td>6</td>
<td>A Basic knowledge about the history of modern science as taught in HPSC2100 AND the principles of philosophy of science as taught in HPSC2101 OR knowledge of the various sub-disciplines within Psychology.</td>
<td><strong>P</strong> (at least 12 credit points of intermediate HPSC Units of study) OR (a CR or above in one HPSC intermediate Unit of Study) OR (12 intermediate credit points in psychology).</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC3024 Science and Ethics</td>
<td>6</td>
<td>P At least 24 credit points of Intermediate or Senior units of study; HPSC1000</td>
<td>N HPSC3007</td>
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<td>Semester 2</td>
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</table>

**Immunobiology**

For a major in Immunobiology, the minimum requirement is 24 credit points comprising:

(i) IMMU3102/3902 Cellular and Molecular Immunology and IMMU3202/3903 Immunology in Human Disease; and

(ii) a minimum of 12 credit points from the following senior elective units of study: BCHM 3071/3971, BCHM 3081/3981, BCHM3072/3972, BCHM 3082/3982, BIOL3018/3918, BIOL3026/3926, BIOL3027/3927, CPAT3201, CPAT3202, MIRC 3011/3911, PHSI 3005/3905, PHSI 3006/3906, VIRO3001/3901, VIRO3002

**Intermediate units of study**

The completion of MBLG(2001 or 2101 or 2901) is highly recommended.

<table>
<thead>
<tr>
<th><strong>Unit of Study</strong></th>
<th><strong>Credit Points</strong></th>
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<th><strong>N: Prohibition</strong></th>
<th><strong>Session</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>IMMU2101 Introductory Immunology</td>
<td>6</td>
<td>A Junior Biology and Junior Chemistry</td>
<td>P 24 credit points of Junior units of study from any of the Science discipline areas.</td>
<td>N IMMU2001, BMED2506, BMED2807</td>
<td>This is a prerequisite unit of study for IMMU3102 and IMMU3202. The completion of 6 credit points of MBLG units of study is highly recommended.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
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<tr>
<td><strong>Senior core units of study</strong></td>
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<tr>
<td>IMMU3102 Molecular and Cellular Immunology</td>
<td>6</td>
<td>A Intermediate biochemistry and molecular biology and genetics.</td>
<td>P BMED2807 or IMMU2101 and 6cp of Intermediate units of study from Biochemistry or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology.</td>
<td>N IMMU3002; BMED3003</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>IMMU3902 Molecular and Cellular Immunology (Adv)</td>
<td>6</td>
<td>A Intermediate biochemistry and molecular biology and genetics.</td>
<td>P Distinction in Intermediate Immunology IMMU2101 and 6CP of intermediate units of study from Biochemistry or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology. For BMedSc students: 36 credit points of intermediate BMedSc units including Distinction in BMED2807</td>
<td>N IMMU3102</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>IMMU3202 Immunology in Human Disease</td>
<td>6</td>
<td>A Intermediate biochemistry and molecular biology and genetics.</td>
<td>P BMED2807 or IMMU2101 and 6CP of Intermediate units of study from Biochemistry, or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology.</td>
<td>N IMMU3002; BMED3003</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>IMMU3903 Immunology in Human Disease (Advanced)</td>
<td>6</td>
<td>A Intermediate biochemistry and molecular biology and genetics.</td>
<td>P At least 6 credit points intermediate immunology including a Distinction in Intermediate Immunology (IMMU2101) and 6 credit points of Intermediate units of study from (Biochemistry or Biology or Molecular Biology and Genetics or Pharmacology or Physiology). For BMedSci students: 42 credit points of intermediate BMedSc units including Distinction in BMED2808 or BMED2809.</td>
<td>N IMMU3002</td>
<td></td>
<td>Semester 2</td>
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<tr>
<td><strong>Senior elective units of study</strong></td>
<td></td>
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<tr>
<td>BCHM3071 Molecular Biology &amp; Biochemistry- Genes</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804.</td>
<td>N BChM3971, BChM3901, BChM3903</td>
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<td>Semester 1</td>
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<tr>
<td>BCHM3971 Molecular Biology &amp; Biochem- Genes (Adv)</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BChM3971, BChM3901</td>
<td></td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BCHM3081 Mol Biology &amp; Biochemistry-Proteins</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804.</td>
<td>N BChM3981, BChM3901</td>
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<td>Semester 2</td>
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<tr>
<td>BCHM3981 Mol Biology &amp; Biochemistry-Proteins Adv</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BChM3981, BChM3901</td>
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<td>Semester 2</td>
<td></td>
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<tr>
<td>BCHM3072 Human Molecular Cell Biology</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/MBLG2971 or BChM2071/2971 or BChM2072/2972) or (42CP of Intermediate BMedSc units, including BMED2802 and BMED2804).</td>
<td>N BCHM3972, BChM3902, BChM3904</td>
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<td>Semester 2</td>
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<tr>
<td>BCHM3972 Human Molecular Cell Biology (Advanced)</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/MBLG2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3972, BChM3902, BChM3904</td>
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<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BCHM3082 Medical and Metabolic Biochemistry</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804.</td>
<td>N BCHM3982, BChM3902, BChM3904</td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BCHM3982 Medical and Metabolic Biochemistry (Adv)</td>
<td>6</td>
<td>P MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BChM2071/2971 or BChM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.</td>
<td>N BCHM3982, BChM3902, BChM3904</td>
<td></td>
<td>Semester 2</td>
<td></td>
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<tr>
<td>BIOL3018 Applications of Recombinant DNA Tech</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSci students: 36 credit points of intermediate BMedSc units including BMED2802.</td>
<td>N BIOL3918</td>
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<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3918 Applications of Recombinant DNA Tech Adv</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSci students: 36 credit points of intermediate BMedSc units including Distinction in BMED2802.</td>
<td>N BIOL3918</td>
<td></td>
<td>Semester 1</td>
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<tr>
<td>BIOL3026 Developmental Genetics</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971) and MBLG (2072/2972), For BMedSci students: 36 credit points of Intermediate BMedSc units including BMED2802.</td>
<td>N BIOL3926</td>
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<td>Semester 2</td>
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<tr>
<td>BIOL3926 Developmental Genetics (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), and MBLG (2072/2972). For BMedSci students: 36 credit points of Intermediate BMedSc units including Distinction in BMED2802.</td>
<td>N BIOL3926</td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BIOL3027 Bioinformatics and Genomics</td>
<td>6</td>
<td>P 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSci students: 36 credit points of Intermediate BMedSc units including Distinction in BMED2802.</td>
<td>N BIOL3927</td>
<td></td>
<td>Semester 1</td>
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</tr>
<tr>
<td>BIOL3927 Bioinformatics and Genomics (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSci students: 36 credit points of Intermediate BMedSc units including Distinction in BMED2802.</td>
<td>N BIOL3927</td>
<td></td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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<tr>
<td>CPAT3201 Pathogenesis of Human Disease 1</td>
<td>6</td>
<td>P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC or as the head of department determines.</td>
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<td>Semester 2</td>
</tr>
<tr>
<td>CPAT3202 Pathogenesis of Human Disease 2</td>
<td>6</td>
<td>P At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC or as the head of department determines.</td>
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<td>Semester 2</td>
</tr>
<tr>
<td>MICR3011 Microbes in Infection</td>
<td>6</td>
<td>P At least 6 credit points of MBLG units and (MICR2022 or MICR2922 or MICR2002 or MICR2902). For BMedSc students: 42 credit points of Intermediate BMED units including (BMED2207 and BMED2208). For BScAgr students: (PLNT2001 or PLNT2091) and (MICR2022 or MICR2922).</td>
<td></td>
<td>N MICR3911, MICR3001, MICR3901</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MICR3911 Microbes in Infection (Advanced)</td>
<td>6</td>
<td>P At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2022 or 2002 or 2002). For BMedSc students: 42 credit points of Intermediate BMED units including in BMED (2007 or 2008) with a Distinction in one of these two. For BScAgr students: PLNT (2001 or 2001) and MICR (2022 or 2002) including one Distinction.</td>
<td></td>
<td>N MICR3011, MICR3001, MICR3901</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHSI3005 Human Cellular Physiology: Theory</td>
<td>6</td>
<td>A 6 credit points of MBLG</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>PHSI3905 Human Cellular Physiology (Adv): Theory</td>
<td>6</td>
<td>P Credit average in PHSI(2005 or 2005) and PHSI(2005 or 2006) or in BMED (2001 and 2002). Students enrolling in this unit should have a WAM of at least 70.</td>
<td></td>
<td>N PHSI3005, PHSI3004, PHSI3904</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHSI3906 Human Cellular Physiology (Adv): Research</td>
<td>6</td>
<td>A 6 credit points of MBLG</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>VIRO3001 Virology</td>
<td>6</td>
<td>A MICR (2021 or 2021 or 2022 or 2022)</td>
<td></td>
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<td>Semester 1</td>
</tr>
<tr>
<td>VIRO3901 Virology (Advanced)</td>
<td>6</td>
<td>P At least 6 credit points of MBLG units and at least 6 credit points of Intermediate MICR or BCHM or BIOL or IMMJ or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: (PLNT (2001 or 2001) and MICR2024.</td>
<td></td>
<td>N VIRO3001</td>
<td>Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>VIRO3002 Medical and Applied Virology</td>
<td>6</td>
<td>A Intermediate microbiology, immunology, molecular biology and genetics.</td>
<td>P 6cp MBLG units and at least 5cp from Intermediate MICR or BCHM or BIOL or IMMJ or PCOL or PHSI units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2207. A: Assumed knowledge</td>
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</tr>
<tr>
<td>VIRO3902 Medical and Applied Virology (Advanced)</td>
<td>6</td>
<td>P VIRO3001 (Distinction) or VIRO3901 (Credit)</td>
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<td>Semester 2</td>
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</table>

**Information Systems**

For a major in Information Systems, the minimum requirement is 24 credit points chosen from the senior units of study for this subject area.

Students enrolled in non-IT degrees or majors are eligible (upon application) for a Minor in Information Technology if they complete at least 18 credit points of intermediate or above units of study offered by the School of IT, within a completed degree. For further information, please refer to: http://www.it.usyd.edu.au/future_students/undergrad/minor.shtml

Students should note that applications for special consideration on the basis of illness or misadventure for INFO, ISYS, COMP, ELEC units should be lodged with the Faculty of Engineering and IT

**Junior units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
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<th>N: Prohibition</th>
<th>Session</th>
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<tbody>
<tr>
<td>INFO1003 Foundations of Information Technology</td>
<td>6</td>
<td>N INFO1000 or INFO1000</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>INFO1103 Introduction to Programming</td>
<td>6</td>
<td>A HSC Mathematics</td>
<td>SOFT (1001 or 1901) or COMP (1001 or 1901) or DECC2011</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>INFO1903 Informatics (Advanced)</td>
<td>6</td>
<td>A HSC Mathematics</td>
<td>P ATAR sufficient to enter BCST(Adv), BIT or BSc(Adv), or portfolio of work suitable for entry</td>
<td>Note; Department permission required for enrolment</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1105 Data Structures</td>
<td>6</td>
<td>A Programming, as for INFO1103</td>
<td>N INFO1005 or SOFT (1002 or 1902) or COMP (1002 or 1002 or 2160 or 2860 or 2111 or 2811 or 2002 or 2002)</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO1905 Data Structures (Advanced)</td>
<td>6</td>
<td>P 75% or greater in INFO1103 or INFO1903</td>
<td>N INFO1105 or SOFT (1002 or 1902) or COMP (1002 or 2002)</td>
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<td></td>
<td>Semester 2</td>
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</table>
### Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<tr>
<td>INFO1911 IT Special Project 1A</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1912 IT Special Project 1B</td>
<td>6</td>
<td>A ATAR of at least 96 and High Distinction average in first year IT units of study and Distinction average in first year non-IT units of study.</td>
<td>Departmental permission required for enrolment</td>
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<td>Semester 2</td>
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### Intermediate units of study

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<thead>
<tr>
<th>Unit of study</th>
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<th>P: Prerequisites</th>
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<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP2007 Algorithms and Complexity</td>
<td>6</td>
<td>INFO1105, MATH1004 or MATH1904</td>
<td>COMP2907, COMP3309, COMP3609, COMP3111, COMP3811</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2007 Algorithms and Complexity (Advanced)</td>
<td>6</td>
<td>INFO1905, MATH1904 P Distinction level result in INFO1105 or INFO1905 or SOFT1002 or SOFT1902</td>
<td>COMP2007 OR COMP2907</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2121 Distributed Systems &amp; Network Principles</td>
<td>6</td>
<td>P (INFO1103 or INFO1903) AND (INFO1105 or INFO1905) C (COMP2007 OR COMP2907)</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>COMP2129 Operating Systems and Machine Principles</td>
<td>6</td>
<td>A Programming, as from INFO1103</td>
<td>COMP2004, COMP2904</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO2110 Systems Analysis and Modelling</td>
<td>6</td>
<td>A Experience with a data model as in INFO1003 or INFO1103 or INFS1000</td>
<td>INFO2810, INFO2000, INFO2300</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO2120 Database Systems 1</td>
<td>6</td>
<td>A Some exposure to programming and some familiarity with data model concepts such as taught in INFO1103 or INFO1105 or INFS1000 or INFO1903</td>
<td>INFO2820, INFO2005, INFO2905</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO2820 Database Systems 1 (Advanced)</td>
<td>6</td>
<td>P Distinction-level result in INFO1103 or INFO1105 or INFO1903 or INFO1905</td>
<td>INFO2905</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO2831 Introduction to IT Security</td>
<td>6</td>
<td>A Computer literacy N NETS3305, NETS3605, NETS3916, ELEC5610, ELEC5616</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO2911 IT Special Project 2A</td>
<td>6</td>
<td>P Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year</td>
<td>Departmental permission required</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO2912 IT Special Project 2B</td>
<td>6</td>
<td>P Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year</td>
<td>Departmental permission required</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ISYS2140 Information Systems</td>
<td>6</td>
<td>A INFO1003 or INFS1000</td>
<td>ISYS2000, ISYS2007</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Senior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC3610 E-Business Analysis and Design</td>
<td>6</td>
<td>INFO2120</td>
<td>EBUS3003, EBUS3001</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3220 Object Oriented Design</td>
<td>6</td>
<td>INFO2110, INFO1105 N SOFT3301, SOFT3601, SOFT3101, SOFT3801, COMP3008, COMP3908</td>
<td></td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3315 Human-Computer Interaction</td>
<td>6</td>
<td>INFO2110</td>
<td>MULT3007, MULT3607, MULT3018, MULT3918, SOFT3102, SOFT3802, COMP3102, COMP3802</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3402 Management of IT Projects and Systems</td>
<td>6</td>
<td>INFO2000, INFO2110, INFO2810, INFO2900 N ISYS3000, ISYS3012, ELEC3606</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3404 Database Systems 2</td>
<td>6</td>
<td>A Introductory database study such as INFO2120 or INFO2820 or INFO2005 or INFO2905. Students are expected to be familiar with SQL and the relational data model, and to have some programming experience.</td>
<td>INFO3004, INFO3905, COMP3005, COMP3905</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3504 Database Systems 2 (Adv)</td>
<td>6</td>
<td>P Distinction-level result in INFO2120 or INFO2820 or COMP2007 or COMP2907</td>
<td>INFO3004, INFO3905, COMP3005, COMP3905</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3600 Major Development Project (Advanced)</td>
<td>12</td>
<td>INFO3402</td>
<td>COMP3615, ISYS3400, SOFT3300, SOFT3600, SOFT3200, SOFT3700 Only available to students in BIT, BCST(Adv) or BSc(Adv)</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO3911 IT Special Project 3A</td>
<td>6</td>
<td>P Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.</td>
<td>Departmental permission required</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO3912 IT Special Project 3B</td>
<td>6</td>
<td>P Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.</td>
<td>Departmental permission required</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ISYS3400 Information Systems Project</td>
<td>6</td>
<td>A INFO1003</td>
<td>INFO3402 or ISYS3012 and (ISYS3401 or ISYS3015)</td>
<td>INFO3000, ISYS3207</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ISYS3401 Analytical Methods &amp; Information Systems</td>
<td>6</td>
<td>A INFO2110, ISYS2140</td>
<td>ISYS3015</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Marine Biology

For a major in Marine Biology, the minimum requirement is 24 credit points from senior units listed in this subject area. Intermediate units leading to a major in Marine Biology are 12 credit points of intermediate BIOL units that include BIOL2018 or 2918.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3906 Ecological Methods</td>
<td>6</td>
<td>A BIOL (2011 or 211 or 2012 or 2912) or PLNT (2002 or 2902); P 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENV1 (2111 or 2911) or GEOS (2115 or 2915)</td>
<td>BIOL3906</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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<tr>
<td>BIOL3906 Ecological Methods (Advanced)</td>
<td>6</td>
<td>A: BIOL (2011 or 2911 or 2012 or 2912) or PLNT (2002 or 2002).</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3906</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3007 Ecology</td>
<td>6</td>
<td>A: Although not prerequisites, knowledge obtained from BIOL3006/3906, and BIOL3008/3908</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3007</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BIOL3007 Ecology (Advanced)</td>
<td>6</td>
<td>A: Although not prerequisites, knowledge obtained from BIOL3006/3906, and BIOL3008/3908</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3007</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BIOL3008 Marine Field Ecology</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115, BIOL (3006 or 3906). Prior completion of one of these units is very strongly recommended.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3008</td>
<td>2 Intensive Session</td>
<td></td>
</tr>
<tr>
<td>BIOL3008 Marine Field Ecology (Advanced)</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115. Prior completion of BIOL (3006 or 3906) is very strongly recommended.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3008</td>
<td>2 Intensive Session</td>
<td></td>
</tr>
<tr>
<td>BIOL3011 Ecophysiology</td>
<td>6</td>
<td>A: BIOL (2012 or 2016 or 2916) or PLNT (2003 or 2003).</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3911</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3911 Ecophysiology (Advanced)</td>
<td>6</td>
<td>A: BIOL (2012 or 2016 or 2916) or PLNT (2003 or 2003).</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3911</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3013 Marine Biology</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3913</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3913 Marine Biology (Advanced)</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3913</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3016 Coral Reef Biology</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3916</td>
<td>2 Intensive Session</td>
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</tr>
<tr>
<td>BIOL3016 Coral Reef Biology (Advanced)</td>
<td>6</td>
<td>A: BIOL2018 or GEOS2115.</td>
<td>P: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N: BIOL3916</td>
<td>2 Intensive Session</td>
<td></td>
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</table>

**Marine Geoscience**

For a major in Marine Geoscience, the minimum requirement is 24 credit points from senior units listed in this subject area. Intermediate units leading to a major in Marine Geoscience are 12 credit points of Intermediate GEOS units OR 6 credit points of Intermediate GEOS units and 6 credit points of either BIOL2018 or 2918.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS3009 Coastal Environments and Processes</td>
<td>6</td>
<td>(6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or (MARS2005 or MARS2005) and (MARS2006 or MARS2006)</td>
<td>N: GEOS3009, MARS3003, MARS3015</td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3009 Coastal Environments and Processes (Adv)</td>
<td>6</td>
<td>P: Distinction average in (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or (MARS2005 or MARS2005) and (MARS2006 or MARS2006)</td>
<td>N: GEOS3009, MARS3003, MARS3015</td>
<td>A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3014 GIS in Coastal Management</td>
<td>6</td>
<td>P: MARS2005 or 2905 and MARS2006 or 2906, or 12 credit points of Intermediate Geoscience units, or (GEOS(2115 or 2915) and BIOL(2018 or 2918))</td>
<td>N: GEOS3014, MARS3014</td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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</tr>
<tr>
<td>GEOS3914 GIS in Coastal Management (Advanced)</td>
<td>6</td>
<td>P Distinction average in 12 credit points of Intermediate geography or geology units or GEOS (2115 or 2193) and BIOL (2018 or 2918), Department permission required for enrolment</td>
<td>N GEOS3914, MARS3104</td>
<td>Note: Department permission required for enrolment</td>
<td>A Distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit coordinator.</td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS3018 Rivers: Science, Policy and Management</td>
<td>6</td>
<td>P 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience (GEOG or GEOS) units of study</td>
<td>N GEOS3918</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOS3918 Rivers: Science and Management (Adv)</td>
<td>6</td>
<td>P Distinction average in 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience(GEOS or GEOG) units of study</td>
<td>N GEOS3018</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOS3103 Environmental and Sedimentary Geology</td>
<td>6</td>
<td>A GEOS1003, GEOS2124</td>
<td>P GEOS(2124 or 2924) and GEOS(2111 or 2911 or 2114 or 2914 or 2113 or 2913); or GEOS(1003 or 2903) and 24 credit points of Intermediate Science units of study with permission of the Head of School</td>
<td>N GEOS3003</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS3803 Environmental &amp; Sedimentary Geology(Adv)</td>
<td>6</td>
<td>A GEOS1003, GEOS2124</td>
<td>P Distinctions in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with permission of the Head of School</td>
<td>N GEOS3103</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS3104 Geophysical Methods</td>
<td>6</td>
<td>P Distinction of Intermediate Science units of study or (GEOS(2114/2914) and GEOS(2124/2924))</td>
<td>N GEOS3004, GEOS3804, GEOS3003, GEOS3903, GEOS3006, GEOS3906, GEOS3016, GEOS3916, GEOS3917, GEOS3919</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS3804 Geophysical Methods (Advanced)</td>
<td>6</td>
<td>P Distinction in GEOS2114 or GEOS2914 and GEOS2124 or GEOS2924; Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School</td>
<td>N GEOS3104, GEOS3003, GEOS3903, GEOS3006, GEOS3906, GEOS3016, GEOS3916, GEOS3917, GEOS3919</td>
<td></td>
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<td>Semester 2</td>
</tr>
<tr>
<td>GEOS3102 Global Energy and Resources</td>
<td>6</td>
<td>A GEOS2114 and GEOS2914</td>
<td>P GEOS(2114 or 2914) and GEOS(2124 or 2924); or 24 credit points of Intermediate Science units of study and GEOS1003 with permission of the Head of School</td>
<td>N GEOS3802, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3006, GEOS3906, GEOS3017, GEOS3917</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOS3802 Global Energy and Resources (Adv)</td>
<td>6</td>
<td>A GEOS2114 and GEOS2914</td>
<td>P Distinction in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School.</td>
<td>N GEOS3102, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3006, GEOS3906, GEOS3017, GEOS3917</td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

**Marine Science**

For a major in Marine Science, the minimum requirement is 24 credit points of senior units listed under the major in Marine Geoscience and the major in Marine Biology, which must include at least 6 credit points of GEOS3XXX and at least 6 credit points BIOL3XXX from the units listed below.

### Intermediate units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL2018 Introduction to Marine Biology</td>
<td>6</td>
<td>A Distinction average in 12 credit points of Junior Biology</td>
<td>P BIOL (1051 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH); 12 credit points of Junior Chemistry.</td>
<td>N BIOL2918</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BIOL2918 Introduction to Marine Biology (Adv)</td>
<td>6</td>
<td>A Distinction average in BIOL (1051 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH); 12 credit points of Junior Chemistry or for BSc (Marine Science) students 6 credit points of Junior Chemistry and either an additional 6 credit points of Junior Chemistry or 6 credit points of Junior Physics. These requirements may be varied and students with lower averages should consult the Unit Executive Officer.</td>
<td>N BIOL2918</td>
<td>Entry is restricted and selection is made from applicants on the basis of previous performance.</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS2115 Oceans, Coasts and Climate Change</td>
<td>6</td>
<td>A Distinction average in 48 credit points from Junior units of study</td>
<td>P Distinction average in 48 credit points from Junior Units of Study</td>
<td>N GEOS2915, MARS2006</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOS2915 Oceans, Coasts and Climate Change (Adv)</td>
<td>6</td>
<td>A GEOS1001, GEOL1001, GEOL1002, GEOS1003, GEOS1903, ENVI1002, GEOL1902, GEOL1901</td>
<td>P 48 credit points from Junior Units of Study</td>
<td>N GEOS2915, MARS2006</td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Senior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3006 Ecological Methods</td>
<td>6</td>
<td>A BIOL (2111 or 2911 or 2191 or 2992) or PLNT (2002 or 2902).</td>
<td>P 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3906</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL3007 Ecology</td>
<td>6</td>
<td>A Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL, and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3907</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BIOL3008 Marine Field Ecology</td>
<td>6</td>
<td>A: Assumed knowledge</td>
<td>P Distinction average in 24 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3908</td>
<td>Dates: 28 June - 5 July 2011.</td>
<td></td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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<tr>
<td>BIOL3011 Ecophysiology</td>
<td>6</td>
<td>A BIOL(2012 or 2912 or 2016 or 2916) or PLNT(2003 or 2903).</td>
<td>P 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3911</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3013 Marine Biology</td>
<td>6</td>
<td>A BIOL2018 or GEOS2115.</td>
<td>P 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3913</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3016 Coral Reef Biology</td>
<td>6</td>
<td>A BIOL2018 or GEOS2115.</td>
<td>P 12 credit points of Intermediate Biology; or 6 credit points of BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3916, NTMP3001</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3916 Coral Reef Biology (Advanced)</td>
<td>6</td>
<td>A BIOL2018 or GEOS2115.</td>
<td>P Distinction average in 12 credit point from Intermediate science units of study which must include at least 6 credit points of Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3006, NTMP3001</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS3103 Environmental and Sedimentary Geology</td>
<td>6</td>
<td>A GEOS1003, GEOS2124</td>
<td>P GEOS(2124 or 2924) and GEOS(2111 or 2911 or 2114 or 2914 or 2113 or 2913); or GEOS(1003 or 1903) and 24 credit points of Intermediate Science units of study with permission of the Head of School</td>
<td>N GEOS3803</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS3009 Coastal Environments and Processes</td>
<td>6</td>
<td>(6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or (MARS2005 or MARS2905 and (MARS2006 or MARS2906))</td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
<td>N GEOS3909, MARS3003, MARS3105</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3014 GIS in Coastal Management</td>
<td>6</td>
<td>P MARS(2005 or 2905) and MARS(2006 or 2906).</td>
<td>P 12 credit points of Intermediate Geoscience* units, or (GEOS(2115 or 2915) and BIOL(2018 or 2918)).</td>
<td>N GEOS3914, MARS3104</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS3018 Rivers: Science, Policy and Management</td>
<td>6</td>
<td>(6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or (MARS2005 or MARS2905 and (MARS2006 or MARS2906))</td>
<td>* Geoscience is the disciplines of Geography, Geology and Geophysics.</td>
<td>N GEOS3918</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3006 Ecological Methods (Advanced)</td>
<td>6</td>
<td>A BIOL (2011 or 2911 or 2012 or 2912) or PLNT (2002 or 2902).</td>
<td>P Distinction average in 12 credit point from Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3006</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3907 Ecology (Advanced)</td>
<td>6</td>
<td>A Although not prerequisites, knowledge obtained from BIOL3006/3906, and BIOL3008/3908 and/or BIOL3009/3909, is strongly recommended. Students entering this unit of study should have achieved Distinction average.</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3007</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>BIOL3008 Marine Field Ecology (Advanced)</td>
<td>6</td>
<td>A BIOL2018 or GEOS2115. Prior completion of BIOL (3006 or 3906) is very strongly recommended.</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3008</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3911 Ecophysiology (Advanced)</td>
<td>6</td>
<td>A BIOL (2012 or 2912 or 2016 or 2916) or PLNT (2003 or 2903).</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3011</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BIOL3913 Marine Biology (Advanced)</td>
<td>6</td>
<td>A BIOL2018 or GEOS2115.</td>
<td>P Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915).</td>
<td>N BIOL3013</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>GEOS3003 Environmental &amp; Sedimentary Geology(Adv)</td>
<td>6</td>
<td>A GEOS1003, GEOS2124</td>
<td>P Distinctions in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with permission of the Head of School</td>
<td>N GEOS3303</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>GEOS3004 Geophysical Methods (Advanced)</td>
<td>6</td>
<td>P Distinction in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School</td>
<td>N GEOS3304, GEOS3003, GEOS3903, GEOS3006, GEOS3906, GEOS3016, GEOS3916, GEOS39017, GEOS3917</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Mathematics

For a major in Mathematics, the minimum requirement is 24 credit points from senior units of study listed in this subject area.

#### Junior units of study

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed Knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH1011 Applications of Calculus</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N MATH1111, MATH1001, MATH1901, MATH1906, BIOM1003</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1014 Introduction to Linear Algebra</td>
<td>3</td>
<td>A HSC Mathematics or MATH1111</td>
<td>N MATH1012, MATH1002, MATH1902</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1013 Mathematical Modelling</td>
<td>3</td>
<td>A HSC Mathematics or MATH1111</td>
<td>N MATH1003, MATH1903, MATH1907</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1015 Biostatistics</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N MATH1005, MATH1905, STAT1021, STAT1022, ECM1010, BIOM1003</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1001 Differential Calculus</td>
<td>3</td>
<td>A HSC Mathematics Extension 1</td>
<td>N MATH1011, MATH1901, MATH1906, MATH1111</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1002 Linear Algebra</td>
<td>3</td>
<td>A HSC Mathematics Extension 1</td>
<td>N MATH1902, MATH1012, MATH1014</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1003 Integral Calculus and Modelling</td>
<td>3</td>
<td>A HSC Mathematics Extension 2 or MATH1001 or MATH1901</td>
<td>N MATH1013, MATH1903, MATH1907</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1004 Discrete Mathematics</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N MATH1904, MATH2011</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1005 Statistics</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>N MATH1015, MATH1905, STAT1021, STAT1022, ECM1010</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1111 Introduction to Calculus</td>
<td>6</td>
<td>A HSC General Mathematics</td>
<td>N MATH1001, MATH1901, MATH1011, MATH1906</td>
<td>Students who have previously studied calculus at any level are prohibited from enrolling in this unit. In particular, students with HSC Mathematics/Extension 1/Extension 2 (or equivalent) are prohibited.</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1901 Differential Calculus (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2</td>
<td>This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.</td>
<td>N MATH1111, MATH1011, MATH1901, MATH1906</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1902 Linear Algebra (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2</td>
<td>This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.</td>
<td>N MATH1002, MATH1012, MATH1014</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1903 Integral Calculus and Modelling</td>
<td>3</td>
<td>P HSC Mathematics Extension 2 or Credit or better in MATH1001 or MATH1901</td>
<td>This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.</td>
<td>N MATH1003, MATH1013, MATH1907</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1905 Statistics (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2</td>
<td>This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.</td>
<td>N MATH1015, MATH1905, STAT1021, STAT1022, ECM1010</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1906 Mathematics (Special Studies Program) A</td>
<td>3</td>
<td>P UAI (or ATAR equivalent) of at least 98.5 and result in Band E4 HSC Mathematics Extension 2; by invitation</td>
<td>N MATH1111, MATH1001, MATH1011, MATH1901</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1907 Mathematics (Special Studies Program) B</td>
<td>3</td>
<td>P Distinction in MATH1906; by invitation</td>
<td>N MATH1003, MATH1013, MATH1903</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

#### Intermediate units of study

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH2001 Linear Mathematics and Vector Calculus</td>
<td>6</td>
<td>P MATH1011 or 1001 or 1901 or 1906</td>
<td>N MATH2001, MATH2901, MATH2002, MATH2902, MATH2961, MATH2967</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH2003 Math Computing and Nonlinear Systems</td>
<td>6</td>
<td>P MATH1011 or 1001 or 1901 or 1906</td>
<td>N MATH2003, MATH2903, MATH2006, MATH2906, MATH2963</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH2009 Discrete Mathematics and Graph Theory</td>
<td>6</td>
<td>P 6 credit points of Junior level Mathematics</td>
<td>N MATH2011, MATH2009, MATH2969</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>
MATH2961 Linear Mathematics & Vector Calculus Adv
6 P MATH (1901 or 1906 or Credit in 1001) and MATH (1902 or Credit in 1002) and MATH (1903 or 1907, or Credit in 1003)
N MATH2001, MATH2901, MATH2002, MATH2902, MATH2061, MATH2067 Semester 1

MATH2962 Real and Complex Analysis (Adv)
6 P MATH (1901 or 1906 or Credit in 1001) and MATH (1902 or Credit in 1002) and MATH (1903 or 1907, or Credit in 1003)
N MATH2007, MATH2907 Semester 1

MATH2963 Math Computing & Nonlinear Systems (Adv)
6 P MATH (1901 or 1906 or Credit in 1001) and MATH (1902 or Credit in 1002) and MATH (1903 or 1907, or Credit in 1003)
N MATH2003, MATH2903, MATH2006, MATH2906, MATH2063 Semester 1

MATH2969 Discrete Mathematics & Graph Theory Adv
6 P 9 credit points of Junior Mathematics (advanced level) or Credit at the normal level
N MATH1011, MATH2009, MATH2969 Semester 1

MATH2916 Working Seminar A (SSP)
3 P By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics
Note: Department permission required for enrolment Semester 1

MATH2065 Partial Differential Equations (Intro)
6 P MATH(1011 or 1001 or 1901 or 1906) and (MATH(1014 or 1002 or 1902) or MATH(1003 or 1903 or 1907))
N MATH2005, MATH2905, MATH2965, MATH2067 Semester 2 Summer Main

MATH2068 Number Theory and Cryptography
6 A MATH (1014 or 1002 or 1902)
N MATH3024, MATH3009, MATH2988 Semester 2

MATH2988 Number Theory and Cryptography Advanced
6 P At least 9cp from MATH (1901 or Credit in 1001), MATH (1902 or Credit in 1002), MATH (1903 or Credit in 1003), MATH (1904 or Credit in 1004), MATH (1905 or Credit in 1005), MATH1906, MATH1907, MATH2961, MATH2962 or MATH (2901 or Credit in 2061), MATH2962 or MATH (2969 or Credit in 2069).
N MATH2008 Semester 2

MATH2070 Optimisation and Financial Mathematics
6 A MATH (1002 or 1003 or 1907)
P MATH(1011 or 1001 or 1901 or 1906) and MATH(1014 or 1002 or 1902)
N MATH2010, MATH2033, MATH2933, MATH2970, ECM37510
Students may enrol in both MATH2070 and MATH2075 in the same semester Semester 2 Summer Main

MATH2965 Partial Differential Equations Intro Adv
6 P MATH (2961 or Credit in 2061) or [MATH (2901 or Credit in 2001) and MATH (2902 or Credit in 2002)]
N MATH2005, MATH2905, MATH2965, MATH2067 Semester 2

MATH2968 Algebra (Advanced)
6 P 9 credit points of Junior Mathematics (advanced level) or Credit at normal level including (MATH1902 or Credit in MATH1002)
N MATH2908, MATH2918, MATH2908 Semester 2

MATH2970 Optimisation & Financial Mathematics Adv
6 A MATH (1903 or 1907) or Credit in MATH1003
P MATH (1901 or 1906 or Credit in 1001) and MATH (1902 or Credit in 1002)
N MATH2010, MATH2033, MATH2933, MATH2970
Students may enrol in both MATH2970 and MATH3975 in the same semester Semester 2

MATH2917 Working Seminar B (SSP)
3 P By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics
Note: Department permission required for enrolment Semester 2

Senior units of study

MATH3063 Differential Equations and Biomath
6 A MATH2961
P 12 credit points of Intermediate Mathematics
N MATH3020, MATH3920, MATH3003, MATH3923, MATH3963 Semester 1

MATH3065 Logic and Foundations
6 P 6 credit points of Intermediate Mathematics
N MATH3005 Semester 1

MATH3076 Mathematical Computing
6 P 12 credit points of Intermediate Mathematics and one of MATH(1001 or 1003 or 1901 or 1903 or 1906 or 1907)
N MATH3976, MATH3016, MATH3916 Semester 1

MATH3961 Metric Spaces (Advanced)
6 A MATH2961 or MATH2962
P 12 credit points of Intermediate Mathematics units
N MATH3901, MATH3001 Semester 1

MATH3962 Rings, Fields and Galois Theory (Adv)
6 A MATH2961
P 12 credit points of Intermediate Mathematics
N MATH3062, MATH3902, MATH3002
Students are advised to take MATH2968 before attempting this unit.
Semester 1

MATH3963 Differential Equations & Biomath (Adv)
6 A MATH2961
P 12 credit points of Intermediate Mathematics
N MATH3020, MATH3920, MATH3003, MATH3923, MATH3063 Semester 1

MATH3974 Fluid Dynamics (Advanced)
6 A MATH2961, MATH2965
P 12 credit points of Intermediate Mathematics with average grade of at least Credit
N MATH3914 Semester 1

MATH3976 Mathematical Computing (Advanced)
6 P 12 credit points of Intermediate Mathematics and one of MATH(1903 or 1907) or Credit in MATH1003
N MATH3076, MATH3016, MATH3916 Semester 1

MATH3061 Geometry and Topology
6 P 12 credit points of Intermediate Mathematics
N MATH3001, MATH3006 Semester 2

MATH3062 Algebra and Number Theory
6 P 12 credit points of Intermediate Mathematics
N MATH3962, MATH3002, MATH3009
Students are advised to take MATH(2968 or 2969) before attempting this unit.
Semester 1

MATH3067 Information and Coding Theory
6 P 12 credit points of Intermediate Mathematics
N MATH3007, MATH3010 Semester 2

MATH3068 Analysis
6 P 12 credit points of Intermediate Mathematics
N MATH3008, MATH2907, MATH2962
This unit of study is offered only in odd numbered years.
Semester 2

MATH3075 Financial Mathematics
6 P 12 credit points of Intermediate Mathematics
N MATH3975, MATH3015, MATH3933 Semester 2
### Microbiology

A major in Microbiology requires 24 credit points from senior units of study listed in the subject area.

#### Senior units of study

- **MICR3011 Microbes in Infection**
  - Prerequisite: At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2922 or 2002 or 2926) or Micr2909
  - Prerequisite: 6 credit points of Intermediate Mathematics units of study at Intermediate or Senior level.
  - Credit average at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.

- **MICR2024 Microbes in the Environment**
  - Prerequisite: At least 6 credit points of Intermediate Biology units of study in at least one of Junior Biology or MBLG1001 or MBLG1901 or PLNT2001 or PLNT2911.
  - Credit average at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.

- **MICR2922 Microbes in Society (Advanced)**
  - Prerequisite: At least 6 credit points of Junior Biology units and (6 credit points of MBLG (1001 or 1901) or MBLG2901 or PLNT2001 or PLNT2911) and 6 of Junior Chemistry.
  - Credit average at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.

- **MICR2921 Microbes in Society**
  - Prerequisite: At least 6 credit points of Junior Biology units and 6 of Junior Chemistry.
  - Credit average at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.

- **MICR2022 Microbes in Society**
  - Prerequisite: 6 credit points of Junior Biology units and 6 of Junior Chemistry.
  - Credit average at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.

### Medicinal Chemistry

For a major in Medicinal chemistry, the minimum requirement is 24 credit points comprising:

- **PCOL3011 3911 and PCOL3012 3912:**
  - 6 credit points from senior Chemistry units of study.

Note that there are intermediate prerequisites for the core senior units of study. Junior and intermediate units of study should be selected to permit progression to the required senior units of study.

### Microbiology

A major in Microbiology requires 24 credit points from senior units of study listed in the subject area.

#### Senior units of study

- **MICR3011 Microbes in Infection**
  - Prerequisite: At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2922 or 2002 or 2926) or Micr2909
  - Prerequisite: 6 credit points of Intermediate Mathematics units of study at Intermediate or Senior level.

- **MICR3911 Microbes in Infection (Advanced)**
  - Prerequisite: At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2922 or 2002 or 2926) or Micr2909
  - Prerequisite: 6 credit points of Intermediate Mathematics units of study at Intermediate or Senior level.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH3078 PDEs and Waves</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965)</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH3978, MATH3979, MATH3981, MATH3982</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3964 Complex Analysis with Applications (Adv)</td>
<td>6</td>
<td>A MATH2962</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH3904, MATH3915</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3966 Modules and Group Representations (Adv)</td>
<td>6</td>
<td>A MATH3962</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH3906, MATH3907</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3968 Differential Geometry (Advanced)</td>
<td>6</td>
<td>A at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.</td>
<td>P 12 credit points of Intermediate Mathematics, including MATH2961</td>
<td>N MATH3953, MATH3954</td>
<td></td>
<td></td>
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<tr>
<td>MATH3969 Measure Theory &amp; Fourier Analysis (Adv)</td>
<td>6</td>
<td>A at least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH3959</td>
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<td></td>
</tr>
<tr>
<td>MATH3975 Financial Mathematics (Advanced)</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics with at least Credit average</td>
<td>N MATH3953, MATH3954, MATH3955</td>
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</tr>
<tr>
<td>MATH3977 Lagrangian &amp; Hamiltonian Dynamics (Adv)</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics with at least Credit average</td>
<td>N MATH2904, MATH2905, MATH2906</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3978 PDEs and Waves (Advanced)</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965)</td>
<td>P 12 credit points of Intermediate Mathematics with at least Credit average</td>
<td>N MATH3970, MATH3971, MATH3972</td>
<td></td>
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</tr>
<tr>
<td>MATH3976 Modules and Group Representations (Adv)</td>
<td>6</td>
<td>A MATH3976</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH3978, MATH3979</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH3977 Lagrangian &amp; Hamiltonian Dynamics (Adv)</td>
<td>6</td>
<td>P 12 credit points of Intermediate Mathematics</td>
<td>N MATH2904, MATH2905, MATH2906</td>
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<tr>
<td>MATH3978 PDEs and Waves (Advanced)</td>
<td>6</td>
<td>A MATH(2061/2961) and MATH(2065/2965)</td>
<td>P 12 credit points of Intermediate Mathematics with at least Credit average</td>
<td>N MATH3970, MATH3971, MATH3972</td>
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<td></td>
</tr>
</tbody>
</table>

Session:
- Semester 1
- Semester 2

**Note:** This unit of study is offered only in odd numbered years.
### Unit of study | Credit points | A: Assumed knowledge | P: Prerequisites | C: Corequisites | N: Prohibition | Session
---|---|---|---|---|---|---
**MICR3032** Molecular Microbiology Concepts | 6 | A MICR2021 or equivalent introductory microbiology. | P At least 6 credit points of MBLG units and MICR (2022 or 2022 or 2002 or 2092). For BMedSc students: 42 credit points of Intermediate BMED units including BMD (2092, 2807 and 2088). For BScAgr students: PLNT (2001 or 2091) and MICR2024. | N MICR3932 | Students undertaking a major in microbiology must take MICR3042 or MICR3942. | Semester 2

**MICR3932** Molecular Microbiology Concepts (Adv) | 6 | A MICR2021 or equivalent introductory microbiology. | P At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2022 or 2002 or 2092). For BMedSc students: 42 credit points of Intermediate BMED units including BMD (2092, 2807 and 2088) with a Distinction in one of these three. For BScAgr students: PLNT (2001 or 2091) and MICR2024. | C Students undertaking a major in microbiology must take MICR3042 or MICR3942. | Semester 2

**MICR3042** Molecular Microbiology Research Skills | 6 | A MICR2021 or equivalent introductory microbiology. | P At least 6 credit points of MBLG units and MICR (2022 or 2022 or 2002 or 2092). For BMedSc students: 42 credit points of Intermediate BMED units including BMD (2092, 2807 and 2088). For BScAgr students: PLNT (2001 or 2091) and MICR2024. | N MICR3942, MICR3022, MICR3922 | Semester 2

**MICR3942** Molecular Micro Research Skills (Adv) | 6 | A MICR2021 or equivalent introductory microbiology. | P At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2022 or 2002 or 2092). For BMedSc students: 42 credit points of Intermediate BMED units including BMD (2092, 2807 and 2088) with a Distinction in one of these three. For BScAgr students: PLNT (2001 or 2091) and MICR2024. | C, MICR3932 or MICR3922 | Semester 2

**VIRO3001** Virology | 6 | A MICR (2021 or 2021 or 2022 or 2092) | P At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MICR or BCHM or BIOL or IMMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMD2002. For BScAgr students: PLNT (2001 or 2091) and MICR2024. | N VIRO3001 | Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2. | Semester 2

**VIRO3901** Virology (Advanced) | 6 | A MICR (2021 or 2021 or 2022 or 2092) | P At least 6 credit points of MBLG units and at least 6 credit points including one Distinction in Intermediate Micro or BCHM or BIOL or IMMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including Distinction in BMD2002. For BScAgr students: PLNT (2001 or 2091) and MICR2024. | N VIRO3001 | Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2. | Semester 2

**VIRO3002** Medical and Applied Virology | 6 | A Intermediate microbiology, immunology, molecular biology and genetics. | P 6 CP MBLG units and at least 6 CP from Intermediate MICR or BCHM or BIOL or IMMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including Distinction in BMD2007. Students are very strongly recommended to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2. | N VIRO3002 | Students undertaking a major in microbiology must take MICR3042 or MICR3942. | Semester 2

**VIRO3902** Medical and Applied Virology (Advanced) | 6 | P VIRO3001 (Distinction) or VIRO3901 (Credit) | N VIRO3002 | Semester 2 | Session 2

### Molecular Biology and Genetics

**Junior unit of study**

**MBLG1001** Molecular Biology and Genetics (Intro) | 6 | A 6 credit points of Junior Biology and 6 cp of Junior Chemistry | N AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2311, MBLG2771, MBLG1901 | Semester 2

**MBLG1901** Molecular Biology and Genetics (Adv) | 6 | A HSC Chemistry and Biology OR 6 credit points of Junior Biology and 6 cp of Junior Chemistry | P UAI (or ATAR equivalent) of 95 or minimum Band 5 in HSC chemistry and biology or by invitation | N AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2311, MBLG2771, MBLG2871, MBLG1901 | Semester 2

### Intermediate units of study

**MBLG2071** Molecular Biology and Genetics A | 6 | P MBLG1001 or MBLG1901 and 12 CP of Junior Chemistry. | N MBLG2971, MBLG2771, MBLG2871, MBLG2001, MBLG2101, MBLG2901, MBLG2111, AGCH2001, BCHM2001, BCHM2101, BCHM2901. Students enrolled in the combined BAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course (CHEM1101, BACH1161, BIOS1159, EXSS1018, CHEM1102, BIOS1133, BIOS1160, EXSS1023, MBLG1001) prior to enrolling in this unit. | Semester 2

**MBLG2971** Molecular Biology and Genetics A (Adv) | 6 | P 12 credit points of Junior Chemistry and Distinction in MBLG (1001 or 1901) | N MBLG2071, MBLG2771, MBLG2871, MBLG2001, MBLG2101, MBLG2901, MBLG2111, AGCH2001, BCHM2001, BCHM2101, BCHM2901. Students enrolled in the combined BAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course prior to enrolling in this unit. | Semester 2

**MBLG2072** Molecular Biology and Genetics B | 6 | A One of MBLG2071, MBLG2971 | P BIOL (1001 or 1003 or 1911 or 1903) and MBLG (1001 or 1901) and 12 credit points of Junior Chemistry | N MBLG2972 | Semester 2
<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLBG2972 Molecular Biology and Genetics B Adv</td>
<td>6</td>
<td>P MLBG2071 or MLBG2971</td>
<td>MLBG2071 or MLBG2971</td>
<td>MLBG2071 or MLBG2971</td>
<td>MLBG2071 or MLBG2971</td>
<td>Semester 2</td>
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<tr>
<td>CHEM3112 Materials Chemistry</td>
<td>6</td>
<td>P CHEM2401 or 2911 or 2915</td>
<td>CHEM2402 or 2912 or 2916</td>
<td>CHEM2402 or 2912 or 2916</td>
<td>CHEM2402 or 2912 or 2916</td>
<td>Semester 1</td>
</tr>
<tr>
<td>CHEM3912 Materials Chemistry (Adv)</td>
<td>6</td>
<td>P WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916)</td>
<td>CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916</td>
<td>CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916</td>
<td>CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916</td>
<td>Semester 2</td>
</tr>
<tr>
<td>CHEM3931 Membranes, Self Assembly and Surfaces</td>
<td>6</td>
<td>P CHEM2401 or 2911 or 2915</td>
<td>CHEM2402 or 2912 or 2916</td>
<td>CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916</td>
<td>CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS3063 Cond Matter Physics Nanoscience/Optics</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS3064 Cond Matter Matter/Nanoscience/Astrophysics</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2911) and PHYS (2012 or 2912) and PHYS (2013 or 2913)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>Semester 2</td>
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<tr>
<td>PHYS3067 Cond Matter Matter/Nanoscience/Lab</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2911) and PHYS (2012 or 2912)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>Semester 2</td>
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<tr>
<td>PHYS3967 Cond Matter Phys.,Nanoscience/Lab (Adv)</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS3969 Quantum Mechanics &amp; Physics Lab (Adv)</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td>Semester 2</td>
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</tbody>
</table>

### Nanoscience and Technology

A major in Nanoscience and Technology requires 24 credit points of study at senior level taken from the following:

- Materials Chemistry (CHEM3112 or CHEM3912)
- Membranes, Self-Assembly & Surfaces (CHEM3116 or CHEM3916)
- Senior Physics units containing the Nanoscience lecture module (PHYS3060/3960, PHYS3064/3964, PHYS3065/3965, PHYS3067/3967, or PHYS3068/3968)
- Mechanics of Solids (MECH3361)
- Nanoscience and Technology (MECH3362)

A major in Nanoscience and Technology requires 24 credit points of study at senior level taken from the following:

- Materials Chemistry (CHEM3112 or CHEM3912)
- Membranes, Self-Assembly & Surfaces (CHEM3116 or CHEM3916)
- Senior Physics units containing the Nanoscience lecture module (PHYS3060/3960, PHYS3064/3964, PHYS3065/3965, PHYS3067/3967, or PHYS3068/3968)
- Mechanics of Solids (MECH3361)
- Nanoscience and Technology (MECH3362)
Neuroscience

For a major in Neuroscience, students are required to complete at least 24 credit points of the senior elective units of study listed below. At least two subject areas must be chosen from NEUR, PSYC and PCOL.

Intermediate elective units of study

The following intermediate units are recommended: ANAT2010, MBLG2071/2971 or MBLG2072/2972, PCOL2011, PHSI2005/2905, PHSI2006/2906, PSYC2011, PSYC2013.

ANAT2010 Concepts of Neuroanatomy 6 A Background in basic cell biology and basic mammalian biology. P BIOL (1003 or 1903) and one of: ANAT2008 or BIOL (1002 or 1902) or MBLG(1001 or 1901 or 2071 or 2971) or PSYC (1001 and 1002). Students must have a grade of credit in at least one of the prerequisite units. N ANAT2003 Semester 2

MBLG2071 Molecular Biology and Genetics A 6 P MBLG1001 or MBLG1901 and 12 CP of Junior Chemistry. N MBLG2971, MBLG2771, MBLG2901, MBLG2902, MBLG2911, AGCH2001, BCHM2001, BCHM2101, BCHM2901 Students enrolled in the combined BioSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course (CHEM101, BACH1161, BIOIS159, EXSS1018 CHEM102, BIOIS1133, BIOIS1160, EXSS1033, MBLG1001) prior to enrolling in this unit. Semester 1

MBLG2971 Molecular Biology and Genetics B (Adv) 6 P 12 credit points of Junior Chemistry and a Distinction in MBLG(1001 or 1901) N MBLG2071, MBLG2971, MBLG2901, MBLG2902, MBLG2911, AGCH2001, BCHM2001, BCHM2101, BCHM2901 Students enrolled in the combined BioSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course prior to enrolling in this unit. Semester 2

PCOL2011 Pharmacology Fundamentals 6 P (6 credit points of Junior Chemistry) and (6 credit points of Junior Biology or MBLG (1001 or 1901)). N PCOL2001 Semester 1

PSYC2010 Pharmacology: Drugs and People 6 A PCOL2011 P (6 credit points of Junior Chemistry) and (6 credit points of Junior Biology or MBLG (1001 or 1901)). N PCOL2002, PCOL2003 Semester 2

PHSI2005 Integrated Physiology A 6 P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 1 Mathematics, Biology, Psychology units of study. N PHSI2905, PHSI3201, PHSI2101, PHSI2901 The completion of 6 credit points of MBLG units of study is highly recommended for progression to Senior Physiology. Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites.

PHSI2905 Integrated Physiology A (Advanced) 6 P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 1 Mathematics, Biology, Psychology units of study, approval of Coordinator N PHSI2005, PHSI2901, PHSI3201, PHSI2901 Note: Department permission required for enrolment

PSYC2011 Brain and Behaviour 6 P PSYC (1001 and 1002). N PSYC2111 Semester 1

PSYC2013 Cognitive and Social Psychology 6 P PSYC (1001 and 1002). N PSYC2111 Semester 2

Senior elective units of study

For a major in Neuroscience, 24 credit points must be chosen from any of the following units: PCOL3022/3922, NEUR3001/3901, NEUR3002/3902, NEUR3003/3903, NEUR3004/3904, PSYC3011, PSYC3013, PSYC3014, PSYC3018

At least two subject areas must be chosen from NEUR, PSYC and PCOL.

NEUR3001 Neuroscience: Special Senses 6 A It is strongly recommended that students also take unit NEUR3002. P For BMedSc students: BMED(2801 or 2503) and BMED(2806 or 2505). For other students: (PHSI2101 or 2901 or 2905 or 2905) or ANAT2003 (or 2010) and 6 credit points of MBLG. N PHSI3001, NEUR3901
### Pharmacology

For a major in Pharmacology, the minimum requirement is 24 credit points from senior units of study listed in this subject area.

### Intermediate units of study

The completion of MBLG(1001 or 1901) is highly recommended.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
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<th>N: Prohibition</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>NEUR3901 Neuroscience: Special Senses (Advanced)</td>
<td>6</td>
<td>A PHSI2005 and ANAT2010</td>
<td>P For BMedSci students: Credit average in BMED(2801 or 2503) and BMED(2806 or 2505) For other students: Credit average in (PHSI(2101 or 2201 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. N NEUR3001, PHSI3001, PHSI3901 Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3002 or NEUR3902.</td>
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<tr>
<td>NEUR3002 Neuroscience: Motor Systems &amp; Behaviour</td>
<td>6</td>
<td>A It is strongly recommended that students also take unit NEUR3001. ANAT2010 and PHSI2005 Semester 1 is assumed knowledge. P For BMedSci students: BMED2801 and BMED2806 For other students: (PHSI(2101 or 2201 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. N PHSI3001, NEUR3902</td>
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<tr>
<td>NEUR3902 Neuroscience: Motor Systems &amp; Behav. Adv</td>
<td>6</td>
<td>A ANAT2010 and PHSI2005 is assumed knowledge. P For BMedSci students: Credit average in BMED2801 and BMED2806 For other students: Credit average in (PHSI(2101 or 2201 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. N NEUR3002, PHSI3001 Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3001 or NEUR3901.</td>
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<tr>
<td>NEUR3003 Cell and Developmental Neuroscience</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain. P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. N NEUR3003, PHSI3002, PHSI3902 Enrolment in NEUR3004 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.</td>
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<tr>
<td>NEUR3903 Cell and Developmental Neurosci. (Adv)</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain. P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001/3901 and NEUR3002/3902. N NEUR3003, PHSI3002, PHSI3902 Note: Department permission required for enrolment Enrolment in NEUR3004/3904 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.</td>
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<tr>
<td>NEUR3004 Integrative Neuroscience</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain. P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. N NEUR3003, PHSI3002, PHSI3902 Enrolment in NEUR3003 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.</td>
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<tr>
<td>NEUR3904 Integrative Neuroscience (Advanced)</td>
<td>6</td>
<td>A Students should be familiar with the material in Bear, Connors &amp; Paradiso Neuroscience: Exploring the Brain. P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science units of study from Anatomy &amp; Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001/3901 and NEUR3002/3902. N NEUR3004, PHSI3002, PHSI3902 Note: Department permission required for enrolment Enrolment in NEUR3003/3903 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. Students must receive permission from the coordinators for enrolment.</td>
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<td>PSYC3011 Learning and Behaviour</td>
<td>6</td>
<td>A PSYC (2012 or 2112)</td>
<td>P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114). N PSYC3409</td>
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<tr>
<td>PSYC3012 Cognition, Language and Thought</td>
<td>6</td>
<td>A PSYC (2012 or 2112)</td>
<td>P PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114). N PSYC3405</td>
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<tr>
<td>PSYC3013 Perceptual Systems</td>
<td>6</td>
<td>A PSYC2012</td>
<td>P PSYC (2012 or 2112) and at least one other Intermediate Psychology Unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114) or ANAT2010. N PSYC2105</td>
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<tr>
<td>PSYC3014 Behavioural and Cognitive Neuroscience</td>
<td>6</td>
<td>A PSYC (2113 or 2114)</td>
<td>P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114). OR (ANAT2010 plus PCOL2011). N PSYC3024, PSYC3215</td>
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### Unit of study

<table>
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<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<tbody>
<tr>
<td>PCOL2012 Pharmacology: Drugs and People</td>
<td>6</td>
<td>A PCOL2011</td>
<td>P (6 credit points of Junior Chemistry) and (6 credit points of Junior Biology or MBLG (1001 or 1901).</td>
<td>N PCOL2002, PCOL2003</td>
<td>Semester 2</td>
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<tr>
<td>PCOL3011 Toxicology</td>
<td>6</td>
<td>P PCOL2001 or PCOL2011 and PCOL2012 or 42 credit points from Intermediate BMED units</td>
<td>Semester 1 of study.</td>
<td>N PCOL3001, PCOL3901, PCOL3911</td>
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<tr>
<td>PCOL3012 Drug Design and Development</td>
<td>6</td>
<td>P PCOL2001 or PCOL2011 and PCOL2012 or 42 credit points from Intermediate BMED units</td>
<td>Semester 1 of study.</td>
<td>N PCOL3001, PCOL3901, PCOL3912</td>
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<tr>
<td>PCOL3911 Toxicology (Advanced)</td>
<td>6</td>
<td>P Distinction average in PCOL2011 and PCOL2012 or Distinction average in 42 credit points from Intermediate BMED units of study.</td>
<td>Semester 1</td>
<td>N PCOL3001, PCOL3901, PCOL3911</td>
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<tr>
<td>PCOL3912 Drug Design and Development (Adv)</td>
<td>6</td>
<td>P Distinction average in PCOL2011 and PCOL2012 or Distinction average in 42 credit points from Intermediate BMED units of study.</td>
<td>Semester 1</td>
<td>N PCOL3001, PCOL3901, PCOL3912</td>
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<tr>
<td>PCOL3021 Drug Therapy</td>
<td>6</td>
<td>P PCOL2011 and PCOL2012 or 36 credit points from intermediate BMED units of study.</td>
<td>Semester 2</td>
<td>N PCOL3002, PCOL3902, PCOL3921</td>
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<tr>
<td>PCOL3022 Neuropharmacology</td>
<td>6</td>
<td>P PCOL2011 and PCOL2012 or 36 credit points from intermediate BMED units of study.</td>
<td>Semester 2</td>
<td>N PCOL3002, PCOL3902, PCOL3922</td>
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<tr>
<td>PCOL3921 Drug Therapy (Advanced)</td>
<td>6</td>
<td>P Distinction average in PCOL2011 and PCOL2012 or in 36 credit points from intermediate BMED units of study.</td>
<td>Semester 2</td>
<td>N PCOL3002, PCOL3902, PCOL3921</td>
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<tr>
<td>PCOL3922 Neuropharmacology (Advanced)</td>
<td>6</td>
<td>P Distinction average in PCOL2011 and PCOL2012 or 36 credit points from intermediate BMED units of study.</td>
<td>Semester 2</td>
<td>N PCOL3002, PCOL3902, PCOL3922</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Physics

For a major in Physics, the minimum requirement is 24 credit points from senior units of study listed in this subject area which must include:

(i) One semester 1 Core unit (PHYS3040, 3940 or 3941)

(ii) One semester 2 Core unit (PHYS3060, 3960 or 3961)

(iii) Two other non-overlapping Options units (chosen from PHYS30XX and 39XX)

Note that one Senior Computational Science unit (COSC3011, 3911, 3012 or 3912) may be included in a Physics major as one of the options.

### Junior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS1001 Physics 1 (Regular)</td>
<td>6</td>
<td>A HSC Physics</td>
<td>C Recommended concurrent Units of Study: MATH (1001/1901, 1002/1902)</td>
<td>N PHYS1002, PHYS1901, EDUH1017</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHYS1002 Physics 1 (Fundamentals)</td>
<td>6</td>
<td>A No assumed knowledge of Physics</td>
<td>C Recommended concurrent Units of Study: MATH (1001/1901, 1002/1902)</td>
<td>N PHYS1001, PHYS1901, EDUH1017</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHYS1901 Physics 1A (Advanced)</td>
<td>6</td>
<td>P UAI (or ATAR equivalent) at least 96, or HSC Physics result in Band 6.</td>
<td>C Distinction or better in PHYS (1003 or 1004) or an equivalent unit.</td>
<td>N PHYS1001, PHYS1901, EDUH1017</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHYS1003 Physics 1 (Technological)</td>
<td>6</td>
<td>A HSC Physics or PHYS (1001 or 1002 or 1901) or equivalent.</td>
<td>C Recommended concurrent Units of Study: MATH (1003/1903), MATH (1005/1905).</td>
<td>N PHYS1004, PHYS1902</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHYS1004 Physics 1 (Environmental &amp; Life Science)</td>
<td>6</td>
<td>A HSC Physics or PHYS (1001 or 1002 or 1901) or equivalent.</td>
<td>C Recommended concurrent Units of Study: MATH (1003/1903), MATH (1005/1905).</td>
<td>N PHYS1003, PHYS1902</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHYS1902 Physics 1B (Advanced)</td>
<td>6</td>
<td>P UAI (or ATAR equivalent) at least 96, or HSC Physics result in Band 6.</td>
<td>C Distinction or better in PHYS (1003 or 1004) or an equivalent unit.</td>
<td>N PHYS1003, PHYS1902</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHYS1500 Astronomy</td>
<td>6</td>
<td>A No assumed knowledge of Physics.</td>
<td>C Recommended concurrent unit of study: MATH (1003/1903), MATH (1005/1905).</td>
<td>N PHYS1003, PHYS1904</td>
<td>Semester 2</td>
<td></td>
</tr>
</tbody>
</table>

### Intermediate units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS2011 Physics 2A</td>
<td>6</td>
<td>A MATH (1001/1901 and 1002/1902 and 1003/1903), MATH (1005/1905) would also be useful</td>
<td>P 12 credit points of Junior Physics (excluding PHYS1500)</td>
<td>N PHYS2001, PHYS2901, PHYS2213, PHYS2203</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHYS2911 Physics 2A (Advanced)</td>
<td>6</td>
<td>A MATH (1001/1901 and 1002/1902 and 1003/1903), MATH (1005/1905) would also be useful</td>
<td>P Credit or better in PHYS (1901 or 1001 or 1002) and Credit or better in PHYS (1902 or 1003 or 1004).</td>
<td>N PHYS2901, PHYS2902, PHYS2101, PHYS2103, PHYS2213, PHYS2203</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHYS2012 Physics 2B</td>
<td>6</td>
<td>A MATH (1001/1901 and 1002/1902 and 1003/1903), MATH (1005/1905) would also be useful</td>
<td>P PHYS (1003 or 1004 or 1902) and PHYS (1001 or 1002 or 1901 or 2011 or 2911)</td>
<td>N PHYS2902, PHYS2904, PHYS2213, PHYS2203</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHYS2013 Astrophysics and Relativity</td>
<td>6</td>
<td>A MATH (1001/1901 and 1002/1902 and 1003/1903), MATH (1005/1905) would also be useful</td>
<td>P PHYS (1003 or 1004 or 1902) and PHYS (1001 or 1002 or 1901 or 2011 or 2911)</td>
<td>N PHYS2901, PHYS2903, PHYS2913, PHYS2101, PHYS2103</td>
<td>Semester 2</td>
<td></td>
</tr>
</tbody>
</table>
### Unit of study

<table>
<thead>
<tr>
<th>Physics 2B (Advanced)</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS2912</td>
<td>A: MATH (100/1901 and 100/2002 and 100/3003), MATH 1005/1905 would also be useful. P: Credit or better in PHYS (1003 or 1004 or 1902) and Credit or better in PHYS (1001 or 1002 or 1901 or 2001 or 2901 or 2011 or 2911). N PHYS2102, PHYS2104, PHYS2902, PHYS2002, PHYS2102, PHYS2213, PHYS2203</td>
</tr>
<tr>
<td>PHYS2913 Astrophysics and Relativity (Advanced)</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS2912</td>
<td>A: MATH (100/1901 and 100/2002 and 100/3003), MATH 1005/1905 would also be useful. P: Credit or better in PHYS (1003 or 1004 or 1902) and Credit or better in PHYS (1001 or 1002 or 1901 or 2001 or 2901 or 2011 or 2911). N PHYS2101, PHYS2901, PHYS2101, PHYS2103</td>
</tr>
</tbody>
</table>

### Senior units of study

<table>
<thead>
<tr>
<th>Topics in Senior Physics A</th>
<th>Semester 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS3035 Physics/Lab (Adv)</td>
<td>A: 6 credit points of Intermediate Mathematics P PHYS (2011 or 2911) and PHYS (2012 or 2912) Note: Department permission required for enrolment</td>
</tr>
<tr>
<td>PHYS3035 Physics/Lab (Adv)</td>
<td>A: 6 credit points of Intermediate Mathematics P PHYS (2011 or 2911) and PHYS (2012 or 2912) Note: Department permission required for enrolment</td>
</tr>
<tr>
<td>PHYS3035 Topics in Senior Physics B</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS3035 Topics in Senior Physics B</td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS3035 Electromagnetism and Physics Lab</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Electromagnetism and Physics Lab</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Electromagnetism &amp; Special Project (Adv)</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Biophysics/High Energy Phys.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Biophysics/High Energy Phys.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma/High Energy Phys.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma/High Energy Phys.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma/High Energy Phys.</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma Physics/Lab</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma Physics/Lab</td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS3035 Thermodynamics/Plasma Physics/Lab</td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Notes

- A: Assumed knowledge
- P: Prerequisites
- C: Corequisites
- N: Prohibition
- Approval for this unit must be obtained from the School of Physics Senior Coordinator.
- Note: Department permission required for enrolment
### Unit of study

<table>
<thead>
<tr>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYS3049</strong></td>
<td>Thermodynamics/High Energy Physics/ Lab</td>
<td>6</td>
<td>PHYS (2011 or 2911) and PHYS (2012 or 2912)</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3949</strong></td>
<td>Thermodynamics/High Energy Phys/ Lab (Adv)</td>
<td>6</td>
<td>P: Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912)</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3051</strong></td>
<td>Thermodynamics/Biophysics &amp; Lab</td>
<td>6</td>
<td>PHYS (2011 or 2911) with at least Credit</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3951</strong></td>
<td>Thermodynamics/Biophysics &amp; Lab (Adv)</td>
<td>6</td>
<td>P: PHYS (2011 or 2911) with at least Credit</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3059</strong></td>
<td>Plasma Physics/Thermodynamics/Biophysics</td>
<td>6</td>
<td>A: Electromagnetism at Senior Physics level; MATH (2061 or 2961 or 2067)</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3959</strong></td>
<td>Plasma Physics./Thermodynamics/Biophysics</td>
<td>6</td>
<td>P: PHYS (2011 or 2911) with at least Credit</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3073</strong></td>
<td>Plasma High Energy Physics &amp; Lab</td>
<td>6</td>
<td>A: Electromagnetism at Senior Physics level.</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3973</strong></td>
<td>Plasma High Energy Physics &amp; Lab (Adv)</td>
<td>6</td>
<td>A: Electromagnetism at Senior Physics level</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>PHYS3060</strong></td>
<td>Quantum Mechanics &amp; Physics Lab</td>
<td>6</td>
<td>P: PHYS (2011 or 2911) with at least Credit and MATH (2061 or 2961 or 2067)</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>PHYS3960</strong></td>
<td>Quantum Mechanics and Physics Lab (Adv)</td>
<td>6</td>
<td>P: PHYS (2011 or 2911) with at least Credit</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>PHYS3961</strong></td>
<td>Quantum Mechanics &amp; Special Project (Adv)</td>
<td>6</td>
<td>P: PHYS (2011 or 2911) with at least Credit</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>PHYS3068</strong></td>
<td>Condensed Matter Physics/Optics Lab</td>
<td>6</td>
<td>A: Electromagnetism and Quantum Mechanics at Senior Physics level</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
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<tr>
<td><strong>PHYS3968 Condensed Matter</strong>&lt;br&gt;Physics/Optics/Lab(Adv)</td>
<td>6</td>
<td>A Electromagnetism and Quantum Mechanics at Senior Physics level</td>
<td>PHYS (2011 or 2011) with at least Credit; PHYS (2012 or 2012) with at least Credit; MATH (2061 or 2061 or 2067)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3063 Cond. Matter</strong>&lt;br&gt;Physics/Nanoscience/Optics</td>
<td>6</td>
<td>P PHYS (2011 or 2011) and PHYS (2012 or 2012) and MATH (2061 or 2061 or 2067)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3963 Cond Matter</strong>&lt;br&gt;Phys/Nanoscience/Optics(Adv)</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2011) and Credit in PHYS (2012 or 2012) and MATH (2061 or 2061 or 2067)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3064 Cond. Matter</strong>&lt;br&gt;Nanoscience/Astrophysics</td>
<td>6</td>
<td>P PHYS (2011 or 2011) and PHYS (2012 or 2012) and PHYS (2013 or 2013)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3964 Cond. Matter</strong>&lt;br&gt;Nanoscience/Astrophysics(Adv)</td>
<td>6</td>
<td>P Credit in PHYS (2011 or 2011) and Credit in PHYS (2012 or 2012) and PHYS (2013 or 2013)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3065 Condensed Matter/Optics/Astrophysics</strong></td>
<td>6</td>
<td>P PHYS (2011 or 2011) and PHYS (2012 or 2012) and PHYS (2013 or 2013) and MATH (2061 or 2061 or 2067)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3965 Condensed Matter/Optics/Astrophysics. (Adv)</strong></td>
<td>6</td>
<td>P Credit in PHYS(2011 or 2011) and Credit in PHYS(2012 or 2012) and PHYS(2013 or 2013) and MATH(2061 or 2061 or 2067)</td>
<td>PHYS(3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3066 Optics/Astrophysics/Physics Lab</strong></td>
<td>6</td>
<td>P PHYS (2011 or 2011) and PHYS (2012 or 2012) and PHYS (2013 or 2013) and MATH (2061 or 2061 or 2067)</td>
<td>PHYS(3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3966 Optics/Astrophysics/Physics Lab (Adv)</strong></td>
<td>6</td>
<td>P Credit in PHYS(2011 or 2011) and Credit in PHYS(2012 or 2012) and PHYS(2013 or 2013) and MATH(2061 or 2061 or 2067)</td>
<td>PHYS(3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYS3067 Cond. Matter</strong>&lt;br&gt;Physics/Nanoscience/Lab</td>
<td>6</td>
<td>P PHYS (2011 or 2011) and PHYS (2012 or 2012)</td>
<td>PHYS (3060 or 3960 or 3961)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Session: Semester 2

Credit in (PHYS2011 or PHYS2911) and Credit in (PHYS2012 or PHYS2912) and (PHYS2013 or PHYS2913) and (MATH2061 or MATH2961 or MATH2067)
### Intermediate units of study

**PHSI2005 Integrated Physiology A**
- 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 1
  - Mathematics, Biology, Psychology units of study
  - N PHYS2005, PHYS2001, PHYS2101, PHYS2201
  - The completion of 6 credit points of MBLG units of study is highly recommended for progression to Senior Physiology. Students taking combined degrees or with passes in units not listed must consult a coordinator if they do not meet the prerequisites.

**PHSI2905 Integrated Physiology A (Advanced)**
- 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 1
  - Mathematics, Biology, Psychology units of study, approval of Coordinator
  - N PHYS2005, PHYS2001, PHYS2101, PHYS2201
  - Note: Department permission required for enrolment
  - Permission from the coordinator is required for entry into this course. It is available only to selected students who have achieved a WAM of 75 or higher in their Junior units of study.
  - Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites.

**PHSI2006 Integrated Physiology B**
- 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 2
  - Mathematics, Biology, Psychology units of study
  - N PHYS2006, PHYS2002, PHYS2102, PHYS2202
  - The completion of Molecular Biology and Genetics (Intro) is highly recommended for progression to Senior Physiology. Students taking combined degrees or with passes in units not listed must consult a coordinator if they do not meet the prerequisites.

**PHSI2906 Integrated Physiology B (Advanced)**
- 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Semester 2
  - Mathematics, Biology, Psychology units of study, approval of coordinator
  - N PHYS2006, PHYS2002, PHYS2102, PHYS2202
  - Note: Department permission required for enrolment
  - Permission from the coordinator is required for entry into this course. It is available only to selected students who have achieved a WAM of 75 or higher in their Junior units of study.
  - Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites.

### Senior units of study

**PHSI3005 Human Cellular Physiology: Theory**
- 6 A 6 credit points of MBLG
- P Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906)
- N PHYS3005, PHYS3001, PHYS3104, PHYS3904
- It is highly recommended that this unit of study be taken in conjunction with PHSI3006.

**PHSI3905 Human Cellular Physiology (Adv): Theory**
- 6 A 6 credit points of MBLG
- P Credit average in PHSI(2005 or 2905) and PHSI(2006 or 2906) or in BMED (2801 and 2802)
- Students enrolled in this unit should have a WAM of at least 70.
- N PHYS3005, PHYS3004, PHYS3904
- Note: Department permission required for enrolment
- It is highly recommended that this unit of study be taken in combination with PHSI3006.

**PHSI3006 Human Cellular Physiology: Research**
- 6 A 6 credit points of MBLG
- P Except for BMedSc students: PHSI (2005 or 2905) and PHSI(2006 or 2906) For BMedSc: BMED (2801 and 2802)
- N PHYS3005, PHYS3004, PHYS3904

**PHSI3906 Human Cellular Physiology (Adv): Research**
- 6 A 6 credit points of MBLG
- P PHYS(2005 or 2905) and PHYS(2006 or 2906) or in BMED (2801 and 2802)
- Students enrolled in this unit should have a WAM of at least 70.
- C PHYS3005
- N PHYS3006, PHYS3004, PHYS3904
- Note: Department permission required for enrolment

**NEUR3001 Neuroscience: Special Senses**
- 6 A It is strongly recommended that students also take unit NEUR3002. PHYS3005 and ANAT2010 are assumed knowledge
- P For BMedSc students: BMED(2801 or 2503) and BMED(2806 or 2505)
- For other students: Credit average in (PHSI(2101 or 2001 or 2901 or 2505) or ANAT(2003 or 2010)) and 6 credit points of MBLG
- N PHYS3001, NEUR3901

**NEUR3901 Neuroscience: Special Senses (Advanced)**
- 6 A PHYS2005 and ANAT2010
- P For BMedSc students: Credit average in BMED(2801 or 2503) and BMED(2806 or 2505)
- For other students: Credit average in (PHSI(2101 or 2001 or 2901 or 2505) or ANAT(2003 or 2010)) and 6 credit points of MBLG
- N NEUR3001, PHYS3001, PHYS3901
- Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3002 or NEUR3902.
### Unit of study | Credit points | A: Assumed knowledge | P: Prerequisites | C: Corequisites | N: Prohibition | Session | Semester | Notes |
--- | --- | --- | --- | --- | --- | --- | --- | --- |
**NEUR3002**  
Neuroscience: Motor Systems & Behaviour | 6 | A It is strongly recommended that students also take unit NEUR3001. ANAT2010 and PHSI2005 is assumed knowledge. | P For BMedSci students: BMED2801 and BMED2806 For other students: (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. | N PHSI3001, NEUR3902 |  | Semester 1 |  |  |
**NEUR3902**  
Neuroscience: Motor Systems & Behav. Adv | 6 | A ANAT2010 and PHSI2005 is assumed knowledge. | P For BMedSci students: Credit average in BMED2801 and BMED2806 For other students: Credit average in (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. | N NEUR3002, PHSI3001 |  | Semester 1 |  |  |
**PHSI3007**  
Heart and Circulation: Normal Function | 6 | A 6 credit points of MBLG | P Except for BMedSci students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of intermediate Science Units of Study For BMedSci: BMED (2801 and 2903). | N PHSI3007, PHSI3003, PHSI3903 |  | Semester 2 |  | Note: Department permission required for enrolment
Available to selected students who have achieved an average of at least 75 in their prerequisite units of study. It is highly recommended that this unit of study be taken in combination with PHSI3907. |
**PHSI3907**  
Heart & Circulation: Normal Function Adv | 6 | A 6 credit points of MBLG | P Except for BMedSci students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of intermediate Science Units of Study For BMedSci: BMED (2801 and 2903). | N PHSI3007, PHSI3003, PHSI3903 |  | Semester 2 |  | Note: Department permission required for enrolment
Available to selected students who have achieved an average of at least 75 in their prerequisite units of study. It is highly recommended that this unit of study be taken ONLY in combination with PHSI3007. |
**PHSI3008**  
Heart and Circulation: Dysfunction | 6 | A 6 credit points of MBLG | P Except for BMedSci students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of intermediate Science Units of Study For BMedSci: BMED (2801 and 2903). | N PHSI3007, PHSI3003, PHSI3903 |  | Semester 2 |  |  |
**PHSI3908**  
Heart & Circulation: Dysfunction Adv | 6 | A 6 credit points of MBLG | P Except for BMedSci students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of intermediate Science Units of Study For BMedSci: BMED (2801 and 2903). | N PHSI3007, PHSI3003, PHSI3903 |  | Semester 2 |  |  |
**NEUR3003**  
Cellular and Developmental Neuroscience | 6 | A Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. | P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of intermediate science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. | N NEUR3003, PHSI3002, NEUR3902 |  | Semester 2 |  | Enrolment in NEUR3004 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. |
**NEUR3903**  
Cellular & Developmental Neurosci. (Adv) | 6 | A Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. | P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of intermediate science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001, NEUR3002 and NEUR3902. | N NEUR3003, PHSI3002, NEUR3902 |  | Semester 2 |  | Note: Department permission required for enrolment
Enrolment in NEUR3004/3904 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. Students must receive permission from the coordinators for enrolment. |
**NEUR3004**  
Integrative Neuroscience | 6 | A Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. | P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of intermediate science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. | N NEUR3004, PHSI3002, NEUR3902 |  | Semester 2 |  | Enrolment in NEUR3003 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. |
**NEUR3904**  
Integrative Neuroscience (Advanced) | 6 | A Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. | P For BMedSci: 42 credit points of intermediate BMed units. For others: 18 credit points of intermediate science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001, NEUR3002 and NEUR3902. | N NEUR3004, PHSI3002, NEUR3902 |  | Semester 2 |  | Note: Department permission required for enrolment
Enrolment in NEUR3003/3903 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. Students must receive permission from the coordinators for enrolment. |

### Plant Science

For a major in Plant Science, the minimum requirement is 24 credit points from senior units of study listed in this subject area, including a minimum of 12 credit points of senior PLNT units.

#### Intermediate units of study

| Unit of study | Credit points | A: Assumed knowledge | P: Prerequisites | C: Corequisites | N: Prohibition | Session | Semester | Notes |
--- | --- | --- | --- | --- | --- | --- | --- | --- |
**PLNT2001**  
Plant Biochemistry and Molecular Biology | 6 | P 12 Junior credit points from Chemistry and Biology (or with the Dean's permission BIOL1201 | N PLNT2901, AGCH2004 |  |  | Semester 1 |  |  |

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### Psychology

For a major in Psychology, the minimum requirement is 48 credit points across intermediate and senior psychology units of study including PSYC (2111 or 2011), PSYC (2112 or 2012), PSYC (2113 or 2013) and PSYC (2114 or 2014). No other intermediate psychology units can be counted towards the major. You must complete at least 24 (30 for BPsys) credit points of Senior Psychology for a major. The senior units must include PSYC3018 and at least one of PSYC3011, 3012, 3013 and 3014. Students who want to be eligible for entry to the Honours program must also include PSYC3010.

*Note: HPSC3023 Psychology & Psychiatry: History & Phil is available for senior Psychology students and will count towards a major in Psychology. Successful completion of this unit of study is essential for students intending to take the Theoretical Thesis option in Psychology Honours.

### Junior units of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Session</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC1001</td>
<td>Psychology 1001</td>
<td>Summer Main</td>
<td></td>
</tr>
<tr>
<td>PSYC1002</td>
<td>Psychology 1002</td>
<td>Summer Main</td>
<td></td>
</tr>
</tbody>
</table>

### Senior units of study

#### PLNT2901
**Plant Biochem & Molecular Biology (Adv)**
- Credit points: 6
- Prerequisites: A: Distinction average in 12 Junior credit points from Chemistry and Biology (or with the Dean's permission BIOL1201 and BIOL1202)
- Prohibition: N PLNT2001, AGCH2004
- Session: Semester 1

#### PLNT2002
**Aust Flora: Ecology and Conservation**
- Credit points: 6
- Prerequisites: P 6 credit points of a Junior unit of study
- Prohibition: N PLNT2902
- Session: Semester 1

#### PLNT2902
- Credit points: 6
- Assumed knowledge: A The contents of BIOL1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL and Plant Science (PLNT) units of study using BIOL1003 or 1903) will need to do some preparatory reading
- Prerequisites: P Distinction average in 6 credit points of Junior units of study
- Prohibition: N PLNT2002
- Session: Semester 1

#### PLNT2003
**Plant Form and Function**
- Credit points: 6
- Prerequisites: A 12 credit points of Junior Biology, or equivalent eg BIOL (1001 or 1101 or 1901 or 1911) and BIOL (1002 or 1902 or 1003 or 1902)
- Prohibition: N PLNT2903, BIOL2003, BIOL2903, CROP2001
- Session: Semester 2

#### PLNT2903
**Plant Form and Function (Advanced)**
- Credit points: 6
- Prerequisites: A 12 credit points of Junior Biology, or equivalent eg BIOL (1001 or 1101 or 1901 or 1911) and BIOL (1002 or 1902 or 1003 or 1903)
- Session: Semester 2

#### Senior units of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Session</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLNT3001</td>
<td>Plant, Cell and Environment</td>
<td>Semester 2</td>
<td>P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent PLNT3001</td>
</tr>
<tr>
<td>PLNT3001</td>
<td>Plant, Cell and Environment (Advanced)</td>
<td>Semester 2</td>
<td>P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent with average grade of distinction Note: Department permission required for enrolment N PLNT3001</td>
</tr>
<tr>
<td>PLNT3002</td>
<td>Plant Growth and Development</td>
<td>Semester 2</td>
<td>P 12 credit points of Intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent N PLNT3002, BIOL3021, BIOL3931</td>
</tr>
<tr>
<td>PLNT3002</td>
<td>Plant Growth and Development (Advanced)</td>
<td>Semester 2</td>
<td>P 12 credit points of Intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. N PLNT3002, BIOL3021, BIOL3931</td>
</tr>
<tr>
<td>PLNT3003</td>
<td>Systems and Evolution of Plants</td>
<td>Semester 1</td>
<td>P 6 credit points of any Intermediate unit of study from PLNT, PLNT, LWSC, HORT, GEOS, GEOG, ENVI, SOIL. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. N PLNT3003</td>
</tr>
<tr>
<td>PLNT3003</td>
<td>Systems and Evolution of Plants (Adv)</td>
<td>Semester 1</td>
<td>P Distinction average in 6 credit points of any Intermediate unit of study from PLNT, PLNT, LWSC, HORT, GEOS, GEOG, ENVI, SOIL. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. N PLNT3003</td>
</tr>
<tr>
<td>BIOL3009</td>
<td>Terrestrial Field Ecology</td>
<td>S2 Intensive</td>
<td>P 12 credit points of Intermediate Biology or ANSC2004 and BIOM2001. One 6 day field trip held in the pre-semester break (17 - 22 July 2011), and 4x4 hr practical classes during weeks 1-4 in Semester 2. A BIOL (3006 or 3906). Prior completion of one of these units is very strongly recommended.</td>
</tr>
<tr>
<td>BIOL3009</td>
<td>Terrestrial Field Ecology (Advanced)</td>
<td>S2 Intensive</td>
<td>P Distinction average in 12 credit points of Intermediate Biology or ANSC2004 and BIOM2001. One 6 day field trip held in the pre-semester break (17 - 22 July 2011) and 4x4 practical classes during weeks 1-4 in Semester 2. A BIOL (3006 or 3906). Prior completion of one of these units is very strongly recommended.</td>
</tr>
<tr>
<td>BIOL3107</td>
<td>Fungi in the Environment</td>
<td>S1 Intensive</td>
<td>P 12 credit points of Intermediate Biology or Plant Science, or 6 credit points of Intermediate Biology, Plant Science, and 6 Intermediate credit points of either Microbiology or Geography. N BIOL3009 Dates: 14-25 February 2011. The completion of 6 credit points of MBGL units is highly recommended.</td>
</tr>
<tr>
<td>BIOL3107</td>
<td>Fungi in the Environment (Adv)</td>
<td>S1 Intensive</td>
<td>P 12 credit points of Intermediate Biology or Plant Science, or 6 credit points of Intermediate Biology, Plant Science, and 6 Intermediate credit points of either Microbiology or Geography. N BIOL3009 The completion of 6 credit points of MBGL units is highly recommended.</td>
</tr>
<tr>
<td>PPAT3003</td>
<td>Plant Disease</td>
<td>Semester 1</td>
<td>P MICR2024</td>
</tr>
<tr>
<td>PPAT3004</td>
<td>Advanced Mycology and Plant Pathology</td>
<td>Semester 1</td>
<td>P PPAT3003</td>
</tr>
<tr>
<td>PPAT4005</td>
<td>Soil Biology</td>
<td>Semester 1</td>
<td>P MICR2024 or 6cp intermediate microbiology</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------</td>
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<td>------------------</td>
</tr>
<tr>
<td>PSYC1002 Psychology 1002</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intermediate units of study</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC2011 Brain and Behaviour</td>
<td>6</td>
<td>P PSYC (1001 and 1002), N PSYC211</td>
<td></td>
</tr>
<tr>
<td>PSYC2012 Statistics &amp; Research Methods for Psych</td>
<td>6</td>
<td>A Recommended: HSC Mathematics, any level</td>
<td>P PSYC (1001 and 1002), N PSYC2112</td>
</tr>
<tr>
<td>PSYC2013 Cognitive and Social Psychology</td>
<td>6</td>
<td>P PSYC (1001 and 1002), N PSYC2113</td>
<td></td>
</tr>
<tr>
<td>PSYC2014 Personality and Intelligence 1</td>
<td>6</td>
<td>P PSYC (1001 and 1002), N PSYC2114</td>
<td></td>
</tr>
<tr>
<td><strong>Senior units of study</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC3011 Learning and Behaviour</td>
<td>6</td>
<td>A PSYC (2012 or 2112) P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114), N PSYC3209</td>
<td></td>
</tr>
<tr>
<td>PSYC3012 Cognition, Language and Thought</td>
<td>6</td>
<td>A PSYC (2012 or 2112) P PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114), N PSYC3205</td>
<td></td>
</tr>
<tr>
<td>PSYC3015 Personality and Intelligence 2</td>
<td>6</td>
<td>A PSYC(2012 or 2112), P PSYC(2013 or 2113) and at least one other Intermediate Psychology Unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114), N PSYC3206</td>
<td></td>
</tr>
<tr>
<td>PSYC3016 Developmental Psychology</td>
<td>6</td>
<td>A PSYC (2012 or 2112) P PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114), N PSYC3202</td>
<td></td>
</tr>
<tr>
<td>PSYC3017 Social Psychology</td>
<td>6</td>
<td>A PSYC (2012 or 2112) P PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114), N PSYC3212</td>
<td></td>
</tr>
<tr>
<td>HPSC3023 Psychology &amp; Psychiatry: History &amp; Phil</td>
<td>6</td>
<td>A Basic knowledge about the history of modern science as taught in HPSC2100 AND the principles of philosophy of science as taught in HPSC2101 OR knowledge of the various sub-disciplines within Psychology. P at least 12 credit points of intermediate HPSC Units of study OR (a CR or above in one HPSC intermediate Unit of Study) OR (12 intermediate credit points in psychology).</td>
<td></td>
</tr>
<tr>
<td>PSYC3019 Advanced Statistics for Psychology</td>
<td>6</td>
<td>P PSYC (2012 or 2112) plus at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2013 or 2113), PSYC (2014 or 2114), N PSYC3201</td>
<td></td>
</tr>
<tr>
<td>PSYC3013 Perceptual Systems</td>
<td>6</td>
<td>A PSYC2012 P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114), or ANAT2010 N PSYC3210</td>
<td></td>
</tr>
<tr>
<td>PSYC3014 Behavioural and Cognitive Neuroscience</td>
<td>6</td>
<td>A PSYC (2113 or 2013) P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114) OR (ANAT2010 plus PCOL2011) N PSYC3204, PSYC3215</td>
<td></td>
</tr>
<tr>
<td>PSYC3018 Abnormal Psychology</td>
<td>6</td>
<td>A PSYC (2012 or 2112) and PSYC (2014 or 2114) P at least two Intermediate Psychology units of study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2013 or 2113) and PSYC (2014 or 2114) N PSYC3203</td>
<td></td>
</tr>
<tr>
<td>PSYC3020 Applications of Psychological Science</td>
<td>6</td>
<td>P at least 12 credit points of junior psychology and 12 credit points in Intermediate Psychology</td>
<td></td>
</tr>
</tbody>
</table>

**Soil Science**

For a major in soil science, the minimum requirement is completion of ENVX3001, SOIL3009, SOIL3010 and one of AGCH3032 or LWSC3007 or PPAT4005.

**Intermediate units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOIL2003 Soil Properties and Processes</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>SOIL2004 The Soil Resource</td>
<td>6</td>
<td>Semester 2</td>
</tr>
<tr>
<td>LWSC2002 Introductory Hydrology</td>
<td>6</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

**Senior units of study**

Compulsory units for a major in Soil Science

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVX3001 Environmental GIS</td>
<td>6</td>
<td>Semester 2</td>
</tr>
<tr>
<td>SOIL3009 Contemporary Field and Lab Soil Science</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>SOIL3010 The Soil at Work</td>
<td>6</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

At least one of these units must be taken for a major in Soil Science.
### Unit of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGCH3032 Land and Water Ecochemistry</td>
<td>6</td>
<td>P AGCH2003 or AGCH2004 or PLNT2001 or CHEM24XX or BCHM2XXX or ENVI2001</td>
<td>N AGCH3030, AGCH3031</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LWSC3007 Advanced Hydrology and Modelling</td>
<td>6</td>
<td>P LWSC2002</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PPAT4005 Soil Biology</td>
<td>6</td>
<td>P MICR2024 or 6cp intermediate microbiology</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

### Statistics

For a major in Statistics, the minimum requirement is 24 credit points from senior units of study listed below.

#### Intermediate units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT2011 Statistical Models</td>
<td>6</td>
<td>P MATH(1001 or 1901 or 1906 or 1011) and [MATH(1005 or 1905 or 1015) or STAT1021]</td>
<td>N STAT2901, STAT2901, STAT2911</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT2012 Statistical Tests</td>
<td>6</td>
<td>P MATH(1005 or 1905 or 1015)</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>STAT2911 Probability and Statistical Models (Adv)</td>
<td>6</td>
<td>P MATH(1903 or 1907 or Credit in 1003) and MATH(1905 or 1904 or Credit in 1005)</td>
<td>N STAT2901, STAT2901, STAT2911</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT2912 Statistical Tests (Advanced)</td>
<td>6</td>
<td>A STAT (2911 or 2901)</td>
<td>P MATH1005 or Credit in MATH1005</td>
<td>N STAT2901, STAT2904</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Senior units of study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3011 Stochastic Processes and Time Series</td>
<td>6</td>
<td>P STAT(2011 or 2911 or 2901 or 2902) and MATH(1003 or 1903 or 1907).</td>
<td>N STAT3911, STAT3903, STAT3904, STAT3905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3012 Applied Linear Models</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2004) and MATH(1002 or 1014 or 1902).</td>
<td>N STAT3912, STAT3902, STAT3904, STAT3905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3013 Statistical Inference</td>
<td>6</td>
<td>P STAT(2012 or 2912 or 2003 or 2903) and STAT (2011 or 2911)</td>
<td>N STAT3913, STAT3901, STAT3902</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3014 Applied Statistics</td>
<td>6</td>
<td>A STAT(2012 or 2912, or 2903).</td>
<td>P STAT(2012 or 2912 or 2004).</td>
<td>N STAT3914, STAT3902, STAT3903, STAT3906</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3911 Stochastic Processes and Time Series Adv</td>
<td>6</td>
<td>P (STAT2911 or credit in STAT2011) and MATH(1003 or 1903 or 1907).</td>
<td>N STAT3011, STAT3903, STAT3904, STAT3905</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3912 Applied Linear Models (Advanced)</td>
<td>6</td>
<td>P (STAT2912 or Credit in STAT2004 or Credit in STAT2012) and MATH(2001 or 2901 or 1902).</td>
<td>N STAT3012, STAT3902, STAT3903, STAT3904</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3913 Statistical Inference Advanced</td>
<td>6</td>
<td>P STAT(2911 or 2903).</td>
<td>N STAT3013, STAT3001, STAT3901</td>
<td>It is advisable to have also completed STAT2912</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3914 Applied Statistics Advanced</td>
<td>6</td>
<td>A STAT3912</td>
<td>P STAT2912 or credit or better in (STAT2004 or STAT2012).</td>
<td>N STAT3014, STAT3902, STAT3903, STAT3906, STAT3907</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Study in other Faculties

A total of 48 credit points of units of study from non-Science discipline areas may be counted towards the Bachelor of Science degree. Students should consult the Handbooks from other faculties to determine any prerequisites, corequisites or other requirements relating to enrolment in units of study offered by departments in these faculties. Students may not enrol in General Statistical Methods 1 (STAT1021) or Econometrics first year units, or any other unit of study deemed mutually exclusive with units of study listed in this Table. Students enrolled in the combined BSc/BCom program may enrol in Econometrics 1A (ECMT1010). Students may not enrol in LAWS units of study, unless enrolled in the combined BSc/Llb degree.
Bachelor of Science, BSc(Adv), BSc(Adv Maths), BSc(Adv)/MBBS
4. Bachelor of Science specialist degree programs

This chapter is intended to give enrolment advice to undergraduate students in the Faculty of Science enrolling in specialist Bachelor of Science degrees. It should be stressed that the information in this chapter is intended to be a rough guide only. All students will have to decide for themselves how to plan their degree to suit their own particular interests and situation.

**Bachelor of Science (Bioinformatics)**
Degree code: LH019
Note: this degree is not available to new students from 2007. Please refer to the Science Handbook 2009 for requirements and resolutions relating to this degree. A new major in Bioinformatics is available to students enrolling in the BSc.

**Bachelor of Science (Environmental)**
Degree code: LH017
Note: this degree is not available to new students from 2007. A major in Environmental Studies is available to students enrolling in the Bachelor of Science degree. Please refer to the Science Handbook 2010 for requirements and resolutions relating to this degree

**Bachelor of Science (Marine Science)**
Degree code: LH021
Note: this degree is not available to new students from 2009. Majors in Marine Science are available to students enrolling in the Bachelor of Science degree. Please refer to the Science Handbook 2010 for requirements and resolutions relating to this degree.

**Bachelor of Science (Molecular Biotechnology)**
Degree code: LH022
Note: this degree is not available to new or transferring students from 2009. Please refer to the Science Handbook 2010 for requirements and resolutions relating to this degree.

**Bachelor of Science (Nutrition)**
Degree code: LH020
This degree is not available to new students from 2009. Please refer to the Science Handbook 2010 for requirements and resolutions relating to this degree.

Students interested in completing a Nutrition degree should consider the BSc/MND double degree.

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**Bachelor of Science (Molecular Biology and Genetics)**

**Bachelor of Science (Molecular Biology and Genetics) (Honours)**
These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

**Course resolutions**

1. **Course codes**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH018</td>
<td>Bachelor of Science (Molecular Biology and Genetics)</td>
</tr>
<tr>
<td>LH045</td>
<td>Bachelor of Science (Molecular Biology and Genetics)(Honours)</td>
</tr>
</tbody>
</table>

2. **Attendance pattern**

The attendance pattern for this course is full time or part time according to candidate choice.

3. **Admission to candidature**

Admission to undergraduate courses at the University of Sydney is competitive on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Rule), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

4. **Requirements for award**

1. The Dean may permit a student of exceptional merit who is admitted to the Talented Student Program to undertake a unit or units of study within the Faculty other than those specified in the tables.
2. The units of study that may be taken for Bachelor of Science (Molecular Biology and Genetics) are listed in Table 1D and Table 1.
3. To qualify for the award of the Bachelor of Science (Molecular Biology and Genetics), a candidate must successfully complete 144 credit points specified in Table 1D including:
   a. 48 credit points of Junior units of study; and
   b. 48 credit points of Intermediate units of study; and
   c. 48 credit points of Senior units of study.

5. **Progression rules**

Candidates enrolled in the Bachelor of Science (Molecular Biology and Genetics) who fail to maintain a minimum average mark of 65 in units of study in Science subject areas in each year of enrolment will be transferred to the Bachelor of Science.
6 Requirements for the Honours degree

(1) Honours is available to meritorious students who complete an additional year of full time study, after the completion of the pass degree. Candidates must complete the requirements for the honours course full-time over two consecutive semesters. If the School is satisfied that a student is unable to attempt honours course on a full time basis and if the Dean so recommends, permission may be granted to undertake honours part-time over four consecutive semesters.

(2) Admission, requirements and award of honours are according to the Resolutions of the Faculty of Science.

(3) Candidates for the honours degree in Molecular Biology and Genetics must complete an honours program from Table VI, incorporating research in molecular biology and genetics, in a School in the Faculty of Science.

7 Award of the degree

(1) The Bachelor of Science (Molecular Biology and Genetics) is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science.

(2) Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree merited.

8 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.

Planning your degree

Enrolment guide

In your Junior year you should complete:

- 12 credit points from the science subject areas of Mathematics and Statistics (it is recommended that students take units that assume completion of HSC Mathematics Extension 1 or 2 and include some statistics)
- 12 credit points of any junior BIOL units of study (BIOL1911 and BIOL1902 is the preferred option)
- 12 credit points of junior units of study in the science subject area of Chemistry (CHEM1108 and 1109 is the preferred option)
- 6 credit points of elective junior science units of study (Physics or Computer Science are recommended).

Sample Bachelor of Science (Molecular Biology and Genetics)

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Unit of study 6 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 MATH1XXX</td>
<td>MATH1XXX</td>
<td>BIOL1XXX</td>
<td>CHEM1108</td>
<td>Science elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MATH1XXX</td>
<td>MATH1XXX</td>
<td>BIOL1XXX</td>
<td>CHEM1109</td>
<td>MBLG1901</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 MBLG2X71</td>
<td>BCHM2X71</td>
<td>MICR2X21</td>
<td>Science elective</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>MBLG2X72</td>
<td>BCHM2X72</td>
<td>CHEM2403</td>
<td>Science elective</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 BCHM3X71</td>
<td>BCHM3X81</td>
<td>BIOL3X18</td>
<td>BIOL3X27</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Table ID elective</td>
<td>Table ID elective</td>
<td>Table ID elective</td>
<td>Table 1D elective</td>
<td>MBLG3999</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total credit points:</td>
<td>144</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Require: 144cp total, and units of study as per Table ID.
Table 1D: Bachelor of Science (Molecular Biology and Genetics)

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Junior units of study</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidates are required to enrol in and complete:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) 12 credit points of any Junior BIOL units of study (BIOL1911 and BIOL1902 is the preferred option); and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) CHEM(1101 or 1901 or 1903 or 1108) and CHEM(1102 or 1902 or 1904 or 1109) (The combination of CHEM 1108 and 1109 is the preferred option. The combination of CHEM 1001 and 1002 is available with special permission.);</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) MBLG1901 (MBLG1001 and MBLG1999 for students who commenced prior to 2008);</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(iv) 12 credit points of Junior units of study from the Subject Area of Mathematics (it is recommended that students take units requiring HSC Mathematics Extension 1 or 2 and include some statistics in their choice of Mathematics units of study); and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) 6 credit points of other Junior units of study from BSc units of study (Table I). It is recommended that the extra 6 credit points be selected from Junior units of study in Physics or in Computer Science.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MBLG1901</strong></td>
<td>6</td>
<td>A HSC Chemistry and Biology OR 6 credit points of Junior Biology and 6 cp of Junior Chemistry</td>
<td>Semester 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molecular Biology and Genetics (Adv)</td>
<td></td>
<td>P UAI (or ATAR equivalent) of 95 or minimum Band 5 in HSC chemistry and biology or by invitation</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>MBLG1999</strong></td>
<td>Only available in the BSc(MBG) and MBLG1901</td>
<td></td>
<td>Semester 2</td>
<td></td>
<td></td>
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<tr>
<td>Molecular Biology &amp; Genetics Seminar A</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| **B. Intermediate units of study** | | | | | | |

In order to proceed to the Intermediate year, candidates for the BSc (Molecular Biology and Genetics) must achieve a Credit average in Junior units of study. Candidates who fail to maintain the required Credit average will be transferred to candidature for the Bachelor of Science degree in their next year of enrolment with full credit for the units of study completed as Bachelor of Science (Molecular Biology and Genetics) candidates. Candidates who fail to achieve the required average across all units of study attempted in the year in which they have otherwise completed the requirements for the degree will be awarded the Bachelor of Science.

In the Intermediate year candidates are required to enrol in and complete:

(i) MBLG(2071 or 2971) and(2072 or 2972);
(ii) CHEM(2403 or 2913);
(iii) BCHM(2071 or 2971) and BCHM(2072 or 2972);
(iv) MICR(2021 or 2921); and
(v) 12 Credit points of Intermediate Science units of study. (In 1st Semester, CHEM2401/2911/2915 or BIOL(2016/2916) and in 2nd Semester, MICR(2022 or 2922) and CHEM2402/2912/2916, are strongly recommended as the Science options.)

Note: Students wishing to proceed to the Senior units of Chemistry or Microbiology must complete 12 credit points of Intermediate units in the appropriate discipline area.

| **C. Senior units of study** | | | | | | |

In order to proceed to the Senior year, candidates for the BSc (Molecular Biology and Genetics) must achieve a Credit average in Intermediate units of study. Candidates who fail to maintain the required Credit average will be transferred to candidature for the Bachelor of Science degree in their next year of enrolment with full credit for the units of study completed as Bachelor of Science (Molecular Biology and Genetics) candidates. Candidates who fail to achieve the required average across all units of study attempted in the year in which they have otherwise completed the requirements for the degree will be awarded the Bachelor of Science.

In the Senior year candidates are required to enrol in and complete:

(i) MBLG3999, and
(ii) BCHM(3071 or 3971) and BCHM(3081 or 3981); and
(iii) BIOL(3018 or 3918) and (3027 or 3927); and
(iv) Semester 2 elective units of study: Select 24 credit points from BCHM(3072 or 3972), BCHM(3082 or 3982), BCHM(3092 or 3992), BIOL(3025 or 3925), BIOL(3026 or 3926), CHEM(3114 or 3914), CHEM(3115 or 3915), CHEM(3116 or 3916), CHEM(3117 or 3917), MICR(3012 or 3912), MICR(3022 or 3922).

**NOTE:** The July semester enrolment must include a unit of study which incorporates the seminar and discussion program.

Other suitable options incorporating molecular biology and genetics would be considered by the Program Committee.

| **MBLG3999** | Only available to students enrolled in the BSc(MBG) degree or the BCHM3972 course | Semester 2 |
| Molecular Biology & Genetics Seminar B | | | |

| **Honours units of study** | | | | | | |

Candidates for the Honours degree in Molecular Biology and Genetics shall complete an Honours program incorporating research in molecular biology and genetics in a Department or School in the Faculty of Science.
Bachelor of Science/ Master of Nutrition and Dietetics

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH026</td>
<td>Bachelor of Science/ Master of Nutrition and Dietetics</td>
</tr>
<tr>
<td>LC005</td>
<td>Master of Nutrition and Dietetics</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for the Bachelor of Science is full time or part time according to student choice, whereas the attendance pattern for the Master of Nutrition and Dietetics is full time only.

3 Master's type

The master's degree in these resolutions is a professional master's course, as defined by the Coursework Policy. It is accredited by the Dieticians Association of Australia.

4 Admission to candidature

Admission to undergraduate courses at the University of Sydney is either on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Policy), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

5 Requirements for award

(1) To qualify for the award of Bachelor of Science/ Master of Nutrition and Dietetics a student must successfully complete 240 credit points, comprising:
(a) 144 credit points from the Bachelor of Science
(b) 96 credit points from the Master of Nutrition and Dietetics

(2) Requirements for the Bachelor of Science
(a) The Dean may permit a student of exceptional merit who is admitted to the Talented Student Program to undertake a unit or units of study within the Faculty other than those specified in the tables.
(b) The units of study that may be taken for the Bachelor of Science are listed in:
(i) Table 1G for the combined Bachelor of Science/ Master of Nutrition and Dietetics; and
(ii) Table 1 for the Bachelor of Science;
(c) Students must complete 144 credits points, comprising:
(i) 42 credit points of core Junior Science units as specified in Table 1G
(ii) 24 credit points of core Intermediate Science units as specified in Table 1G
(iii) At least 24 credit points of elective Intermediate Science units selected from Table 1
(iv) at least one major from Science subject areas of Biochemistry, Physiology, Microbiology or Psychology as described in Table 1; and
(v) ensure no more than 60 credit points of junior units of study.

(3) Requirements for the Master of Nutrition and Dietetics

Candidates must complete the requirements for the Master of Nutrition and Dietetics degree as set out in the course resolutions and table of units for the Master of Nutrition and Dietetics.

6 Majors

(1) A candidate must complete at least one of the following majors in this degree:
(a) Biochemistry
(b) Microbiology
(c) Physiology
(d) Psychology
(2) Completion of a major is a requirement of the Bachelor of Science. With the exception of the Psychology major which requires 48 credit points across intermediate and senior Psychology units of study, a major requires the completion of 24 senior credit points in one Science subject area, chosen from units of study listed in the table for that subject area. Units of study counted towards one major may not count toward any other major. The full list of majors available in the Bachelor of Science is specified in the course resolution for the Bachelor of Science.
(3) There are no majors for the Master of Nutrition and Dietetics.

7 Progression rules

(1) Candidates must complete the requirements for the Bachelor of Science with a Weighted Average Mark of at least 65 in order to be eligible to proceed to the Master of Nutrition and Dietetics.
(2) Candidates who complete the requirements for the Bachelor of Science but fail to achieve a WAM of 65 will not progress to the Master of Nutrition and Dietetics.

8 Requirements for the Honours degree

(1) Honours in Science is available to meritorious candidates who complete an additional year of full time study, after the completion of the pass degree. Students must complete the requirements for the honours course full-time over two consecutive semesters. If the School is satisfied that a student is unable to attempt honours course on a full time basis and if the Dean so recommends, permission may be granted to undertake honours part-time over four consecutive semesters.
(2) Admission and award requirements for honours in Science are described in the resolutions of the Faculty of Science.
(3) Students who qualify to undertake honours in the Bachelor of Science may elect to enrol in the honours program:
(a) by suspending candidature from the Master of Nutrition and Dietetics for one year, with the permission of the Faculty; or
(b) by undertaking the honours course after completion of both degrees in the combined program.

9 Award of the degree

(1) The Bachelor of Science is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science. Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.
(2) The Master of Nutrition and Dietetics is awarded as a Pass degree only.

10 Course transfer

A student may abandon this course and elect to complete the Bachelor of Science in accordance with the resolutions governing that degree. Completion of the Master of Nutrition and Dietetics in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.
11 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.

Enrolment guide

In your junior year you should complete:

- 12 credit points in the science areas of Maths and Statistics, including 3 credit points of Statistics
- 12 credit points in the science subject area of Chemistry
- 6 credit points in the science subject area of Biology, selected from Concepts in Biology, Concepts in Biology (Adv) or Human Biology or Human Biology (Adv) (BIOL1001 or 1901 or 1003 or 1903)
- MBLG1001 and PSYC1001
- 6 credit points as an elective in a science subject area

Sample Bachelor of Science/ Master of Nutrition and Dietetics

<table>
<thead>
<tr>
<th>Semester</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH1XXX</td>
<td>MATH1XXX</td>
<td>BIOL1001 or 1911 or 1X03</td>
<td>PSYC1001</td>
<td>CHEM1XXX</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 MATH1XXX</td>
<td>MATH1XXX</td>
<td>MBLG1X01</td>
<td>Science elective</td>
<td>CHEM1XXX</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 MBLG2X71</td>
<td>PHSI2X05</td>
<td>Science intermediate elective</td>
<td>Science intermediate elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 BCHM2X72</td>
<td>PHSI2X06</td>
<td>Science intermediate elective</td>
<td>Science intermediate elective</td>
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<td></td>
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<td>6</td>
<td>6</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 12 credit points towards a major in Biochemistry or Physiology or Microbiology or Psychology</td>
<td>Senior Science elective</td>
<td>Senior Science elective</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 12 credit points to complete major chosen in semester 1</td>
<td>Senior Science elective</td>
<td>Senior Science elective</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Years 4 & 5: All units for the Master of Nutrition and Dietetics degree, listed in the postgraduate Nutrition chapter. 96

Table 1G: Bachelor of Science/ Master of Nutrition and Dietetics

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
</table>
| BOL1001       |               | A None. However, semester 1 students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). | N BIOL1911 It is recommended that BOL1 (1001 or 1911) be taken concurrently with either BIOL1003 or BIOL1903. Students who have completed HSC Biology and scored 80+ should enrol in BIOL1911. Students who lack 80+ in HSC Biology but have a UAI of at least 93 may enrol in BIOL1911 with permission from the UEO. The completion of MBLG 1001 is highly recommended. | Semester 1 
Summer Main |
| BOL1911       |               | P 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology. Semester 1 unit, or by invitation. | N BIOL 1001 Note: Department permission required for enrolment It is recommended that BOL (1001 or 1911) be taken concurrently with all other Junior units of study in Biology. The completion of MBLG1001 is highly recommended. | Semester 1 
Summer Main |
4. Bachelor of Science specialist degree programs

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL1003 Human Biology</td>
<td>6</td>
<td>HSC 2-unit Biology</td>
<td>Semester 1</td>
<td>Students who have not completed HSC biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February).</td>
<td>N BIOL1903</td>
<td>Semester 1, Summer Main</td>
</tr>
<tr>
<td>BIOL1903 Human Biology (Advanced)</td>
<td>6</td>
<td>P UAI (or ATAR equivalent) of at least 93 and HSC Biology result in the 90+.</td>
<td>Semester 1</td>
<td>Distinction or better in a University level Biology unit, or by invitation.</td>
<td>N BIOL1903</td>
<td>Semester 1</td>
</tr>
<tr>
<td>CHEM1001 Fundamentals of Chemistry 1A</td>
<td>6</td>
<td>A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence.</td>
<td>Semester 1</td>
<td>N CHEM1101, CHEM1901, CHEM1109, CHEM1903</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>CHEM1002 Fundamentals of Chemistry 1B</td>
<td>6</td>
<td>P CHEM (1001 or 1101) or equivalent</td>
<td>Semester 2</td>
<td>N CHEM1102, CHEM1108, CHEM1902, CHEM1904</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>CHEM1101 Chemistry 1A</td>
<td>6</td>
<td>A HSC Chemistry and Mathematics</td>
<td>Semester 1</td>
<td>C Recommended concurrent units of study: 6 credit points of Junior Mathematics</td>
<td>N CHEM1001, CHEM1109, CHEM1901, CHEM1903</td>
<td>Semester 2, Summer Main</td>
</tr>
<tr>
<td>CHEM1102 Chemistry 1B</td>
<td>6</td>
<td>P CHEM (1101 or 1901) or a Distinction in CHEM1001 or equivalent.</td>
<td>Semester 1</td>
<td>C Recommended concurrent units of study: 6 credit points of Junior Mathematics</td>
<td>N CHEM1002, CHEM1108, CHEM1902, CHEM1904</td>
<td>Semester 2, Summer Main</td>
</tr>
<tr>
<td>CHEM1901 Chemistry 1A (Advanced)</td>
<td>6</td>
<td>P ATAR of at least 95.4 and HSC Chemistry result in band 5 or 6, or by invitation.</td>
<td>Semester 1</td>
<td>C Recommended concurrent unit of study: 6 credit points of Junior Mathematics</td>
<td>N CHEM1001, CHEM1101, CHEM1909, CHEM1903</td>
<td>Semester 1</td>
</tr>
<tr>
<td>CHEM1902 Chemistry 1B (Advanced)</td>
<td>6</td>
<td>P CHEM (1901 or 1903) or Distinction in CHEM1001 or equivalent</td>
<td>Semester 2</td>
<td>C Recommended concurrent unit of study: 6 credit points of Junior Mathematics</td>
<td>N CHEM1002, CHEM1102, CHEM1108, CHEM1904</td>
<td>Semester 2</td>
</tr>
<tr>
<td>CHEM1903 Chemistry 1A (Special Studies Program)</td>
<td>6</td>
<td>P ATAR of at least 99.0 and HSC Chemistry result in Band 6</td>
<td>Semester 1</td>
<td>C Recommended concurrent unit of study: 6 credit points of Junior Mathematics.</td>
<td>N CHEM1001, CHEM1101, CHEM1109, CHEM1901</td>
<td>Semester 1</td>
</tr>
<tr>
<td>CHEM1904 Chemistry 1B (Special Studies Program)</td>
<td>6</td>
<td>P Distinction in CHEM1903</td>
<td>Semester 2</td>
<td>C Recommended concurrent units of study: 6 credit points of Junior Mathematics.</td>
<td>N CHEM1002, CHEM1102, CHEM1108, CHEM1902</td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1011 Applications of Calculus</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>Semester 1</td>
<td>N MATH1111, MATH1901, MATH1906, BIOM1003</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH1014 Introduction to Linear Algebra</td>
<td>3</td>
<td>A HSC Mathematics or MATH1111</td>
<td>Semester 2</td>
<td>N MATH1012, MATH1902, MATH1904</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MATH1111 Introduction to Calculus</td>
<td>6</td>
<td>A HSC General Mathematics</td>
<td>Semester 1</td>
<td>N MATH1001, MATH1901, MATH1906, MATH1907</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH1013 Mathematical Modelling</td>
<td>3</td>
<td>A HSC Mathematics or MATH1111</td>
<td>Semester 2</td>
<td>N MATH1003, MATH1903, MATH1907</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MATH1015 Biostatistics</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>Semester 1</td>
<td>N MATH1005, MATH1905, STAT1021, STAT1022, ECMT1010, BIOM1003</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH1001 Differential Calculus</td>
<td>3</td>
<td>A HSC Mathematics Extension 1</td>
<td>Semester 1</td>
<td>N MATH1011, MATH1901, MATH1906, MATH1111</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH1002 Linear Algebra</td>
<td>3</td>
<td>A HSC Mathematics Extension 1</td>
<td>Semester 1</td>
<td>N MATH1902, MATH1902, MATH1014</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MATH1003 Integral Calculus and Modelling</td>
<td>3</td>
<td>A HSC Mathematics Extension 2 or MATH1001 or MATH1011</td>
<td>Semester 2</td>
<td>N MATH1013, MATH1903, MATH1907</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MATH1004 Discrete Mathematics</td>
<td>3</td>
<td>A HSC Mathematics Extension 1</td>
<td>Semester 2</td>
<td>N MATH1904, MATH2011</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MATH1005 Statistics</td>
<td>3</td>
<td>A HSC Mathematics</td>
<td>Semester 2</td>
<td>N MATH1015, MATH1905, STAT1021, STAT1022, ECMT1010</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MATH1901 Differential Calculus (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in</td>
<td>Semester 1</td>
<td>Students who have previously studied calculus at any level are prohibited from enrolling in this unit.</td>
<td>N MATH1111, MATH1011, MATH1906</td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1902 Linear Algebra (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in</td>
<td>Semester 1</td>
<td>Students who have previously studied calculus at any level are prohibited from enrolling in this unit.</td>
<td>N MATH1002, MATH1012, MATH1904</td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1903 Integral Calculus and Modelling Advanced</td>
<td>3</td>
<td>A HSC Mathematics Extension 2 or Credit or better in MATH1001 or MATH1901</td>
<td>Semester 2</td>
<td>Students with an interest in mathematics, but without HSC Mathematics Extension 2 should consult the unit of study coordinator.</td>
<td>N MATH1003, MATH1013, MATH1907</td>
<td>Semester 2</td>
</tr>
<tr>
<td>MATH1905 Statistics (Advanced)</td>
<td>3</td>
<td>P HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in</td>
<td>Semester 2</td>
<td>Students who have previously studied calculus at any level are prohibited from enrolling in this unit.</td>
<td>N MATH1015, MATH1005, STAT1021, STAT1022, ECMT1010</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

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### 4. Bachelor of Science specialist degree programs

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH1906 Mathematics (Special Studies Program) A</td>
<td>3</td>
<td>P UAI (orATAR equivalent) of at least 98.5 and result in Band E4 HSC Mathematics Extension</td>
<td>2: by invitation</td>
<td>N MATH1111, MATH1001, MATH1011, MATH1901</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
</tr>
<tr>
<td>MATH1907 Mathematics (Special Studies Program) B</td>
<td>3</td>
<td>P Distinction in MATH1906: by invitation</td>
<td>N MATH1003, MATH1013, MATH1903</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>MBLG1001 Molecular Biology and Genetics (Intro)</td>
<td>6</td>
<td>A 6 credit points of Junior Biology and 6 cp of Junior Chemistry</td>
<td>N ASC2001, BCHM2001, BCHM2101, BCHM2901, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2971, MBLG1901</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC1001 Psychology 1001</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Summer Main</td>
<td></td>
</tr>
</tbody>
</table>

### Second year

Students must complete:

1. MBLG2071 or 2971
2. BCHM2072 or 2972
3. PHSI2005 or 2905
4. PHSI2006 or 2906

5. An additional 12 credit points of Science electives from Table 1
6. A further 12 credit points of intermediate Science electives from Table 1

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBLG2071 Molecular Biology and Genetics A</td>
<td>6</td>
<td>P MBLG1001 or MBLG1901 and 12 CP of Junior Chemistry</td>
<td>N MBLG2971, MBLG2771, MBLG2871, MBLG2001, MBLG2101, MBLG2901, MBLG2111, ASC2001, BCHM2001, BCHM2101, BCHM2901</td>
<td>Students enrolled in the combined BiAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course (CHEM101, BACH1161, BIOS1159, EXSS1018 CHEM102, BIOS1133, BIOS1166, EXSS1033, MBLG1001) prior to enrolling in this unit.</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>MBLG2971 Molecular Biology and Genetics A (Adv)</td>
<td>6</td>
<td>P 12 credit points of Junior Chemistry and Distinction in MBLG (1001 or 1901)</td>
<td>N MBLG2071, MBLG2771, MBLG2871, MBLG2001, MBLG2101, MBLG2901, MBLG2111, ASC2001, BCHM2001, BCHM2101, BCHM2901</td>
<td>Students enrolled in the combined BiAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course prior to enrolling in this unit.</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>BCHM2072 Human Biochemistry</td>
<td>6</td>
<td>P Either MBLG (1001 or 1901) and 12 credit points of Junior Chemistry or either MBLG2071</td>
<td>N BCHM2972, BCHM2002, BCHM2102, BCHM2902, BCHM2112</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCHM2972 Human Biochemistry (Advanced)</td>
<td>6</td>
<td>P Distinction in one of (BCHM (2071 or 2971) or MBLG(2071 or 2971)) or (Distinction in MBLG 2 (1001 or 1901) and Distinction average in all other Junior Science Units of Study undertaken).</td>
<td>N BCHM2072, BCHM2002, BCHM2102, BCHM2902, BCHM2112</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHSI2005 Integrated Physiology A</td>
<td>6</td>
<td>P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics,</td>
<td>Mathematics, Biology, Psychology units of study</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>PHSI2905 Integrated Physiology A (Advanced)</td>
<td>6</td>
<td>P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics,</td>
<td>Mathematics, Biology, Psychology units of study, approval of Coordinator</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHSI2006 Integrated Physiology B</td>
<td>6</td>
<td>P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics,</td>
<td>Mathematics, Biology, Psychology units of study</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>PHSI2906 Integrated Physiology B (Advanced)</td>
<td>6</td>
<td>P 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics,</td>
<td>Mathematics, Biology, Psychology units of study, approval of coordinator</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
<td></td>
</tr>
</tbody>
</table>

### Third year

Students must complete

1. A major in Biochemistry or Physiology or Microbiology or Psychology
2. Up to an additional 24 senior credit points which may constitute a second major, or electives chosen from Table 1.

### Years 4 & 5

Students who successfully complete progression requirements enrol in the Master of Nutrition and Dietetics degree.

Students complete requirements for the Master of Nutrition and Dietetics degree as set out in the relevant postgraduate chapter.
Bachelor of Medical Science

Bachelor of Medical Science (Honours)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH010</td>
<td>Bachelor of Medical Science</td>
</tr>
<tr>
<td>LH043</td>
<td>Bachelor of Medical Science (Honours)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time or part time according to student choice.

3 Admission to candidature

(1) Admission to undergraduate courses at the University of Sydney is either on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Rule), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

(2) Transferring into the Intermediate year of the Bachelor of Medical Science degree. A limited number of students may be permitted to transfer into the course at the beginning of the Intermediate year after completing the first year of a degree with the same or very similar content to the Bachelor of Medical Science. Applicants must complete all of the units of study deemed equivalent by the faculty. Selection is based solely on performance in the first year units of study.

4 Requirements for award

(1) The units of study that may be taken for this award are set out in Table IV for the Bachelor of Medical Science. The Dean may permit a candidate of exceptional merit who is admitted to the Talented Student Program to undertake a unit or units of study within the Faculty other than those specified in Table IV.

(2) To qualify for the award of the pass degree, a student must successfully complete 144 credit points, comprising:

(a) a minimum of 48 credit points of Junior units of study, including MBLG (1001 or 1901) and 6 credit points of Biology and 12 credit points each from Chemistry, Mathematics and either (i) 12 credit points of Psychology; or (ii) 12 credit points of Physics (not including PHYS1500); (iii) or 6 credit points of psychology and 6 credit points of physics (not PHYS1500).

(b) 48 credit points of intermediate core units of study listed in Table IV; and

(c) 48 credit points of senior units of study, which includes a minimum of 36 credit points of senior units of study taken from the subject areas of Anatomy/Histology, Biology, Biochemistry, Cell Pathology, Immunology, Infectious Diseases, Microbiology, Pharmacology and Physiology; and

(d) no more than 60 credit points of junior units of study; and

(e) no more than 12 credit points from outside Table IV.

5 Progression rules

(1) Except with the permission of the Dean, students may not enrol in an intermediate core unit of study until they have completed 42 credit points of junior units of study.

(2) Students may not enrol in a senior unit of study until they have completed 42 credit points of intermediate core units of study.

6 Requirements for the Honours degree

(1) Honours is available to meritorious students who complete an additional year of full time study.

(2) Admission, requirements and award of honours are according to the Resolutions of the Faculty of Science.

(3) To qualify for the award of the honours degree, a student must complete 48 credit points of honours units of study in one of the honours subject areas listed in Table IV D.

7 Award of the degree

(1) The Bachelor of Medical Science is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science.

(2) Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

8 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.

To view the latest updates, or to purchase or search a handbook, please visit the website: sydney.edu.au/handbooks
Bachelor of Medical Science/Bachelor of Medicine and Bachelor of Surgery

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH034</td>
<td>Bachelor of Medical Science/Bachelor of Medicine and Bachelor of Surgery</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Cross faculty management

(1) Candidates in this combined degree will be under the general supervision of the Faculty of Science until the end of the semester in which they complete the requirements for the Bachelor of Medical Science. After that they will be under the general supervision of the Faculty of Medicine (Sydney Medical School).

(2) The Deans of the Faculties of Medicine and Science shall jointly exercise authority in any matter concerned with the combined degree program not otherwise dealt with in these resolutions.

4 Admission to candidature

(1) Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents) leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Applicants are ranked by merit and offers for available places are issued according to the ranking. Eligible Indigenous or Torres Strait Islander applicants who submit additional information may improve their ranking by participating in the University's access and equity schemes. Details of admission policies are found in the Coursework Rule.

(2) In addition, admission to this course requires the applicant to participate in a semi structured interview. The results of this interview will form part of the ranking of applicants.

5 Requirements for award

(1) The units of study that may be taken for the course are set out in:

(a) Table IV for the Bachelor of Medical Science in the Faculty of Science handbook; and

(b) the table of units of study for the Bachelor of Medicine and Bachelor of Surgery from the Faculty of Medicine.

(2) The Dean of the Faculty of Science may permit a candidate of exceptional merit who is admitted to the Talented Student Access and Equity Scheme to undertake a unit or units of study within the Faculty other than those specified in Table IV.

(3) To qualify for the award of both degrees a candidate must successfully complete 336 credit points, comprising:

(a) 144 credit points to qualify for the award of the Bachelor of Medical Science as required in the Bachelor of Medical Science resolutions; and

(b) 192 credit points to qualify for the award of the Bachelor of Medicine and Bachelor of Surgery as required by the resolutions for the Bachelor of Medicine and Bachelor of Surgery, and

(c) One zero credit point Medicine unit of study in the first three years of the program.

6 Progression rules

(1) Candidates must complete all requirements for the degree Bachelor of Medical Science in minimum time and must maintain a minimum average mark of 65 in each year of the Bachelor of Medical Science, this being the minimum achievement required for admission to candidacy for the Bachelor of Medicine and Bachelor of Surgery.

(2) Failure to maintain required progression and minimum result requirements will result in candidates being transferred from the combined degree program to the Bachelor of Medical Science with full credit for the units of study completed.

7 Requirements for the Honours degree

(1) Honours is available to meritorious candidates, in either or both the Bachelor of Medical Science or Bachelor of Medicine and Bachelor of Surgery.

(2) Honours in the Bachelor of Medical Science requires completion of an additional year of full time study. Candidates must complete the requirements for the honours course full-time over two consecutive semesters.

(3) Candidates who enrol in the honours year at the completion of the Bachelor of Medical Science will suspend enrolment in the combined degree and transfer to the Bachelor of Medical Science honours candidacy and enrol in fourth year units of study, before returning to complete the combined award. Honours can also be attempted at the completion of the combined pass program.

(4) Admission and award requirements for honours are described in the resolutions of the Faculty of Science.

(5) Honours in the Bachelor of Medicine and Bachelor of Surgery requires successful completion of an alternative set of units completed within the normal timeframe of the pass degree. Admission and award requirements for honours are listed in the course resolutions relating to the Bachelor of Medicine and Bachelor of Surgery.

8 Award of the degree

(1) The Bachelor of Medical Science is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the resolutions of the Faculty of Science.

(2) The Bachelor of Medicine and Bachelor of Surgery is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Second Class (Division 2) according to the conditions specified in the course resolutions relating to the Bachelor of Medicine and Bachelor of Surgery.

(3) Candidates for the award of either Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the relevant pass degree.

9 Credit Transfer

It is not possible for candidates enrolled in the Bachelor of Medical Science/Bachelor of Medicine and Bachelor of Surgery to obtain credit for previous studies.

10 Course transfer

A candidate may abandon the combined program and elect to complete the Bachelor Medical Science in accordance with the resolutions governing that degree. Completion of the Bachelor of Medicine and Bachelor of Surgery in the future will require a new application for admission to candidacy for that course and completion in accordance with the resolutions governing that degree.
11 Transitional provisions

(1) These resolutions apply to students who commenced their candidature after 1 January, 2011 and students who formally elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may elect to complete the requirements in accordance with the resolutions in force at the time of their commencement.

Sample Bachelor of Medical Science

<table>
<thead>
<tr>
<th>Semester</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>MATH1XXX</td>
<td>MATH1XXX</td>
<td>CHEM1XXX</td>
<td>PHYS1XXX</td>
<td>BIOL1XXX</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>BMED2801</td>
<td>BMED2802</td>
<td>BMED2803</td>
<td>BMED2806</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td>Senior core 3XXX</td>
<td>Senior core 3XXX</td>
<td>Senior core 3XXX</td>
<td>Senior core 3XXX or elective</td>
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<td>24</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total credit points: 144

Require: 144cp total, min 48cp Junior, min 48cp Intermediate core, min 36cp Senior core, no more than 12cp from units of study outside Table IV.

Table IV – Bachelor of Medical Science

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Junior units of study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidates are required to enrol in and complete:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) MBLG1X01;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) 12 credit points of Junior units of study from the Science Subject Area of Chemistry;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) 12 credit points of Junior units of study from the Science Subject Area of Mathematics;</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>(iv) 12 credit points of Junior units of study from the Science Subject Area of Physics (excluding PHYS1500) or Computational Science; and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(v) 6 credit points of Junior units of study from the Science Subject Area of Biology.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>B. Intermediate units of study</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Candidates are required to complete 48 credit points of Intermediate core units of study.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BMED2801 Cell Structure and Function</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2802 Molecular Basis of Medical Sciences</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2803 Cardiac, Respiratory and Renal Function</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2804 Digestion, Absorption and Metabolism</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2805 Hormones, Reproduction and Development</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2806 Sensory and Motor Functions</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMED2807 Microbes and Body Defences</td>
<td>6</td>
<td>P 42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td>Semester 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### C. Senior units of study

Students may complete their Senior year by taking 48 credit points of Senior core units from the subject areas of Anatomy and Histology, Biology (Genetics) (ie. BIOL3016/3916, 3025/3925, 3026/3926, 3027/3927), Biochemistry, Cell Pathology, Immunology, Infectious Diseases, Microbiology, Pharmacology and Physiology. The unit listed in the table below is available only to students enrolled in the Bachelor of Medical Science. Details of the other units available are listed in Table I. Candidates may elect to take 36 credit points of Senior core units and 12 credit points of elective units. The electives may be chosen from any units of study available in the university, and in which the candidate is permitted to enrol by the relevant Faculty or School.

**Table I. Honours units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMED2808 Disease in Society</td>
<td>6</td>
<td>P</td>
<td>42 credit points of Junior Bachelor of Medical Science units of study</td>
<td>N All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INF5301 Infectious Diseases</td>
<td>6</td>
<td>A</td>
<td>Intermediate microbiology, immunology, molecular biology and genetics.</td>
<td>P 42 credit points of intermediate BMED units including BMED2807. The completion of MICR3011 is strongly recommended prior to undertaking this course.</td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

### D. Honours units of study

Wherehonours units of study are designated A, B, C, D the units should be taken in that order, whether a student enrols full-time, part-time or mid-year.

#### Anatomy

| ANAT4011 Anatomy Honours A | 12 | Note: Department permission required for enrolment | | | Semester 1 Semester 2 |
| ANAT4012 Anatomy Honours B | 12 | C ANAT-4011 | | | Semester 1 Semester 2 |
| ANAT4013 Anatomy Honours C | 12 | C ANAT-4012 | | | Semester 1 Semester 2 |
| ANAT4014 Anatomy Honours D | 12 | C ANAT-4013 | | | Semester 1 Semester 2 |

#### Biochemistry

| BCHM4011 Biochemistry Honours A | 12 | Note: Department permission required for enrolment | Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65. | | Semester 1 Semester 2 |
| BCHM4012 Biochemistry Honours B | 12 | C BCHM-4011 | Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65. | | Semester 1 Semester 2 |
| BCHM4013 Biochemistry Honours C | 12 | C BCHM-4012 | Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65. | | Semester 1 Semester 2 |
| BCHM4014 Biochemistry Honours D | 12 | C BCHM-4013 | Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65. | | Semester 1 Semester 2 |

#### Biology (Genetics)

| BIOL4015 Scientific Research in Biology | 6 | P Pass degree in an area of Life Sciences or Equivalent | Note: Department permission required for enrolment | C BIOL4016 | Semester 1 Semester 2 |
| BIOL4016 Biology Honours A | 6 | C BIOL4015 | BIOL4009, BIOL4010, BINF5002, BINF5003 | N BIOL4011 | Note: Department permission required for enrolment | Semester 1 Semester 2 |
| BIOL4017 Biology Honours B | 12 | C BIOL4011 or (BIOL4015 and BIOL4016) | | | Semester 1 Semester 2 |
| BIOL4018 Biology Honours C | 12 | C BIOL4012 | | | Semester 1 Semester 2 |
| BIOL4019 Biology Honours D | 12 | C BIOL4013 | Note: Department permission required for enrolment | | Semester 1 Semester 2 |

#### Cell Pathology

| CPAT4011 Cell Pathology Honours A | 12 | Note: Department permission required for enrolment | | | Semester 1 Semester 2 |
| CPAT4012 Cell Pathology Honours B | 12 | C CPAT-4011 | | | Semester 1 Semester 2 |
| CPAT4013 Cell Pathology Honours C | 12 | C CPAT-4012 | | | Semester 1 Semester 2 |
| CPAT4014 Cell Pathology Honours D | 12 | C CPAT-4013 | | | Semester 1 Semester 2 |

#### Histology and Embryology

Students should enrol in Anatomy Honours
### Immunology

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>IMMU4011 Immunology Honours A</td>
<td>12</td>
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<td>Note: Department permission required for enrolment</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>IMMU4012 Immunology Honours B</td>
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<td>12</td>
<td>C IMMU4012 N BMED4013</td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>IMMU4014 Immunology Honours D</td>
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<td>C IMMU4013 N BMED4014</td>
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<td>Semester 1 Semester 2</td>
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### Infectious Diseases

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
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<th>C: Corequisites</th>
<th>N: Prohibition</th>
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<tbody>
<tr>
<td>INFU4011 Infectious Diseases Honours A</td>
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<tr>
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<tr>
<td>INFU4014 Infectious Diseases Honours D</td>
<td>12</td>
<td>C INFU4013 N BMED4024</td>
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</table>

### Microbiology

<table>
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<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<tbody>
<tr>
<td>MICR4011 Microbiology Honours A</td>
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<td>Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65.</td>
<td></td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>MICR4012 Microbiology Honours B</td>
<td>12</td>
<td>P Department permission required for enrolment C MICR4011</td>
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<tr>
<td>MICR4013 Microbiology Honours C</td>
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<td>Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65.</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MICR4014 Microbiology Honours D</td>
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<td>C MICR4013</td>
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<td>Semester 1 Semester 2</td>
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### Pharmacology

<table>
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<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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</thead>
<tbody>
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<td>PCOL4011 Pharmacology Honours A</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>PCOL4012 Pharmacology Honours B</td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>PCOL4013 Pharmacology Honours C</td>
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<td>C PCOL4012</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>PCOL4014 Pharmacology Honours D</td>
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<td>C PCOL4013</td>
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<td>Semester 1 Semester 2</td>
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</table>

### Physiology

<table>
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<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSI4011 Physiology Honours A</td>
<td>12</td>
<td>Note: Department permission required for enrolment</td>
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<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>PHSI4012 Physiology Honours B</td>
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<td>C PHSI4011</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>PHSI4013 Physiology Honours C</td>
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<td>C PHSI4012</td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>PHSI4014 Physiology Honours D</td>
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<td>C PHSI4013</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
</tbody>
</table>
5. Bachelor of Medical Science and BMedSc/MBBS
6. Bachelor of Psychology

Bachelor of Psychology

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course Resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
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</thead>
<tbody>
<tr>
<td>LH013/LH042</td>
<td>Bachelor of Psychology</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Admission to candidature

Admission to undergraduate courses at the University of Sydney is either on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Rule), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

4 Requirements for award

(1) The units of study which may be taken for the degree are set out in Table I from the Faculty of Science and the Table A from the Faculty of Arts. The Dean may permit a student of exceptional merit who is admitted to the Faculty of Science Talented Student Program to undertake units of study within the Faculty other than those specified in Table 1.

(2) To qualify for the award of the Bachelor of Psychology (Honours), students must successfully complete 192 credit points, comprising all common requirements and units from either Arts or Science.

(3) Common requirements for all students

(a) no more than 60 credit points of junior units of study;
(b) a minimum of 12 credit points of junior Psychology units of study, with a minimum average mark of 65;
(c) 24 credit points of intermediate Psychology units of study (PSYC2011, PSYC2012, PSYC2013, PSYC2014), with a minimum average mark of 75;
(d) a minimum of 30 credit points of senior Psychology units of study which must include PSYC3010, PSYC3018 and one unit of study selected from PSYC3011, PSYC3012, PSYC3013 or PSYC3014, with a minimum average mark of 75;
(e) 48 credit points of Psychology Honours units of study from the Honours units of study table.

(4) Units from Arts or Science

(a) Students must complete a minimum of 96 credit points from Science subject areas in Table 1 before progression to Honours; including:
   (i) a minimum of 12 credit points from the Science subject areas of Mathematics and Statistics; and
   (ii) a minimum of 12 credit points of Junior units of study from Science subject areas other than Psychology and Mathematics and Statistics;

(b) Students must complete a major in Arts as set out in the course resolution for Bachelor of Arts degree before progression to Honours; and ensuring a minimum of 60 credit points of units of study from Table A.

5 Progression rules

(1) Students must achieve a minimum average mark of 65 in junior Psychology units of study and a minimum average mark of 75 in both intermediate and senior Psychology units of study in order to progress to the final Honours year.

(2) Students who fail to maintain the required average in Psychology units of study specified above will be transferred to either the Bachelor of Science or the Bachelor of Arts in their next year of enrolment with full credit for the units of study completed.

(3) Students who complete all course requirements to the end of the third year, but fail to achieve the required average in Psychology units in order to progress to the Honours year will be awarded the Bachelor of Science or Bachelor of Arts.

(4) Completion of the honours year in Psychology is a requirement for the award of the Bachelor of Psychology.

(5) To qualify for admission to the honours year a candidate must have completed 144 credit points including the remaining common requirements and the relevant units from Arts or Science.

(6) To qualify for the award of the Bachelor of Psychology a candidate must complete 48 credit points of units of study from the Honours units of study table, with an honours mark of at least 65.

6 Award of the degree

(1) The Bachelor of Psychology is only awarded as an honours degree. The honours degree is awarded in classes ranging from First Class to Third Class according to the conditions specified in the Resolutions of the Faculty of Science.

(2) Candidates who do not achieve an honours mark of 65 or more will be awarded a Bachelor of Science or Bachelor of Arts, depending on their chosen pathway.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.
## Sample Bachelor of Psychology - Science Stream

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Unit of study 6 &amp; credit points</th>
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<tbody>
<tr>
<td>Year 1</td>
<td>1 PSYC1001 MATH1XXX MATH1XXX Science Elective 1XXX</td>
<td>Elective</td>
<td>6 3 3 6 6</td>
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<tr>
<td></td>
<td>2 PSYC1002 MATH1XXX MATH1XXX CHEM1XXX Elective</td>
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<tr>
<td>Year 2</td>
<td>1 PSYC2011 PSYC2012 Science Elective Elective</td>
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<td></td>
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<tr>
<td>Year 3</td>
<td>1 PSYC3018 PSYC301X PSYC3XXX PSYC3XXX or Elective Elective</td>
<td>6 6 6 6 6</td>
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<td></td>
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<td>Year 4</td>
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</tbody>
</table>

Total credit points: 192 Require: 192cp total, min. 12 cp Junior Psychology, min. 24cp Intermediate Psychology, min. 30cp Senior Psychology (incl. PSYC3010, PSYC3018 and at least one of PSYC 3011, 3012, 3013, 3014), min. HPSC3023 may be included as a senior Psychology unit. 48cp Honours Psychology, min. 12cp Maths, max 60cp Junior.

## Sample Bachelor of Psychology - Arts Stream

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
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<tbody>
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<td>Year 1</td>
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</tbody>
</table>

Total credit points: 192 Require: 192cp total, min. 12 cp Junior Psychology, min. 24cp Intermediate Psychology, min. 30cp Senior Psychology (incl. PSYC3010, PSYC3018 and at least one of PSYC 3011, 3012, 3013, 3014), min. HPSC3023 may be included as a senior Psychology unit. 48cp Honours Psychology, min. 12cp Maths, max 60cp Junior.
Bachelor of Liberal Arts and Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH056</td>
<td>Bachelor of Liberal Arts and Science</td>
</tr>
<tr>
<td>AH042</td>
<td>Bachelor of Liberal Arts and Science (Honours)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Admission to candidature

Admission to undergraduate courses at the University of Sydney is either on the basis of completion of secondary study via the NSW Higher School Certificate, leading to the award of an Australian Tertiary Admission Ranking (ATAR) or equivalent (and subject to special admissions provisions as set out in the Coursework Rule), or on the basis of Mature Age Admission as set out in the Admissions chapter of the Coursework Rule.

4 Requirements for award

1. The units of study available for the Bachelor of Liberal Arts and Science are set out in:
   a. the Table of Liberal Studies units for the Bachelor of Liberal Arts and Science;
   b. Table 1 for the Bachelor of Science;
   c. Table A from the Faculty of Arts; and
   d. Table B from the Faculty of Arts.

2. To qualify for the award of the pass degree, a student must successfully complete 144 credit points, comprising:
   a. 36 credit points from the Table of Liberal Studies units for the Bachelor of Liberal Arts and Science, including at least one unit of study from each of the three areas: Analytical Thinking, Communication and Ethics, as specified in the Table; and either
   b. a major in Science from Table 1 together with a minimum of 36 credit points of units of study from

3. In addition, ensure:
   a. no more than 84 junior credit points; and
   b. units of study chosen to satisfy the Liberal Studies requirement can not count towards the Science or Arts requirements.

5 Majors

1. Completion of a major is a requirement of the course. Units of study counted towards one major may not count toward any other major.

2. The list of Science majors available is specified in the course resolutions for the Bachelor of Science.

3. The list of Table A Arts majors available is specified in the resolutions of the Faculty of Arts.

6 Requirements for the Honours degree

1. Honours is available to meritorious candidates who complete an additional year of full time study in either Science or Arts at the completion of the degree.

2. Admission and award requirements for honours in Science are described in the resolutions of the Faculty of Science. Admission and award requirements for honours in the Bachelor of Arts are described in the resolutions of the Faculty of Arts.

7 Award of the degree

1. The Bachelor of Liberal Arts and Science is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science and Faculty of Arts.

2. Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

8 Transitional provisions

1. These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

2. Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the Faculty may, in special circumstances, approve.
Sample Bachelor of Liberal Arts and Science Plans

BLAS: General plan for ARTS Major, with one Liberal Studies (LS) unit per semester. Note that other arrangements are also possible.

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 Arts Junior unit (6)</td>
<td>Arts Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Analytical Thinking ATHK1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts Junior unit (6)</td>
<td>Arts Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Academic English WRIT1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 Arts Major Senior unit (6)</td>
<td>Arts Major Senior unit (6)</td>
<td>Science unit (6)</td>
<td>LS unit from Ethics area (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts Major Senior unit (6)</td>
<td>Elective unit (6)</td>
<td>Science unit (6)</td>
<td>LS elective (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 Arts Major Senior unit (6)</td>
<td>Arts Major Senior unit (6)</td>
<td>Science unit (6)</td>
<td>LS elective (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts Major Senior unit (6)</td>
<td>Elective unit (6)</td>
<td>Science unit (6)</td>
<td>LS elective (6)</td>
<td>24</td>
</tr>
</tbody>
</table>

|       |                               |                               |                               |                               | 144 |

Students intending to major in an Arts area should consult the Faculty of Arts Handbook for information.

SAMPLE BLAS PATHWAY: History Major. Note that other arrangements are also possible.

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 History Junior unit (6)</td>
<td>Anthropology Junior unit (6)</td>
<td>Psychology PSYC1001 (6)</td>
<td>Analytical Thinking ATHK1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 History Junior unit (6)</td>
<td>Anthropology Junior unit (6)</td>
<td>Psychology PSYC1002 (6)</td>
<td>Academic English WRIT1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 History Major Senior unit (6)</td>
<td>History Major Senior unit (6)</td>
<td>Psychology Intermediate unit (6)</td>
<td>Bioethics HPSC1000 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 History Major Senior unit (6)</td>
<td>Anthropology Senior unit (6)</td>
<td>Psychology Intermediate unit (6)</td>
<td>Foundations of IT INFO1003 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 History Major Senior unit (6)</td>
<td>History Major Senior unit (6)</td>
<td>Psychology Intermediate unit (6)</td>
<td>Earth Environment and Society GEOIS1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 History Major Senior unit (6)</td>
<td>Anthropology unit (6)</td>
<td>Psychology Intermediate unit (6)</td>
<td>Critical Thinking PHIL2842 (6)</td>
<td>24</td>
</tr>
</tbody>
</table>

|       |                               |                               |                               |                               | 144 |

Students intending to major in an Arts area should consult the Faculty of Arts Handbook for information.

BLAS: General plan for SCIENCE Major, with one Liberal Studies (LS) unit per semester. Note that other arrangements are also possible.

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 Arts Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Analytical Thinking ATHK1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Science Junior unit (6)</td>
<td>Academic English WRIT1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 Arts unit (6)</td>
<td>Science Intermediate unit (in major area) (6)</td>
<td>Elective (6)</td>
<td>LS unit from Ethics area (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts unit (6)</td>
<td>Science Intermediate unit (in major area) (6)</td>
<td>Elective (6)</td>
<td>LS Elective (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 Arts unit (6)</td>
<td>Science Major Senior unit (6)</td>
<td>Science Major Senior unit (6)</td>
<td>LS Elective (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Arts unit (6)</td>
<td>Science Major Senior unit (6)</td>
<td>Science Major Senior unit (6)</td>
<td>LS Elective (6)</td>
<td>24</td>
</tr>
</tbody>
</table>

|       |                               |                               |                               |                               | 144 |

Students intending to major in a Science subject area should enrol in the appropriate junior level of units of study. For more information, refer to the Faculty of Science Handbook, Chapter 3: Enrolment Guide by Major for the Bachelor of Science degree.

SAMPLE BLAS PATHWAY: Psychology Major. Note that other arrangements are also possible.

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 Sociology Unit (6)</td>
<td>Psychology PSYC1001(6)</td>
<td>Mathematics Junior Units(6)</td>
<td>Analytical Thinking ATHK1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Sociology Unit (6)</td>
<td>Psychology PSYC1002(6)</td>
<td>Mathematics Junior Units (6)</td>
<td>Academic English WRIT1001 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 Sociology Senior Unit (6)</td>
<td>Psychology PSYC2011 (6)</td>
<td>Psychology PSYC2012 (6)</td>
<td>Australian Texts: International Contexts ENGL1008 (6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Sociology Senior Unit (6)</td>
<td>Psychology PSYC2013 (6)</td>
<td>Psychology PSYC2014 (6)</td>
<td>Indigenous Australia: An Introduction KOCR2600 (6)</td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 Sociology Senior Unit (6)</td>
<td>Psychology Major Senior Unit (6)</td>
<td>Psychology Major Senior Unit (6)</td>
<td>Bioethics HPSC1000(6)</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Sociology Senior Unit (6)</td>
<td>Psychology Major Senior Unit (6)</td>
<td>Psychology Major Senior Unit (6)</td>
<td>HSTY1044 20th Century Politics and Culture (6)</td>
<td>24</td>
</tr>
</tbody>
</table>

|       |                               |                               |                               |                               | 144 |

Students intending to major in a Science subject area should enrol in the appropriate junior level of units of study. For more information, refer to the Faculty of Science Handbook, Chapter 3: Enrolment Guide by Major for the Bachelor of Science degree.
### Table of Liberal Studies Units for the Bachelor of Liberal Arts and Science

Candidates are required to complete 36 credit points from units listed in the Liberal Studies table. At least one 6 credit point unit of study from each of the three core areas Analytical Thinking, Communication and Ethics must be completed. The remaining 18 credit points of Liberal Studies units may be taken from any of the six areas of the table, A-F.

1. **Compulsory Liberal Studies Units**

From the Table of Liberal Studies Units below, students must complete ATHK1001 Analytical Thinking, and WRIT1001 Academic English, and one 6 credit point unit from the Ethics area, totalling 18 credit points. Note that ATHK1001 and WRIT1001 must be taken in the first year of the degree.

2. **Table of Liberal Studies Units**

#### A. Analytical Thinking

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATHK1001 Analytical Thinking</td>
<td>6</td>
<td>ATHK1001 is a compulsory unit within the Bachelor of Liberal Arts and Science (BLAS) degree and will only be available to students enrolling the BLAS.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LNGS1001 Structure of Language</td>
<td>6</td>
<td>N LNGS1004, LNGS1005</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHIL1012 Introductory Logic</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>STAT1021 General Statistical Methods 1</td>
<td>6</td>
<td>A HSC General Mathematics N MATH1005, MATH1015, MATH1905, ECMT1010</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHIL2642 Critical Thinking</td>
<td>6</td>
<td>P 12 Junior credit points in any units within the University</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHIL2650 Logic and Computation</td>
<td>6</td>
<td>P PHIL1012 or PHIL2628 or permission of instructor</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHIL2615 Intermediate Logic</td>
<td>6</td>
<td>P 12 Junior credit points in Philosophy and PHIL1012 or PHIL2203 or PHIL2628. N PHIL2215, PHIL3215</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>STAT2012 Statistical Tests</td>
<td>6</td>
<td>P MATH (1005 or 1905 or 1015) N STAT2004, STAT2912</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

#### B. Communication

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL1007 Language, Texts and Time</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ENGL1008 Australian Texts: International Contexts</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LNGS1002 Language and Social Context</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>WRIT1001 Academic English</td>
<td>6</td>
<td>Upon registration for this unit students will be directed to an online diagnostic exercise.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>WRIT1002 Academic Writing</td>
<td>6</td>
<td>A WRIT1001 is not a prerequisite for WRIT1002, but successful completion of WRIT1001 would be advantageous to students undertaking WRIT1002</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LNGS2617 Cross-Cultural Communication</td>
<td>6</td>
<td>N LNGS1001, LNGS1002, LNGS1003, LNGS1004, LNGS1005 or (Credit average in 12 Senior credit points from one of the foreign languages (French, Japanese, Chinese, Italian, Arabic, Spanish, German, Latin, Modern Greek, Ancient Greek, Indonesian, Malay, Korean, Thai, Yiddish, Hebrew, Syriac, Aramaic, Sanskrit) N LNGS3903, LNGS3923 This unit is available as a designated 'Advanced' unit for students who are already enrolled in the BA (Advanced) degree program.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ENGL2619 Semiotics of Language</td>
<td>6</td>
<td>P 12 Junior credit points of English N ENGL2019, SMTC2001, SMTC2002</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

#### C. Ethics

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSC1000 Bioethics</td>
<td>6</td>
<td>N HPSC1900 This Junior unit of study is highly recommended to Intermediate and Senior Life Sciences students.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC1900 Bioethics (Advanced)</td>
<td>6</td>
<td>N HPSC1000 Note: Department permission required for enrolment</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HPSC3900 Science and Ethics</td>
<td>6</td>
<td>P At least 24 credit points of Intermediate or Senior units of study; HPSC1000 N HPSC3007</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>INFO2315 Introduction to IT Security</td>
<td>6</td>
<td>A Computer literacy N NETS3305, NETS3605, NETS3016, NETS3916, ELEC5610, ELEC5616</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHIL2623 Moral Psychology</td>
<td>6</td>
<td>P 12 Junior credit points in Philosophy. N PHIL2513, PHIL3513</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHIL2617 Practical Ethics</td>
<td>6</td>
<td>P 12 Junior credit points N PHIL2517</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
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<td>----------------------</td>
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<td>-----------------</td>
<td>-----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>D. Culture, Society and Global Citizenship</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH1002 Anthropology and the Global</td>
<td>6</td>
<td>N ANTH1004</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ASNS1601 Introduction to Asian Cultures</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ASNS1602 Modernity in Asia</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOS1001 Earth, Environment and Society</td>
<td>6</td>
<td>N GEOS1901, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOS1901 Earth, Environment and Society Advanced</td>
<td>6</td>
<td>P Departmental permission is required for enrolment. An ATAR above 93 is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator. N GEOS1001, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>E. Scientific Enquiry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOVT1101 Australian Politics</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSTY1044 Twentieth Century Europe</td>
<td>6</td>
<td>N HSTY1043</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2 Summer Late</td>
</tr>
<tr>
<td>JCTC1001 Palestine: Roman Rule to Islam</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH2625 Culture and Development</td>
<td>6</td>
<td>P 12 Junior credit points from Anthropology</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ANTH2626 The City: Global Flows and Local Forms</td>
<td>6</td>
<td>P 12 Junior credit points from Anthropology N ANTH2026</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ASTR2601 Australia: Land and Nation</td>
<td>6</td>
<td>P 18 junior credit points N ASTR2001 May be cross listed to a major in Australian Literature. This unit is available as a designated 'Advanced' unit for students who are already enrolled in the BA (Advanced) degree program.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>KOCS2600 Indigenous Australia: An Introduction</td>
<td>6</td>
<td>P 18 Junior credit points N KOCS2100</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>EUST2611 European &amp; Middle Eastern Myth &amp; Legend</td>
<td>6</td>
<td>P At least 18 junior credit points from Part A of the Table of Units of Study, of which 12 credit points are from one subject</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>HSTY2604 Popular Culture in Australia 1850-1945</td>
<td>6</td>
<td>P 12 credit points of Junior History, Ancient History, or Asian Studies N HSTY2004</td>
<td>This unit of study is not available in 2011</td>
<td></td>
<td></td>
<td>Semester 1 Winter Main</td>
</tr>
<tr>
<td>HSTY2605 Contemporary Europe</td>
<td>6</td>
<td>P 12 credit points of Junior History, Ancient History, or Asian Studies N HSTY2005</td>
<td>This unit of study is not available in 2011</td>
<td></td>
<td></td>
<td>Semester 1 Winter Main</td>
</tr>
<tr>
<td>PACS2602 History and Politics of War and Peace</td>
<td>6</td>
<td>P 18 junior credit points, of which 6 must normally be in either HSTY, GOVT, SCOLG or LAWS this unit is taught jointly with the Department of History and can be counted towards a History major</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>F. Technological Literacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS1500 Astronomy</td>
<td>6</td>
<td>A No assumed knowledge of Physics.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC2101 What is This Thing Called Science?</td>
<td>6</td>
<td>P 24 credit points of Junior units of study N HPSC2201, HPSC2901</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2 Summer Main</td>
</tr>
<tr>
<td>HPSC2100 The Birth of Modern Science</td>
<td>6</td>
<td>P 24 credit points of Junior units of study N HPSC2202, HPSC2900</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Summer Main</td>
</tr>
<tr>
<td>INFO1003 Foundations of Information Technology</td>
<td>6</td>
<td>N INFO1000 or INFS1000</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>INFO1903 Informatics (Advanced)</td>
<td>6</td>
<td>A HSC Mathematics P ATAR sufficient to enter BCST(Adv), BIT or BSc(Adv), or portfolio of work suitable for entry Note: Department permission required for enrolment</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ARIN2600 Technocultures</td>
<td>6</td>
<td>P 18 junior credit points N ARIN3000</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>ARIN2620 Cyberworlds</td>
<td>6</td>
<td>P 18 junior credit points N ARIN2200 May be cross-listed for a Sociology major</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>ARIN2610 Web Production</td>
<td>6</td>
<td>P 18 junior credit points N ARIN2100</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2 Summer Main</td>
</tr>
</tbody>
</table>
8. Combined degrees

Bachelor of Science and Bachelor of Laws

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH006</td>
<td>Bachelor of Science and Bachelor of Laws</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Streams

(1) The Bachelor of Science in this combined degree is available in the following streams:
(a) Advanced
(b) Advanced Mathematics
(2) Students with a sufficient ATAR may choose to be admitted into either of the Advanced streams. All others will enter the Bachelor of Science without a stream. Students, who have completed at least 48 credit points, may be permitted to transfer to either the Bachelor of Science (Advanced) or (Advanced Mathematics) stream if they:
(a) achieved a minimum average mark of 75 over all units of study attempted; and
(b) are able to enrol in the required number of Advanced level units or Talented Student Program (TSP) units.
(3) Students wishing to transfer between streams should contact the Faculty of Science student office.

4 Cross-faculty management

(1) Candidates will be under the general supervision of the Faculty of Science until the end of the semester in which they complete the requirements for the Bachelor of Science. They will then be under the supervision of the Faculty of Law.
(2) The Deans of the Faculty of Science and the Faculty of Law shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

5 Admission to candidature

Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents), tertiary study or an approved preparation program. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Special admission pathways are open for educationally disadvantaged applicants and for Aboriginal and Torres Strait Islander people. Applicants are ranked by merit and offers for available places are issued according to the ranking. Details of admission policies are found in the Coursework Rule.

6 Requirements for award

(1) The units of study that may be taken for this combined degree are set out in Table 1 from the Faculty of Science and the Faculty of Law Undergraduate tables.
(2) To qualify for the award of the pass degrees, a candidate must complete 240 credit points, comprising:
(a) 96 credit points from Science subject areas; and
(b) 144 credit points of Law units of study, of which 48 credit points are Combined Law compulsory units of study for Years 1, 2 and 3 and are credited towards the requirements for both the Bachelor of Science and the Bachelor of Laws.
(3) The Dean of the Faculty of Science may permit a candidate of exceptional merit who is admitted to the Talented Student Program to undertake a unit or units of study within the Faculty of Science other than those specified in the tables.
(4) Requirements for the Bachelor of Science: To qualify for the award of the Bachelor of Science a candidate must complete 144 credit points comprising:
(a) 48 credit points of Combined Law compulsory units of study for Years 1, 2 and 3; and
(b) 96 credit points from Science subject areas, including:
(i) a major in a Science subject area; and
(ii) a minimum of 12 credit points from the Science subject areas of Mathematics and Statistics; and
(iii) 24 credit points of junior units of study from at least two Science subject areas other than Mathematics or Statistics; and
(iv) 50 credit points of intermediate and senior units of study in Science subject areas.
(5) Candidates completing the Advanced stream must also include as part of the above requirements:
(i) a minimum of 12 credit points of intermediate units of study at either the Advanced level or as Talented Student Program (TSP) units in Science subject areas; and
(ii) a minimum of 24 credit points of senior units of study at the Advanced level or as TSP units in a single Science subject area.
(6) Candidates completing the Advanced Mathematics stream must also include as part of the above requirements:
(i) a minimum of 12 credit points of intermediate units of study at either the advanced level or as TSP units in the Science subject areas of Mathematics and Statistics; and
(ii) a minimum of 24 credit points of senior units of study at the Advanced level or as TSP units in a major in Mathematics, Statistics or Financial Mathematics and Statistics.
(7) Requirements for the Bachelor of Laws: To qualify for the award of the Bachelor of Laws, a candidate must complete 144 credit points taken from the Faculty of Law Undergraduate Table, comprising:
(i) 102 credit points of compulsory units of study; and
(ii) 42 credit points of electives units of study, of which a maximum of 36 credit points are taken from Part 1 and a minimum of 6 credit points are taken from Part 2.

7 Majors

(1) Completion of a major is a requirement of the Bachelor of Science in this combined degree.
(2) With the exception of the Psychology major, a major in the Bachelor of Science requires the completion of 24 senior
credit points from one Science subject area listed in Table 1. The list of majors available in the Bachelor of Science is specified in the course resolutions for the Bachelor of Science.

8 Progression rules

(1) Candidates in a combined law program must successfully complete LAWS1006 Foundations of Law before enrolling in any other Bachelor of Laws units of study.
(2) Candidates are required to complete Bachelor of Laws units in the order listed in the Faculty of Law Undergraduate Table.
(3) Except with permission of the Dean of the Faculty of Law, candidates must complete the requirements for the Bachelor of Science before proceeding to Year Four of the Bachelor of Laws.
(4) Candidates enrolled in the Bachelor of Science (Advanced) and (Advanced Mathematics) are required to maintain a minimum average mark of 65 in all intermediate and senior units of study in Science subject areas in each year of enrolment. Failure to maintain the required average will result in candidates being transferred to the Bachelor of Science in their next year of enrolment with full credit for the units of study completed.
(5) Candidates enrolled in the Bachelor of Science (Advanced) or (Advanced Mathematics) who fail to achieve a minimum average mark of 65 in all Science units of study attempted in their final year but have otherwise completed all the requirements of the degree will be awarded the Bachelor of Science.

9 Requirements for the Honours degree

(1) Both the Bachelor of Science and the Bachelor of Laws may be awarded with honours.
(2) Honours in the Bachelor of Science is available to meritorious candidates who complete an additional year of full time study after the completion of the pass degree.
(3) Honours in the Bachelor of Laws is available to meritorious students who complete an alternative set of units of study in the final year of the program.
(4) Candidates who qualify to undertake honours in the Bachelor of Science may elect to enrol in the honours program:

(a) by suspending candidacy from the Bachelor of Laws degree for one year, with the permission of the Faculty of Law;
(b) by undertaking the honours course after completion of both degrees in the combined program.
(5) The admission and award requirements for honours in either Science or Laws are listed in the resolutions of the Faculty of Science and Bachelor of Laws course resolutions respectively.

10 Award of the degree

(1) The Bachelor of Science and Bachelor of Laws are awarded in the grades of either Pass or Honours.
(2) Honours in the Bachelor of Science is awarded in classes ranging from First Class to Third Class in accordance with the resolutions of the Faculty of Science.
(3) Honours in the Bachelor of Laws may be awarded in First Class or Second Class in accordance with the Resolutions of the Bachelor of Laws.
(4) Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

11 Course transfer

A candidate may withdraw from the combined degree program and elect to transfer to the Bachelor of Science by written application to the Faculty of Science, and complete the requirements in accordance with the resolutions governing that degree at the time of transfer. Candidate in the Bachelor of Laws will cease in these circumstances.

12 Transitional provisions

(1) These resolutions apply to students who commenced their candidature on or after 1 January, 2011.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions governing that degree at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the relevant faculty may, in special circumstances, approve.

Sample Bachelor of Science/Bachelor of Laws (Years 1 to 3)

<table>
<thead>
<tr>
<th>Sem</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Unit of study 6 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1 MATH 1XXX</td>
<td>MATH 1XXX</td>
<td>Science elective A 1XXX</td>
<td>Science elective B 1XXX</td>
<td>LAWS1006</td>
<td>LAWS1013</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 MATH 1XXX</td>
<td>MATH 1XXX</td>
<td>Science elective A 1XXX</td>
<td>Science elective B 1XXX</td>
<td>LAWS1012</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Year 2</td>
<td>1 Major 2XXX</td>
<td>Intermediate Science elective</td>
<td>LAWS1014</td>
<td>LAWS1015</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Major 2XXX</td>
<td>Intermediate Science elective</td>
<td>LAWS1016</td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Year 3</td>
<td>1 Major 3XXX</td>
<td>Major 3XXX</td>
<td>Science elective</td>
<td>LAWS1018</td>
<td>LAWS1019</td>
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<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2 Major 3XXX</td>
<td>Major 3XXX</td>
<td>LAWS1017</td>
<td>LAWS1021</td>
<td></td>
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<td>6</td>
<td></td>
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<td>24</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>144</td>
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</tbody>
</table>

Total credit points: 144
Table II: Law units of study for the combined degree

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAWS1006 Foundations of Law</td>
<td>6</td>
<td></td>
<td>N LAWS1000</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LAWS1012 Torts</td>
<td>6</td>
<td></td>
<td>P LAWS1006, N LAWS1005, LAWS1010, LAWS3001</td>
<td></td>
<td></td>
<td>S1 Intensive</td>
</tr>
<tr>
<td>LAWS1013 Legal Research I</td>
<td>C LAWS1006</td>
<td></td>
<td>N LAWS1008</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester 1 classes are for Combined Law candidates in the faculties of Arts, Engineering and Science. Semester 2 classes are for Combined Law candidates in the Faculty of Economics &amp; Business.</td>
<td></td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>LAWS1014 Civil and Criminal Procedure</td>
<td>6</td>
<td></td>
<td>P LAWS1006, LAWS1012</td>
<td>N LAWS1001, LAWS1007, LAWS3002, LAWS3004, LAWS2006</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LAWS1015 Contracts</td>
<td>6</td>
<td></td>
<td>P LAWS1006, N LAWS1002, LAWS2008</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>LAWS1016 Criminal Law</td>
<td>6</td>
<td></td>
<td>P LAWS1006, LAWS1014</td>
<td>N LAWS1003, LAWS3001, LAWS2009</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>LAWS1017 Torts and Contracts II</td>
<td>6</td>
<td></td>
<td>P (LAWS1010 or LAWS1012) and LAWS1015</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>LAWS1019 Legal Research II</td>
<td>P LAWS1013</td>
<td></td>
<td>N LAWS1008, LAWS1022</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester 1 classes are for Combined Law candidates in the faculties of Arts, Engineering and Science. Semester 2 classes are for Combined Law candidates in the Faculty of Economics &amp; Business.</td>
<td></td>
<td></td>
<td>Semester 2</td>
<td></td>
</tr>
<tr>
<td>LAWS1021 Public Law</td>
<td>6</td>
<td></td>
<td>P LAWS1006, N LAWS2002, LAWS3003, LAWS1004</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

Combined Science/Arts degree (5 years)
This degree is not offered. Students continuing in this degree should refer to the Faculty of Science 2010 handbook.

Bachelor of Science and Bachelor of Arts
These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions
1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
<th>Stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH039</td>
<td>Bachelor of Science and Bachelor of Arts</td>
<td>Bachelor of Science (Advanced), Bachelor of Science (Advanced Mathematics)</td>
</tr>
</tbody>
</table>

2 Attendance pattern
The attendance pattern for this course is full time or part time according to candidate choice.

3 Streams
(1) The Bachelor of Science in this combined degree is also available in the following streams:
(a) Advanced
(b) Advanced Mathematics
(2) Students with a sufficient ATAR may choose to be admitted into either of the Advanced streams. All others will enter the Bachelor of Science without a stream. Students, who have completed at least 48 credit points, may be permitted to transfer to either the Bachelor of Science (Advanced) or (Advanced Mathematics) stream if they:
(a) achieved an average mark of 75 or greater over all units of study attempted; and
(b) are able to enrol in the required number of Advanced level units or Talented Student Program (TSP) units.
(3) Students wishing to transfer between streams should contact the Faculty student office.

4 Cross faculty management
(1) Candidates will be under the general supervision of the Faculty of Science for the duration of the combined program.
(2) The Deans of the Faculty of Science and the Faculty of Arts shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

5 Admission to candidature
Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents), tertiary study or an approved preparation program. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Special admission pathways are open for mature aged applicants who do not possess a school leaving qualification, educationally disadvantaged applicants and for Indigenous and Torres Strait Islander people. Applicants are ranked by merit and offers for available places are issued according to the ranking. Details of admission policies are found in the Coursework Rule.

6 Requirements for award
(1) The units of study that may be taken for the course are set out under subject areas in Table 1 from the Faculty of Science and Table A and Table B from the Faculty of Arts.
(2) The Dean may permit a candidate of exceptional merit who is admitted to the Faculty of Science Talented Student Program to undertake a unit or units of study within the Faculty of Science other than those specified in Table 1.
(3) To qualify for the award of the Bachelor of Science and Bachelor of Arts, a candidate must successfully complete 192 credit points, comprising:
(a) a minimum of 96 credit points from Science subject areas, including:
8. Combined degrees

(i) a major from Science subject areas listed in Table 1; and
(ii) a minimum of 12 credit points from the Science subject areas of Mathematics and Statistics; and
(iii) a minimum of 24 credit points of Junior units of study from at least two Science subject areas other than Mathematics and Statistics.

(b) a minimum of 72 credit points of Senior units of study in Arts subject areas from Table A, including:
(i) a major from Arts subject areas listed in Table A; (ii) no more than 18 junior credit points from any one Arts subject area; and
(iii) and ensuring no more than 60 Senior credit points from any one Arts subject area.

(4) Candidates completing the Advanced stream must include as part of the above requirements:
(a) a minimum of 12 credit points of intermediate units of study at either the Advanced level or as Talented Student Program (TSP) units in Science subject areas; and
(b) a minimum of 24 credit points of senior units of study at the Advanced level or as TSP units in a single Science subject area.

(5) Candidates completing the Advanced Mathematics stream must include as part of the above requirements:
(a) a minimum of 12 credit points of intermediate units of study at either the Advanced level or as TSP units in the Science subject areas of Mathematics and Statistics; and
(b) a minimum of 24 credit points of Senior units of study at the Advanced level or as TSP units in a major in Mathematics, Statistics or Financial Mathematics and Statistics.

7 Majors

(1) Completion of a major in each degree is a requirement of the course. Units of study counted towards one major may not count toward any other major completed.
(2) The list of majors available in the Bachelor of Science is specified in the course Resolutions for the Bachelor of Science.
(3) The list of majors available in the Bachelor of Arts are listed in the resolution of the Faculty of Arts.

8 Progression rules

(1) A candidate may proceed concurrently to the degrees of Bachelor of Science, Bachelor of Science (Advanced), Bachelor of Science (Advanced Mathematics) and Bachelor of Arts.
(2) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) are required to maintain a minimum average mark of 65 in all intermediate and senior units of study in Science subject areas in each year of enrolment. Failure to maintain the required average will result in candidates being transferred to the Bachelor of Science in their next year of enrolment with full credit for the units of study completed.
(3) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) who fail to achieve an average mark of 65 across all Science units of study attempted in their final year but have otherwise completed all the requirements of the degree will be awarded the Bachelor of Science.

9 Requirements for the Honours degree

(1) Honours is available to meritorious candidates, in either or both the Bachelor of Science or Bachelor of Arts. Honours requires the completion of one additional full time year of study for each honours degree attempted. Candidates must complete the requirements for the honours course full-time over two consecutive semesters. If the School or Department is satisfied that a student is unable to attempt the honours course on a full time basis and if the Dean so recommends, permission may be granted to undertake honours part-time over four consecutive semesters.
(2) Candidates who enrol in the honours year during the program will suspend enrolment in the combined degree and transfer to the single Bachelor of Arts or Bachelor of Science honours candidature and enrol in fourth year units of study, before returning to complete the combined award. Honours can also be attempted at the completion of the pass program.
(3) Admission and award requirements for honours in the Bachelor of Science are listed in the resolutions of the Faculty of Science. Admission and award requirements for honours in the Bachelor of Arts are listed in the resolutions of the Faculty of Arts.

10 Award of the degree

(1) Candidates will be awarded a separate testamur for each degree completed.
(2) The Bachelor of Science and Bachelor of Arts are awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class according to the rules specified in the Resolutions of the Faculty of Science and Faculty of Arts.
(3) Candidates for the award of the Honours degree who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

11 Course transfer

A candidate may abandon the combined program and elect to complete the either the Bachelor of Arts or the Bachelor of Science in accordance with the resolutions governing that degree. Completion of the abandoned degree in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.

12 Transitional provisions

(1) These resolutions apply to students who commenced their candidature after 1 January, 2011 and students who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that the requirements are completed by 1 January, 2016. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.
8. Combined degrees

Sample Bachelor of Science/Bachelor of Arts (4 years)

<table>
<thead>
<tr>
<th>Sem</th>
<th>Year 1</th>
<th>Unit of study 1 &amp; credit points</th>
<th>Unit of study 2 &amp; credit points</th>
<th>Unit of study 3 &amp; credit points</th>
<th>Unit of study 4 &amp; credit points</th>
<th>Unit of study 5 &amp; credit points</th>
<th>Unit of study 6 &amp; credit points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MATH1XXX</td>
<td>MATH1XXX</td>
<td>Science elective A 1XXX</td>
<td>Science elective B 1XXX</td>
<td>Arts elective 1XXX</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>MATH1XXX</td>
<td>MATH1XXX</td>
<td>Science elective A 1XXX</td>
<td>Science elective B 1XXX</td>
<td>Arts elective 1XXX</td>
<td></td>
<td>24</td>
</tr>
<tr>
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<td>3</td>
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</tr>
<tr>
<td>Year 2</td>
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<td>Intermediate Science elective 2XXX</td>
<td>Intermediate Science elective 2XXX</td>
<td>Arts elective 1XXX</td>
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<td>Arts Senior elective</td>
<td>Arts major Senior elective</td>
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</table>

Total credit points: 192

Require: 192cp total, max 96cp Junior, min. 96cp Science, no more than 18 cp Junior cp from the same Arts area, min 36cp Junior Science incl. 12cp Maths, one Science major, min 72cp Senior Arts including one Arts major.

Bachelor of Engineering and Bachelor of Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>H015</td>
<td>Bachelor of Engineering and Bachelor of Science</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Streams

(1) Streams available for the Bachelor of Engineering are listed in the course resolution for the Bachelor of Engineering. Completion of a stream is a requirement of the Bachelor of Engineering.

(2) The Bachelor of Science degree is available in the following streams:

(a) Advanced

(b) Advanced Mathematics.

(3) Completion of a stream is not a requirement of the Bachelor of Science. Candidates wishing to transfer between streams should contact the Faculty student office.

4 Cross faculty management

(1) Candidates in this combined degree program will be under the general supervision of the Faculty of Engineering and Information Technologies for the duration of the combined program.

(2) The Deans of the Faculty of Engineering and Information Technologies and the Faculty of Science shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

5 Admission to candidature

Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents), tertiary study or an approved preparation program. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Special admission pathways are open for mature aged applicants who do not possess a school leaving qualification, educationally disadvantaged applicants and for Aboriginal and Torres Strait Islander people. Applicants are ranked by merit and offers for available places are issued according to the ranking. Details of admission policies are found in the Coursework Rule.

6 Requirements for award

(1) The units of study that may be taken for the Bachelor of Engineering are set out in the tables of units of study for the specialised streams from the Faculty of Engineering and Information Technologies.

(2) The units of study that may be taken for the Bachelor of Science are listed in Table 1 from the Faculty of Science.

(3) To qualify for the award of the combined degree, a candidate must successfully complete 240 credit points, comprising:

(a) a minimum of 144 credit points of units of study prescribed for the Bachelor of Engineering stream the candidate is pursuing; and

(b) 96 credit points of Science units of study, including one major in a Science subject area.
(4) Candidates completing the Bachelor of Science in the Advanced or the Advanced Mathematics stream must include as part of the above requirements:

(a) a minimum of 54 credit points of intermediate or senior Science units of study, of which at least 36 credit points shall be completed at either the Advanced level or as Talented Student Program (TSP) units of study; and

(b) a minimum of 24 credit points of senior Science units of study at either the Advanced level or as TSP units in a single Science subject area.

7 Majors

Completion of a major is a requirement of the Bachelor of Science component of the combined degree. The list of majors available in the Bachelor of Science is specified in the course resolutions for the Bachelor of Science.

8 Progression rules

(1) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) are required to maintain a minimum average mark of 65 in all intermediate and senior units of study in Science subject areas in each year of enrolment. Failure to maintain the required average will result in candidates being transferred to the Bachelor of Science in their next year of enrolment with full credit for the units of study completed.

(2) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) who fail to achieve an average mark of 65 across all Science units of study attempted in their final year but have otherwise completed all the requirements of the degree will be awarded the Bachelor of Science.

(3) General progression rules for the combined degree are covered by the resolutions of the Faculty of Engineering and Information Technologies.

9 Requirements for the Honours degree

(1) Honours is available to meritorious candidates, in either or both the Bachelor of Engineering or Bachelor of Science. Honours requires the completion of an alternative set of units in the final year of the Bachelor of Engineering degree and of one additional full time year of study for the Bachelor of Science degree. The Science honours course may be undertaken part time over two years if the Faculty of Science is satisfied the candidate cannot undertake honours full time.

(2) Admission and award requirements for honours in the Bachelor of Engineering are listed in the resolution for the Bachelor of Engineering degree. Admission and award requirements for honours in the Bachelor of Science are listed in the resolutions of the Faculty of Science.

10 Award of the degree

(1) Candidates will be awarded a separate testamur for each degree completed.

(2) The Bachelor of Engineering and the Bachelor of Science are awarded in the grades of either Pass or Honours. The Bachelor of Engineering honours degree is awarded in classes ranging from First Class to Second Class, and the Bachelor of Science honours degree is awarded in classes ranging from First Class to Third Class, according to the rules specified in the Resolutions of the Bachelor of Engineering and the Faculty of Science.

(3) Candidates who do not meet the requirements for the award of the Bachelor of Engineering (Honours) but who have otherwise satisfied the requirements of the Bachelor of Engineering shall graduate with the pass degree.

(4) Candidates for the award of the Bachelor of Science (Honours) who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

11 Course transfer

A candidate may abandon the combined program and elect to complete the either the Bachelor of Engineering or the Bachelor of Science in accordance with the resolutions governing that degree. Completion of the abandoned degree in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.

12 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement.

See also Summary of Requirements of the BSc. Students should note that this degree is administered by the Faculty of Engineering.
Double degree in Science/Engineering

Bachelor of Engineering and Bachelor of Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Double degree course resolutions

1 Course codes

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<th>Code</th>
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</thead>
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<td>HH000</td>
<td>Bachelor of Engineering</td>
</tr>
<tr>
<td>LH000</td>
<td>Bachelor of Science</td>
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</tbody>
</table>

2 Admission to candidacy for the Bachelor of Science after partial completion of the Bachelor of Engineering

(1) A student, at the end of second or third year of candidacy for the Bachelor of Engineering, may be admitted to candidacy for the Bachelor of Science, to complete the Bachelor of Science degree, if:

a) all units of study attempted in the Bachelor of Engineering degree to date have been completed with a grade of pass or better;

b) at least 96 credit points from units of study in the Bachelor of Engineering degree have been completed, of which no more than 12 credit points are from units of study with the grade of pass (concessional);

c) the candidate is qualified to enrol in a major in a Science area;

d) for admission to the advanced streams, the candidate satisfies the relevant requirements in the course resolution for the Bachelor of Science degree.

(2) After completion of the Bachelor of Science, the candidate will return to complete the Bachelor of Engineering according to the resolutions for that degree.

3 Attendance pattern

The attendance pattern for the Bachelor of Science is full time over one year, or part time over two years, according to candidate choice.

4 Streams

(1) The Bachelor of Science degree is available in the following streams:

a) Advanced

b) Advanced Mathematics.

(2) Completion of a stream is not a requirement of the Bachelor of Science. Candidates wishing to transfer between Science streams should contact the Faculty student office.

5 Cross faculty management

(1) Candidates in this double degree program will be under the supervision of the Faculty of Engineering and Information Technologies for the period of Bachelor of Engineering degree enrolment, and under the supervision of the Faculty of Science for the Bachelor of Science enrolment.

(2) The Deans of the Faculty of Engineering and Information Technologies and the Faculty of Science shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

6 Requirements for award

(1) The units of study that may be taken for the Bachelor of Engineering are set out in the Flexible First Year table of units of study, and the tables of units of study for the specialised streams from the Faculty of Engineering and Information Technologies.

(2) The units of study that may be taken for the Bachelor of Science are listed in Table 1 from the Faculty of Science. The Dean of the Faculty of Science may permit a candidate of exceptional merit who is admitted to the Talented Student Program (TSP) to undertake a unit or units of study within the Faculty other than those specified in the tables.

(3) To qualify for the award of the Bachelor of Science in the double degree program, a candidate must successfully complete a total of 48 credit points, including:

a) a minimum of 42 credit points of intermediate/senior units of study in Science subject areas; and

b) a major in a Science area.

(4) Candidates completing the Bachelor of Science in the Advanced stream must include as part of the above requirements:

a) a minimum of 24 credit points of senior Science units of study at the Advanced level or as TSP units in a single Science subject area.

(5) Candidates completing the Bachelor of Science in the Advanced Mathematics stream must include as part of the above requirements:

a) a major in Mathematics, Statistics or Financial Mathematics and Statistics;

b) a minimum of 12 credit points of intermediate units of study at either the advanced level or as TSP units in the Science subject areas of Mathematics and Statistics;

c) a minimum of 24 credit points of senior Science units of study at the Advanced level or as TSP units in the Science subject areas of Mathematics and Statistics.

7 Majors

Completion of a major is a requirement of the Bachelor of Science. The list of majors available in the Bachelor of Science is specified in the course resolutions for the Bachelor of Science.

8 Progression rules

(1) The requirements for Bachelor of Science must be completed in one year of full-time study or two years of part-time study. Candidates who complete at least 42 but less than 48 credit points in the prescribed time limits may, in the following year of enrolment in the Bachelor of Engineering, complete the remaining credit points to satisfy the requirements of the Bachelor of Science. Candidates who complete less than 42 credit points will resume their candidacy in the Bachelor of Science.

(2) Candidates enrolled in the Bachelor of Science (Advanced) or Bachelor of Science (Advanced Mathematics) are required to maintain a minimum average mark of 65 in all intermediate and senior units of study in Science. Failure to maintain the required average will result in candidates being transferred to the Bachelor of Science.

(3) General progression rules for the combined degree are covered by the resolutions of the Faculty of Engineering and Information Technologies.

9 Requirements for the Honours degree

(1) Honours in the Bachelor of Science is available to meritorious candidates who complete an additional year of full time study, after the completion of the pass degree. Part time study over two years may be permitted if the Faculty is satisfied the candidate cannot undertake honours full time. Admission, requirements and award of honours are according to the Resolutions of the Faculty of Science.
Candidates for the Bachelor of Science (Honours) must suspend their candidature in the Bachelor of Engineering. On completion of the requirements of the Bachelor of Science (Honours) degree, candidates will be eligible to resume their enrolment toward the Bachelor of Engineering degree according to the Faculty of Engineering and Information Technologies course resolutions for the degree. Alternatively, honours in the Bachelor of Science may be undertaken after successful completion of both the Bachelor of Science and Bachelor of Engineering degrees.

Admission and award requirements for honours in the Bachelor of Engineering are listed in the resolution for the Bachelor of Engineering degree.

10 Award of the degree

(1) Candidates will be awarded a separate testamur for the Bachelor of Science and the Bachelor of Engineering.
(2) The Bachelor of Science is awarded with the grade Pass or Honours. The honours degree is awarded in classes ranging from First Class to Third Class, according to the rules specified in the Resolutions of the Faculty of Science.
(3) Candidates for the award of the Bachelor of Science (Honours) who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

11 Course transfer

Candidates may abandon the Bachelor of Science degree at any stage and resume their enrolment in the Bachelor of Engineering. Completion of the Bachelor of Science in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.

12 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement.

Combined Science/Commerce degrees

See also Summary of Requirements of the BSc.

Degree resolutions

This degree is administered by the Faculty of Economics and Business.

Combined Nursing/Science degrees

See also Summary of Requirements of the BSc.

Degree resolutions

This degree is administered by the Faculty of Nursing.

Combined Education/Science degrees

See also Summary of Requirements of the BSc.

Degree resolutions

This degree is administered by the Faculty of Education.

Combined BAppSc (Exercise and Sport Science)/BSc(Nutrition) degrees

Degree code: SH115

This degree is not available to new students from 2010. Please see the BSc (Nutrition) requirements and table in the 2010 Handbook. See also the Health Sciences Handbook.
Bachelor of Engineering and Bachelor of Medical Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

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<td>HH021</td>
<td>Bachelor of Engineering and Bachelor of Medical Science</td>
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</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Streams

(1) Streams available for the Bachelor of Engineering are listed under the course resolution for the Bachelor of Engineering.

(2) Completion of a stream is a requirement of the Bachelor of Engineering.

4 Cross faculty management

(1) Candidates in this combined degree program will be under the general supervision of the Faculty of Engineering and Information Technologies for the duration of the combined program.

(2) The Deans of the Faculty of Engineering and Information Technologies and the Faculty of Science shall jointly exercise authority in any matter concerned with the combined course not otherwise dealt with in these resolutions.

5 Admission to candidature

Admission to this course is on the basis of a secondary school leaving qualification such as the NSW Higher School Certificate (including national and international equivalents), tertiary study or an approved preparation program. English language requirements must be met where these are not demonstrated by sufficient qualifications taught in English. Special admission pathways are open for mature aged applicants who do not possess a school leaving qualification, educationally disadvantaged applicants and for Aboriginal and Torres Strait Islander people. Applicants are ranked by merit and offers for available places are issued according to the ranking. Details of admission policies are found in the Coursework Rule.

6 Progression rules

General progression rules for the combined degree are covered by the resolutions of the Faculty of Engineering and Information Technologies.

7 Requirements for award

(1) The units of study that may be taken for the Bachelor of Engineering are set out in the tables of units of study for the specialised streams from the Faculty of Engineering and Information Technologies.

(2) The units of study that may be taken for the Bachelor of Medical Science are listed in Table IV for the Bachelor of Medical Science from the Faculty of Science.

(3) To qualify for the award of the combined degree, a candidate must successfully complete 240 credit points.

(4) For the Bachelor of Engineering, candidates must complete all units of study prescribed in the table of units for the Bachelor of Engineering stream the candidate is pursuing, noting that the mathematics requirement for this degree will also satisfy the mathematics requirements for the Bachelor of Medical Science.

(5) For the Bachelor of Medical Science a candidate must complete 102 credit points of units including:

(a) MBLG1001/1901 Introductory Molecular Biology & Genetics;

(b) A minimum of 24 credit points from junior Science units of study, including 12 credit points each from Chemistry and Mathematics;

(c) 48 credit points of intermediate core units of study listed in Table IV for the Bachelor of Medical Science;

(d) A minimum of 24 credit points of senior Science units of study selected from the subject areas of Anatomy/Histology, Biology (Genetics), Biochemistry, Cell Pathology, Immunology, Infectious Diseases, Microbiology, Pharmacology and/or Physiology.

8 Requirements for the Honours degree

(1) Honours is available to meritorious candidates, in either or both the Bachelor of Engineering or Bachelor of Medical Science. Honours requires the completion of an alternative set of units in the final year of the Bachelor of Engineering degree and of one additional full time year of study for the Bachelor of Medical Science degree. The Resolutions of the Faculty of Science allow for part time honours in certain circumstances.

(2) Admission and award requirements for honours in the Bachelor of Engineering are listed in the resolution for the Bachelor of Engineering degree. Admission and award requirements for honours in the Bachelor of Medical Science are listed in the resolutions of the Faculty of Science.

9 Award of the degrees

(1) Candidates will be awarded a separate testamur for each degree completed.

(2) The Bachelor of Engineering and the Bachelor of Medical Science are awarded in the grades of either Pass or Honours. The Bachelor of Engineering honours degree is awarded in classes ranging from First Class to Second Class, and the Bachelor of Medical Science honours degree is awarded in classes ranging from First Class to Third Class, according to the rules specified in the Resolutions of the Faculty of Engineering and Information Technologies and the Faculty of Science.

(3) Candidates who do not meet the requirements for the award of the Bachelor of Engineering (Honours) but who have otherwise satisfied the requirements of the Bachelor of Engineering shall graduate with the pass degree.

(4) Candidates for the award of the Bachelor of Medical Science (Honours) who do not meet the requirements, and who have not already graduated, will be awarded the pass degree.

10 Course transfer

A candidate may abandon the combined program and elect to complete either the Bachelor of Engineering or the Bachelor of Medical Science in accordance with the resolutions governing that degree. Completion of the abandoned degree in the future will require a new application for admission to that course and completion in accordance with the resolutions governing that degree.

11 Transitional provisions

(1) These resolutions apply to students who commenced their candidature after 1 January, 2011 and students who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement.
8. Combined degrees
This chapter provides information on each of the undergraduate units of study offered by the Faculty of Science, as well as additional information on each of the teaching Schools and Departments and interdisciplinary subject areas.

Organisation of unit of study information

The units of study are generally organised alphabetically by School or Departments. EMHU and HSTO units can be found under the entry for Anatomy and Histology. NEUR can be found in the Anatomy or Physiology entries, depending on the principle teaching department for the individual unit. COMP, INFO, ISYS, NETS, MULT AND SOFT can be found under the Information Technologies entry. Further information on Information Technology units can be found in the Faculty of Engineering and Information Technologies Handbook and website. NTMP can be found under the Marine Science entry. STAT can be found under the Mathematics and Statistics entry. VIRO can be found under the Microbiology entry.

Aerospace, Mechanical and Mechatronic Engineering

The School of Aerospace, Mechanical and Mechatronic Engineering is part of the Faculty of Engineering and Information Technologies. In addition to providing professional training in aerospace, mechanical, biomedical and mechatronic engineering, units of study in the School are available to students in the Faculty of Science who meet any prerequisite requirements for a particular unit.

Agricultural Chemistry and Soil Science

Study in the discipline of Agricultural Chemistry is offered by the Faculty of Agriculture, Food and Natural Resources. Units of study in Agricultural Chemistry for Science students cover aspects of chemistry and biochemistry which are relevant in basic and applied biological sciences including agriculture, the environment and food science. The unit of study, Agricultural Chemistry (AGCH2004) introduces students to basic analytical and environmental chemistry. Senior units of study include Chemistry and Biochemistry of Foods A and B (AGCH3025 and AGCH3026) and Land and Water Ecochemistry (AGCH3032). These senior units of study introduce students to the applied aspects of food chemistry science or to applied environmental chemistry. Emphasis is placed on the chemistry of both naturally occurring molecules of biological, agricultural and environmental significance (eg in foods and natural fibres), and chemically synthesised (eg insecticides and herbicides). Agricultural Chemistry Honours is available to students who wish to further their studies in food chemistry or environmental chemistry.

AGCH2004

Agricultural Chemistry

Credit points: 8 Teacher/Coordinator: Dr Robert Caldwell, Professor David Fraser, Professor Ivan Kennedy Session: Semester 1 Classes: 3x1-hr lectures/week, 1x3-hr laboratory session, weeks 1 to 12 Prerequisites: 12 credit points of Junior Chemistry Prohibitions: AGCH2003, PLNT2001 Assessment: 1x2-hr exam (50%), 1x1-hr quiz (10%), 1x1-hr theory of practical test (10%), laboratory reports (30%)

This introductory unit of study consists of aspects of chemistry relevant in studies of basic and applied biological sciences including agriculture, food and the rural environment. Lecture topics include an introduction to quantitative aspects of bio-analytical chemistry; the principles of basic analytical methods such as spectroscopy, chromatography and electrochemistry; environmental aspects of water and its behaviour as a solvent of hydrophobic solutes, surfactants, neutral hydrophobic solutes, salts and other electrolytes, and gases. A component of the unit will be devoted to basic biological chemistry and enzymology having particular emphasis on biochemical processes in animals. Six laboratory sessions will demonstrate aspects of analytical chemistry including: elemental analysis of foods and natural waters, spectrophotometry, chromatographic techniques, preparation of buffers, fundamentals of pH measurement. A further five laboratory sessions will involve experiments in the preparation and/or properties of carbohydrates, proteins, lipids and DNA. One session will examine some fundamental properties of enzymes.

AGCH3025

Chemistry and Biochemistry of Foods

Credit points: 6 Teacher/Coordinator: Dr Meredith Wilkes, Prof Les Copeland Session: Semester 1 Classes: 3x1-hr lectures/week, 1x4-hr practical fortnightly Prerequisites: AGCH2004 or BCHM2071 or BCHM2971 or BCHM2072 or BCHM2972 or PLNT2001 or PLNT2901 or 6 credit points of Intermediate units in Chemistry Assessment: 1x2hr exam (50%) and lab reports (50%)

This unit of study aims to give students an understanding of the properties of food constituents, and the interactions between these constituents during food processing, storage and digestion. The unit will develop an understanding of the relationship between form and functionality of constituents and the concept of fitness-for-purpose (ie, quality) in converting agricultural products into foods. Students will gain an appreciation of the relationship between chemical composition and properties of macroconstituents (carbohydrates, proteins, lipids) and microconstituents (vitamins, minerals, flavour and antinutritional chemicals) and their functions in plant and animal based foods. The material presented in lectures and practical classes will enable students to develop research and inquiry skills and an analytical approach in understanding the biochemistry of foods, food processing and storage. On completing this unit, students will be able to describe the chemical and biochemical properties of major food constituents, and demonstrate an understanding of the functionality of these constituents in food processing and nutrition. Students will have gained experience in laboratory techniques used in industry for the analysis of some food products, and information literacy and communication skills from the preparation of practical reports.

Textbooks

Laboratory notes will be available for purchase from the Copy Centre in the first week of semester and lecture notes and readings will be made available through WebCT. There is no recommended textbook.

AGCH3026

Food Biotechnology

Credit points: 6 Teacher/Coordinator: Dr Meredith Wilkes, Prof Les Copeland Session: Semester 1 Classes: 3x1-hr lectures/week, 1x4-hr practical fortnightly Prerequisites: AGCH2004 or BCHM2071 or BCHM2971 or BCHM2072 or BCHM2972 or PLNT2001 or PLNT2901 or 6 credit points of Intermediate units in Chemistry Corequisites: AGCH3025 Assessment: 1x2hr exam (50%) and lab reports (30%) and 1x oral presentation (20%)

This unit aims to give students an understanding of the chemistry, biochemistry and biotechnology of analytical and diagnostic methods and manufacturing processes used in the conversion of raw products into foods. Knowledge of food constituents gained in AGCH3025 will be applied to develop an understanding of: the use of enzymes in food processing and diagnostic technologies; processing of cereal, legume and oilseed grains, and livestock products, into foods; doughs and baking technologies; the evaluation of foods and food quality. Emphasis is placed on current issues faced by the food industry (including GM technology, organic production, and food safety) through a series of special guest lectures from people connected with the food industry.
industry. On completing this unit, students will have gained an enhanced understanding of food production and manufacturing systems, the processing of raw ingredients into food products, and food analysis and evaluation. Students will have gained experience in laboratory techniques used in industry for the analysis of some food products, and information literacy and communication skills from the preparation of a case study and practical reports.

Textbooks

Laboratory notes will be available for purchase from the Copy Centre in the first week of semester and lecture notes and readings will be made available through WebCT. There is no recommended textbook.

AGCH3032

Land and Water Ecochemistry

Credit points: 6 Teacher/Coordinator: Professor Ivan Kennedy, Dr Robert Caldwell Session: Semester 2 Classes: 5-day field trip in AVCC common break, 20 hr lectures/tutorials, 25 hr laboratory classes and project during semester Prerequisites: AGCH2003 or AGCH2004 or PLNT2001 or CHEM24XX or BCHM2XXX or ENVX2001 Prohibitions: AGCH3030, AGCH3031 Assessment: 1x 2 hr exam (60%), laboratory prac reports (25%) and 1x field trip report and presentation (15%) Note: Department permission required for enrolment.

This field-oriented unit will develop professional expertise in rural ecochemistry, measuring impacts on sustainability and seeking solutions to chemical problems at the catchment scale. AGCH3032 is an elective unit suitable for the BSc, BScAgr, BLWSc, BhortSc, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry or biochemistry. It will promote knowledge and professional skills related to key chemical processes in ecosystems causing risks to soil and water resources, the quality of agricultural produce and to ecological biodiversity. These will be examined by quantitative risk analysis, targeted monitoring and remediation, seeking innovative solutions (e.g. IPM and genetic modification).

A field trip in the AVCC break and professional report on a chosen topic will investigate relevant case studies at selected centres in eastern Australia doing innovative research on global warming and climate change, soil and water quality and environmental protection. Lectures will provide knowledge in the environmental C, N and S cycles important for sustaining action in ecosystems, the nature of greenhouse gases and mitigation of their production including C sequestration, risks to biota (soil, water, plants, animals) from acidification and innovative means of remediation, environmental risk from pesticides and other pollutants, monitoring and their remediation. In laboratory exercises, students will gain skills in relevant analyses using GC, LC, mass spectrometry and ELISA. The assessment procedures are designed to provide students with skills in definition of research problems and risk assessment, quality in analyses, risk management and remediation, and effective communication of outputs.

Soil Science

The Soil Science units of study aim primarily at giving students an introduction to the three major branches of soil science, namely soil physics, soil chemistry, and pedology, and at providing the basis for a professional career in each of these divisions for students wishing to specialise. The introductory unit of study is particularly relevant for students interested in the environmental and geological sciences and in land-use management. For a student in Soil Science, the minimum requirement for completion is a total of 8 weeks: 3010 and one of AGCH3032 or LWSC3007 or PSAT4005).  

SOIL2003

Soil Properties and Processes

Credit points: 6 Teacher/Coordinator: A/Prof Balwant Singh (Coordinator), Prof Alex McIntyre, Dr Stephen Cattle Session: Semester 1 Classes: 3x1hr lectures and 1x3hr practicals/week, commencing week 1, and a compulsory field excursion to be held on the Thursday and Friday in week preceding the first semester. Assessment: Soil description report (10%), Quizzes (or Essay) (15%), Practical exercise book (20%), Practical exam (15%) and Written exam (40%).

This unit of study is designed to introduce students to the fundamental concepts within pedology, soil physics and soil chemistry. These concepts are part of the grounding principles that underpin crop and animal production, nutrient and water cycling, and environmental sustainability taught by other units of study in the Faculty. Students will participate in a two-day field excursion in the first week of semester to examine some common soils of the Sydney Basin, they will also learn to describe soil, and measure soil chemical and physical properties in the field. Referring to common soil profiles of the Sydney Basin, students will concentrate on factors affecting soil formation, the rudiments of soil description, and analysis of soil properties that are used in soil classification. Students will also develop knowledge of the physics of water and gas movement, soil strength, soil chemical properties, inorganic and organic components, nutrient cycles and soil acidity in an agricultural context. At the end of this unit students will become familiar with the factors that determine a soil's composition and behaviour, and will have an understanding of the most important soil physical and chemical properties. Students will develop communication skills through essay, report and practical exercises.

The final report and laboratory exercise questions are designed to develop team work and collaborative efforts.

Textbooks


SOIL2004

The Soil Resource

Credit points: 6 Teacher/Coordinator: Dr Stephen Cattle (Coordinator), Prof Alex McIntyre, A/Prof Balwant Singh Session: Semester 2 Classes: 2x1 hr lec, 1x2hr prac)/wk, 24 hr (5 days) field work out of semester time Assessment: Fieldtrip participation (5%), soil survey mapping report (30%), laboratory report and poster presentation (25%), three group tutorials (20%), viva voce exam (20%)

This unit will familiarize students with the description and mapping of soil types in the Australian landscape, with common analytical methods for soil and with the various forms of degradation that may alter the quality and function of soil. It is an applied soil science unit which builds on the fundamental soil science concepts learned in the SOIL2003 unit. The first practical component of the unit, a five-day soil survey, will give students experience in soil description and classification in the field, and soil samples collected during this survey will be subsequently analysed for a variety of attributes by the students in laboratory practicals. In the lecture series, topics including soil type distribution, soil quality, soil function, soil fertility and soil degradation will be discussed and linked to practical sessions. By the end of this unit, students will be able to construct maps of soil properties and soil type distribution, describe primary soil functions, soil attributes and types of soil degradation in an agricultural context, and be able to recognize and communicate the ability of a soil profile to sustain plant growth. Students will gain research and inquiry skills by collecting, analyzing and interpreting soil survey data, and will gain communication skills by having to prepare and present a poster.

Textbooks


LWSC2002

Introductory Hydrology

Credit points: 6 Teacher/Coordinator: Dr Willem Vervoort Session: Semester 2 Classes: Lect 2hr/wk; practical: 3hr/wk (for 8 weeks); field work: 25hr/wk (for 1 wk only) Assumed knowledge: AFNR1001, AFNR1002, ENSY1001 and (BIOM1003 or ENVK1001) Assessment: One 2 hr exam (50%), laboratory practicals (25%), fieldwork practical reports (20%), field report (30%). Practical field work: 1 week field trip

This unit introduces students to hydrology and water management in the context of Australian integrated catchment management. It
particularly focuses on the water balances, rainfall runoff modeling, analysis and prediction of streamflow and environmental flows, water quality and sustainable practices in water management. Through theoretical work and case studies, the students will engage with problems related water quantity and quality in Australia and the world. The unit builds on knowledge gained in AFNR1001, AFNR1002, and SOIL2001 and establishes the foundation for later units in the hydrology and water area. The unit provides one of the essential building blocks for a career related to water management and hydrology. The unit consists of two parts; the first part will involve a series of lectures, tutorials, practical exercises and case studies. The second part of the unit consists of field excursions to parts of NSW. During natural field excursions, students will engage with current water problems and engage in basic hydrometric and water quality data collection. The data will be used later to analyse catchment condition and water supply issues.

After completion of this unit, you should be able to:

- Explain the different processes in the hydrological cycle
- Measure and interpret hydrometric and basic water quality data
- Elucidate the processes involved in generation of streamflow from rainfall.
- Distinguish the link between water quantity and water quality and its implications for water management.
- Demonstrate a deeper understanding of the unique nature of Australian Hydrology
- Master the ability to critically debate problems facing sustainable water resource management policy and practice in Australia using course material, scientific literature, policy and popular media

Textbooks

SOIL3009
Contemporary Field and Lab Soil Science
Credit points: 6
Teacher/Coordinator: Prof Alex McBratney (coordinator), A/Prof Balwant Singh, Dr Stephen Cattle, Dr Budiman Minasny
Session: Semester 1
Classes: 2 (lec, 2 prac)/wk, 6-day field excursion
Prerequisites: SOIL2003
Assessment: 1 x viva voce exam (40%), pedology written assessments (15%), soil physics written assessments (15%), soil chemistry written assessments (15%), 1 x group presentation (5%), 1 x synthesis paper (10%)

This is a theoretical and empirical unit providing specialised training in three important areas of contemporary soil science, namely pedology, soil chemistry and soil physics. The key concepts of these sub-disciplines will be outlined and strengthened by hands-on training in essential field and laboratory techniques. All of this is synthesized by placing it in the context of soil distribution and use in North-Western New South Wales. The unit is motivated by the teaching team’s research in this locale. It builds on students existing soil science knowledge gained in SOIL2003. After completion of the unit, students should be able to articulate the advantages and disadvantages of current laboratory techniques for gathering necessary soil information, and simultaneously recognise key concepts and principles that guide contemporary thought in soil science. Students will be able to synthesise soil information from a multiplicity of sources and have an appreciation of the cutting edge areas of soil research. By investigating the contemporary nature of key concepts, students will develop their skills in research and inquiry. Students will develop their communication skills through report writing and oral presentations and will also articulate an openness to new ways of thinking which augments intellectual autonomy. Teamwork and collaborative efforts are encouraged in this unit.

Textbooks
D.L. Sparks 2003 Environmental Soil Chemistry (2nd edn). Academic Press, San Diego, CA, USA

SOIL3010
The Soil at Work
Credit points: 6
Teacher/Coordinator: Prof Alex McBratney (coordinator) A/Prof Balwant Singh, Dr Stephen Cattle (facilitators) plus research-only academics
Session: Semester 2
Classes: Problem-based unit: each student completes 2 problems: 4 x 3 hr workshops per problem (each student attends 8 workshops in total)
Prerequisites: SOIL2003 or SOIL2004
Assessment: For each of both scenarios: Statement of the problem report (2x12.5%) - shared info, but two team reports; How to tackle problem seminar (2x12.5%) - team seminars, before fieldwork, analyses done; Results seminar (2x12.5%) - team seminars; Final report (2x12.5%) - individual work.

This is a problem-based applied soil science unit. It is designed to allow students to identify soil-related problems in the real-world and by working in a group and with an end-user to suggest short and long-term solutions to such problems. This is a core unit for students majoring or specializing in soil science and an elective unit for those wishing to gain an understanding of environmental problem-solving. It utilises and reinforces soil-science knowledge gained in SOIL2003 and/or SOIL2004 and problem-solving skills gained during the degree program. This unit will address real-world scenarios which involve soil-related problems such as climate management, structural decline, acidification, salinisation and contamination. Students will gain some understanding of the concept of sustainability, and will be able to identify the causes of problems by reference to the literature, discussion with landusers and by the design and execution of key experiments and surveys. They will gain a focused knowledge of the key soil drivers to environmental problems and will have some understanding on the constraints surrounding potential solutions. By designing and administering strategies to tackle real-world soil issues students will develop their research and inquiry skills and enhance their intellectual autonomy. By producing reports and seminars that enables understanding by an end-user students will improve the breadth of their communication skills.

Textbooks

AGCH3032
Land and Water Ecochemistry
Credit points: 6
Teacher/Coordinator: Professor Ivan Kennedy, Dr Robert Caldwell, Session: Semester 2
Classes: 5-day field trip in AVCC common break; 20 hr lectures/tutorials, 25 hr laboratory classes and project during semester
Prerequisites: AGCH2003 or AGCH2004 or PLNT2001 or CHEM24XX or BCHM2XXX or ENV12001
Prohibitions: AGCH3030, AGCH3031
Assessment: 1 x 2 hr exam (60%), laboratory prac reports (25%) and 1 x field trip report and presentation (15%)
Note: Department permission required for enrolment.

This field-oriented unit will develop professional expertise in rural ecochemistry, measuring impacts on sustainability and seeking solutions to chemical problems at the catchment scale. AGCH3032 is an elective unit suitable for the BSc, BScAgr, BLWSc, BhortSc, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry or biochemistry. It will promote knowledge and professional skills related to key chemical processes in ecosystems causing risks to soil and water resources, the quality of agricultural produce and to ecological biodiversity. These will be examined by quantitative risk analysis, targeted monitoring and remediation, seeking innovative solutions (e.g. IPM and genetic modification).

A field trip in the AVCC break and professional report on a chosen topic will investigate relevant case studies at selected centres in eastern Australian doing innovative research on global warming and climate change, soil and water quality and environmental protection. Lectures will provide knowledge in the environmental C, N and S cycles important for sustaining action in ecosystems, the nature of greenhouse gases and mitigation of their production including C sequestration, risks to biota (soil, water, plants, animals) from acidification and innovative means of remediation, environmental risk from pesticides and other pollutants, monitoring and their remediation.
In laboratory exercises, students will gain skills in relevant analyses using GC, LC, mass spectrometry and ELISA. The assessment procedures are designed to provide students with skills in definition of research problems and risk assessment, quality in analyses, risk management and remediation, and effective communication of outputs.

**LWSC3007 Advanced Hydrology and Modelling**

**Credit points:** 6

**Teacher/Coordinator:** Dr. Willem Vervoort

**Session:** Semester 1

**Classes:** 2 hr lectures/week, 1 hr on-line and 2 hr practical/week

**Prerequisites:** MICR2024 or 6cp intermediate microbiology

**Assessment:** Tutorial papers (30%), project proposal (10%), project report (50%), peer review (10%)

This unit of study is designed to allow students to examine advanced hydrological modeling and sampling designs focusing on catchment level responses and uncertainty. This unit builds on the theoretical knowledge gained in LWSC2002 and possibly GEOG2321. Students will learn how to develop their own simulation model of catchment hydrological processes in R and review the possibilities and impossibilities of using simulation models for catchment management. Students will further investigate optimal sampling techniques for water quality data based on understanding the variability in hydrological responses. At the end of this unit, students will be able to build their own catchment model and calibrate this model, articulate advantages and disadvantages of using simulation models for catchment management, justify the choice of a simulation model for a particular catchment management problem, identify issues in relation to uncertainty in water quality and quantity, develop an optimal water quality sampling scheme. The students will gain research and inquiry skills through research based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation and personal and intellectual autonomy through working in groups.

**Textbooks**

Beven, K.J. Rainfall-Runoff modelling, The Primer, John Wiley and Sons, Chichester, 2001

**PPAT4005 Soil Biology**

**Credit points:** 6

**Teacher/Coordinator:** Prof David Guest

**Session:** Semester 1

**Classes:** 2 tut, 3 hrs prac/week

**Prerequisites:** MICR2024 or 6cp intermediate microbiology

**Assessment:** Tutorial papers (30%), project proposal (10%), project report (50%), peer review (10%)

This unit investigates the diversity of organisms living in the soil, their biology, interactions and ecology, and their roles in maintaining and improving soil function. The unit is an elective for BScAgri, BHortSc and BSc students. It builds on the material introduced in MICR2024, PPAT3003 and BIOL3017. Undertaking this unit will develop skills in soil microbiology, designing, conducting and analysing experiments. At the completion of this unit, students will be able to exercise problem-solving skills (developed through practical experiments, projects and tutorial discussions), think critically, and organise knowledge (from consideration of the lecture material and preparation of project reports), and expand from theoretical principles to practical explanations (through observing and reporting on project work). Students will consolidate their teamwork skills, develop self-directed study skills and plan effective work schedules, use statistical analysis in research, keep appropriate records of laboratory research, work safely in a research laboratory and operate a range of scientific equipment. Students will gain research and inquiry skills through group research projects, information literacy and communication skills through assessment tasks and personal and intellectual autonomy through working in groups.

**Textbooks**


**ANAT2008 Principles of Histology**

**Credit points:** 6

**Teacher/Coordinator:** Dr Laura Lindsay

**Session:** Semester 1

**Classes:** Two 1-hour lectures and one 2-hour practical per week; online and museum exercises (6 hours per week total)

**Prerequisites:** 6 credit points of Junior biology or psychology or molecular biology

**Prohibitions:** ANAT2001

**Assumed knowledge:** General concepts in human biology

**Assessment:** One 1-hour theory exam, one 1-hour practical exam, four quizzes (100%)

This unit of study covers the principles of cell biology and study of the structure of cells, tissues and organ systems at the light and electron microscopic levels. The focus is on human systems. Extension exercises introduce students to the connection between histology and anatomy. Modern practical applications of histological techniques and analysis for research are also presented.

**Textbooks**


**ANAT2009 Comparative Primate Anatomy**

**Credit points:** 6

**Teacher/Coordinator:** Dr Denise Donlon

**Session:** Semester 2

**Classes:** Two 1-hour lectures and one 2-hour practical per week.

**Prerequisites:** 36 credit points, including 12 credit points of Junior Biology (BIOL) or Junior Psychology or Junior Archaeology

**Prohibitions:** ANAT2002

**Assumed knowledge:** Knowledge of basic vertebrate biology

**Assessment:** Essay (10%), 2 quizzes (10%), Theory exam (50%), Practical exam (30%)

This unit of study covers the musculo-skeletal anatomy of the human body with particular emphasis on human evolution and comparisons with apes and fossil hominids. The topics covered include the versatility of the human hand, in manipulation and locomotion, bipedalism, climbing and brachiation in apes, and the change in pelvic anatomy associated with bipedalism and obstetric consequences.

**Textbooks**

Kapit, W and Elson, LM. The Anatomy Coloring Book. Addison-Wesley. 2002. Reference books (Recommended only):


**ANAT2010 Concepts of Neuroanatomy**

**Credit points:** 6

**Teacher/Coordinator:** Dr Karen Cullen

**Session:** Semester 2

**Classes:** Two 1-hour lectures and one 2-hour practical per week.

**Prerequisites:** BIOL (1003 or 1903) and one of: ANAT2008 or BIOL (1002 or 1902) or MBLS1001 or 2071 or 2971 or PSYC (1001 and 1002).

Students must have a grade of credit in at least one of the prerequisite units.

**Website**

The Department's website is http://sydney.edu.au/medicine/anatomy/
Prohibitions: ANAT2003  Assumed knowledge: Background in basic cell biology and basic mammalian biology. Assessment: One 1-hour tutorial per week, one 1-hour practical exam, 2000 word essay, practical reports (100%)

Students are introduced to the structure and organisation of the central and peripheral nervous system. The course begins with an exploration into the make-up of the individual cells, followed by an examination of the different regions of the nervous system. A final theme of the course touches on the organisation of various systems (sensory and motor), together with aspects of higher-order function (memory).

In essence, the course covers general concepts of organisation, structure and function of the brain and its different areas. The practicals offer students the unique opportunity to examine specimens in the Anatomy labs and museum. This course will be of considerable interest to students studying science and related disciplines, as well as those wishing to pursue further study in Neuroscience at senior levels.

Textbooks


ANAT3004 Cranial and Cervical Anatomy

Credit points: 6  Teacher/Coordinator: Dr Robin Arnold  Session: Semester 2  Classes: One 1-hour lecture and two 2-hour tutorials per week. Prerequisites: ANAT2009 or ANAT2010. For BMedSc students: 42 credit points of BMED intermediate units including BMED(2803 or 2804 or 2805 or 2806). Prohibitions: ANAT3904  Assumed knowledge: General knowledge of biology. Assessment: Theory exam, prac exam, continuous assessment (100%)  

Note: The completion of 6 credit points of MBiLG is highly recommended.

This unit of study covers skulls, muscles of facial expression, muscles of jaw and neck, ear, eye, nose, oral cavity and larynx and pharynx as well as peripheral distribution of cranial nerves in the head and neck. The functional components of the cranial nerves and their relationship to the special senses and special motor functions such as facial gesture and speech are also studied. Tutorials are designed to encourage students to develop their own approach to the understanding and organisation of subject material. Communication of key concepts and presentation of subject material in an academic context are encouraged and assessed in a major assignment.

Textbooks

ANAT3004 Cranial & Cervical Anatomy (Advanced)

Credit points: 6  Teacher/Coordinator: Dr Robin Arnold, Professor Longping Liu  Session: Semester 2  Classes: Two lectures per week, one 1-hour tutorial per week  Prerequisites: Available to BSc students only. By invitation only. Requires a credit average in ANAT3007 plus a demonstrated aptitude for practical work. Emphasis in selecting for invitation is placed on results in practical performance, marks and quizzes in ANAT3007. Prohibitions: ANAT3004  Assessment: Theory exam, practical, examination in dissection of detailed weekly reports of the dissection carried out that week (100%)  Practical field work: One 3-hour dissection per week  

Note: Department permission required for enrolment. Note: Course is subject to availability of donor material for dissection.

This unit of study is an alternative to ANAT3004 Cranial & Cervical for talented students with a special interest in and need for dissection experience. The lecture/tutorial component of the course is run in conjunction with ANAT3004. Students in the advanced course will study the anatomy of the skull, muscles of face, jaw and neck, eye, ear, nose oral cavity, larynx and pharynx as well as the peripheral distribution of cranial nerves in the neck. Dissection will allow students to find these structures in donated human cadavers for themselves and to study and to understand at least some of the many anomalies and variations which characterise human cranial and cervical anatomy.

Textbooks
An Anatomy atlas such as Rohan, Yokochi, Lutjen-drecoll. Colour Atlas of Human Anatomy.

ANAT3006 Forensic Osteology

Credit points: 6  Teacher/Coordinator: Dr Denise Donlon  Session: Semester 1  Classes: Two 1-hour lectures, one 2-hour tutorial and one 1-hour practical per week  Prerequisites: ANAT2008 and a credit in ANAT2009 or in ANAT2002. Assumed knowledge: An understanding of basic musculoskeletal anatomy. Assessment: Quiz 1 (5%), Quiz 2 (5%), Critique/review of journal article (15%), Case study report (15%), Theory exam (30%)  Practical exam (30%)  

Note: Department permission required for enrolment. Note: The completion of 6 credit points of MBiLG is highly recommended.

This unit of study aims to introduce students to the area of forensic osteology, which is the study of human skeletal remains within the legal context. Thus the unit of study aims to help students learn about human morphology and variation through the investigation and identification of human bones. It will also help students gain skills in observation and rigorous record taking and in analysis and interpretation. Production of case reports and practice in acting as 'expert witnesses' will improve students written and oral skills. An additional objective will be to assist students in learning to deal with legal and ethical issues.

Textbooks

ANAT3007 Visceral Anatomy

Credit points: 6  Teacher/Coordinator: Dr Robin Arnold  Session: Semester 1  Classes: Two 1-hour lectures and two 2-hour practicals per week. Prerequisites: ANAT2009 or ANAT2010. Assumed knowledge: General knowledge of biology. Assessment: Theory exam, prac exam, continuous assessment (100%)  

This unit of study aims to provide an understanding of the anatomy of the viscera of the thorax, abdomen and pelvis. Structures covered include the heart and associated great vessels, lungs, mediastinum and the abdominal visceras, the alimentary organs and the genitourinary system. The structure of anterior thoracic and abdominal walls and pelvis along with the nerve supply to the viscera and relevant endocrine structures is also covered. Emphasis is placed on the relationship of structure to function especially with respect to the important functions of breathing, digestion, excretion and reproduction. Students will also be encouraged to relate their understanding of the structures studied to current research into these structures in related fields such as molecular biology and physiology.

Textbooks

ANAT3008 Musculoskeletal Anatomy

Credit points: 6  Teacher/Coordinator: Dr Richard Ward  Session: Semester 2  Classes: Two 1-hour lectures, one 3-hour practical class per week. Prerequisites: ANAT2009 or ANAT2002 (for students who completed Intermediate study before 2005). For BMedSc students: 42 credit points of BMED intermediate units including BMED(2803 or 2804 or 2805 or 2806). Prohibitions: ANAT3005 Assumed knowledge: A knowledge of the subject of anatomy, including practical class experience, and some knowledge of basic mammalian biology. Assessment: One 30 min prac exam (40%), One 90 min theory exam (60%)  

The unit provides an opportunity for students to study the topographical and systems anatomy of the upper limb, lower limb and the back regions. Emphasis is placed upon the identification and description of structures and the correlation of structure with function. This includes for the upper limb, its role in manipulation, for the lower limb standing and walking and for the back flexible support and protection. Emphasis is also given to the innervation of the limbs. The unit also aims to develop the general skills of observation, description, drawing, writing and discussion as applying to biological structure.

EMHU3001 Electron Microscopy and Imaging/Theory

Credit points: 6  Teacher/Coordinator: Dr. Suzanne Oilerenshaw/ Dr Allan Jones  Session: Semester 2  Classes: Four 1-hour lectures and one 1-hour tutorial per week. Prerequisites: At least 12 cp of Intermediate Science units from any of the following: Anatomy & Histology, Biochemistry, Biology, Chemistry,
The course is run conjointly by the Department of Anatomy and Histology and the Electron Microscope Unit. The course will focus on the theoretical aspects of transmission and scanning electron microscopy, the preparation of biological samples for electron microscopy, digital imaging, and freeze-fracture. Immunological and other techniques required in modern research and hospital electron microscope laboratories will also be covered. Students will also receive theoretical training in laser scanning confocal microscopy including the use of fluorescent probes to visualise cellular organelles and cellular processes. Students will undertake a theoretical research project of their choice which is of relevance to the course.

Textbooks


**EMHU3002 Electron Microscopy and Imaging/Prac**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Suzanne Ollershaw/Dr Alan Jones  
**Session:** Semester 2  
**Classes:** Two 2-hour practicals and one 1-hour tutorial per week  

**Prerequisites:** 12 cp of Intermediate Science units of study including ANAT2008. For BMEDsc students: 42 credit points of BMED Intermediate units including BMED (2801, 2802, 2803 & 2806) 

**Corequisites:** EMHU3001  
Assumed knowledge: General concepts in Biology, Histology and in Biochemistry or in Chemistry. 

**Assessment:** One 2-hour exam, practical report, practical project assignment by powerpoint submission and group presentation (10 mins.) (100%)

The course is run conjointly by the Department of Anatomy & Histology and the Electron Microscope Unit. The course will provide hands-on training in the operation of transmission and scanning electron microscopes, processing biological samples for electron microscopy, ultrathin sectioning, cryo-ultramicrotomy, freeze-fracture, electron diffraction, digital imaging, immunological and other techniques required in modern research and hospital electron microscope laboratories. Students will also learn the operation of laser scanning confocal microscopes, including the use of fluorescent probes to visualise cellular organelles and cellular processes. Students will apply their knowledge to complete a project of their choice on electron microscopy of a biological sample, from fixation of the sample to interpretation of the resulting electron micrographs.

Textbooks

**HSTO3001 Microscopy & Histochemistry Theory**

**Credit points:** 6  
**Teacher/Coordinator:** Robin Arnold, Prof Chris Murphy  
**Session:** Semester 1  
**Classes:** Usually four 1-hour lectures per week plus some tutorials  

**Prerequisites:** Credit or better grade in ANAT2008. For BMedSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805 

**Corequisites:** HSTO3002  
Assumed knowledge: General concepts in Biology, Histology and in Biochemistry or in Chemistry. 

**Assessment:** One 2-hour theory exam (100%)  

The aims of this unit of study are to provide a theoretical understanding of why biological tissues need to be specifically prepared for microscopic examination, how differing methods yield different types of morphological information; to allow students to study the theory of different types & modalities of microscopes, how they function & the differing information they provide; to develop an understanding of the theory of why biological material needs to be stained for microscopic examination; to allow students to understand how biological material becomes stained; to develop an understanding of the chemical information provided by biological staining - dyes, enzymes & antibodies.

Textbooks

**HSTO3002 Microscopy & Histochemistry Practical**

**Credit points:** 6  
**Teacher/Coordinator:** Robin Arnold, Prof Chris Murphy  
**Session:** Semester 1  
**Classes:** Usually 5.5-hour practical per week  

**Prerequisites:** Credit grade or better in ANAT2008. For BMedSc students: 42 credit points of BMED Intermediate units including Credit in each of BMED2801, BMED2803, BMED2804, BMED2805 

**Corequisites:** HSTO3001  
Assumed knowledge: General concepts in Biology, Histology and in Biochemistry or in Chemistry. 

**Assessment:** One 1.5-hour practical exam, 1 practical report, essay (100%)  

The aims of this unit of study are to provide an practical understanding of why biological tissues need to be specifically prepared for microscopic examination, to apply different methods to gain different types of morphological information; to allow students to learn to use the different types & modalities of microscopes: to gain first hand experience of how they function & see for themselves the differing information they provide; to learn to stain biological material for microscopic examination; applying their theoretical knowledge & to allow students to develop practical skills in diverse histochemical staining procedures - dyes, enzymes and antibodies.

Textbooks

**HSTO3003 Cells and Development: Theory**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Frank Lovicu  
**Session:** Semester 2  
**Classes:** Four 1-hour theory lectures and one 1-hour tutorial per week  

**Prerequisites:** For BSc students: ANAT2008 For BMEDsc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2805. 

**Assumed knowledge:** (i) An understanding of the basic structure of vertebrates; (ii) An understanding of elementary biochemistry and genetics. 

**Assessment:** One 2-hour exam, tutorial research papers (100%)  

The main emphasis of this unit of study concerns the mechanisms that control animal development. Fertilisation, cleavage, gastrulation and the formation of the primary germ layers are described in a range of animals, mainly vertebrates. Much of the emphasis will be placed on the parts played by inductive cell and tissue interactions in cell and tissue differentiation, morphogenesis and pattern formation. This will be studied at both cellular and molecular levels.

Textbooks

**HSTO3004 Cells and Development: Practical (Adv)**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Frank Lovicu  
**Session:** Semester 2  
**Classes:** One 1-hour tutorial and two 2-hour practicals per week  

**Prerequisites:** Unless special permission is granted from the course coordinator, this advanced unit of study is only available to select students who have achieved a mark of 65 or above in the following prerequisite units of study. For BSc students: ANAT2008. For BMEDsc students: 42 credit points of Intermediate BMED units, including: BMED2801, BMED2802, BMED2805. 

**Corequisites:** HSTO3003  
Assumed knowledge: General concepts in Biology, Histology and in Biochemistry or in Chemistry. 

**Assessment:** One 90 minute exam, Practical class reports (100%)  

Note: Department permission required for enrolment.

This advanced unit of study complements HSTO3003 (Cells and Development:Theory) and is catered to provide students with laboratory research experience leading to Honours and higher degrees. It will primarily cover the design and application of experimental procedures involved in cell and developmental biology, using appropriate molecular and cellular techniques to answer developmental questions raised in HSTO3003. This unit of study will promote hands on experience with different animal models, allowing students to observe and examine developing and differentiating tissues at the macroscopic and microscopic level. The main emphasis of this unit of study will concentrate on practical approaches to understanding the mechanisms that control animal development. Fertilization, cleavage, gastrulation and the formation of the primary germ layers are covered. The parts played by inductive cell and tissue interactions in differentiation, morphogenesis and pattern formation are examined at cellular and molecular levels. Note that for some weeks of the course, specialised practical classes will be carried out at the Westmead campus.

Textbooks
NEUR3002
Neuroscience: Motor Systems & Behaviour
Credit points: 6 Teacher/Coordinator: Dr Vladimir Balcar Session: Semester 1 Classes: Two 1-hour lectures per week, one 3-hour practical and one 3-hour tutorial per fortnight. Prerequisites: For BMEdSci students: BMED2801 and BMED2806 For other students: (PHSI(2101 or 2001 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. Prohibitions: PHSI3001, NEUR3902
Assumed knowledge: It is strongly recommended that students also take unit NEUR3001. ANAT2010 and PHSI2005 is assumed knowledge. Assessment: Two 1-hour exams, neuroanatomy practical test, prac report, paper discussion sessions, library essay (100%)

The aim of this course is to provide students with an introduction to the structure and function of the nervous system. Our current knowledge of how the brain works is based on the analysis of the normal structure of the nervous system and its pathways, the functional effects of lesions and neurological diseases in different parts of the nervous system, and the way that nerve cells work at the molecular, cellular and integrative level. This course focuses on to the neural circuits and the mechanisms that control somatic and autonomic motor systems, motivated behaviours, emotions, and other higher order functions. The lecture series addresses the different topics, each of which offers special insight into the function of the nervous system in health and disease.

Textbooks

NEUR3902
Neuroscience: Motor Systems & Behav. Adv
Credit points: 6 Teacher/Coordinator: Dr Vladimir Balcar Session: Semester 1 Classes: Two 1-hour lectures per week, one 3-hour practical and one 3-hour tutorial per fortnight. Advanced students may be exempt from attending some of these classes to permit meetings with supervisor. Prerequisites: For BMEdSci students: Credit average in BMED2801 and BMED2806 For other students: Credit average in (PHSI(2101 or 2001 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. Prohibitions: NEUR3002, PHSI3001
Assumed knowledge: ANAT2010 and PHSI2005 is assumed knowledge. Assessment: Two 1-hour exams, neuroanatomy practical test, prac report, paper discussion sessions, one research or review essay (research essay will replace some other assessment items from regular course) (100%)
Note: Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3001 or NEUR3901.

This unit of study is an extension of NEUR3002 for talented students with an interest in Neuroscience and research in this field. The lecture/practical component of the course is run in conjunction with NEUR3002. The aim of this course is to provide students with an introduction to the structure and function of the nervous system. Our current knowledge of how the brain works is based on the analysis of the normal structure of the nervous system and its pathways, the functional effects of lesions and neurological diseases in different parts of the nervous system, and the way that nerve cells work at the molecular, cellular and integrative level. This course focuses on to the neural circuits and the mechanisms that control somatic and autonomic motor systems, motivated behaviours, emotions, and other higher order functions. The lecture series addresses the different topics, each of which offers special insight into the function of the nervous system in health and disease.

Textbooks

NEUR3004
Integrative Neuroscience
Credit points: 5 Teacher/Coordinator: Dr Kevin Keay, Dr Catherine Leamney Session: Semester 2 Classes: One 0-1 hour lecture, one 2-hour tutorial plus 1-2 hours small meeting/laboratory session per week. Prerequisites: For BMEdSci: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Prohibitions: NEUR3004, PHSI3002, PHSI3902
Assumed knowledge: Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. Assessment: Mid-semester exam. 1-hour final exam. Major essay/report. Tutorial participation. Mini lecture. (100%)
Note: Department permission required for enrolment. Note: Enrolment in NEUR3003/3903 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other. Students must receive permission from the coordinators for enrolment.

This unit encompasses the material taught in NEUR3004. Advanced students perform a research project and present a mini-lecture on a current topic in neuroscience research.

Textbooks

For other NEUR units of study, see the entry under the School of Physiology.

Biochemistry
The discipline teaches Biochemistry and Molecular Biology to Science and Medical Science students at the Junior, Intermediate and Senior levels. This discipline area includes the fundamental principles governing the structure, function and interactions of biological molecules, the nature of genetic material and control of its expression and leads to an understanding of the molecular nature of living systems.

Junior program
The junior program has the introductory faculty unit of study Molecular Biology and Genetics Intro (MBLG1001) or Molecular Biology and Genetics Adv (MBLG1901).

Intermediate program
The comprehensive Intermediate program in Biochemistry and Molecular Biology includes Protein Biochemistry (BCHM2071/2971), Human Biochemistry (BCHM2072/2972) and the faculty unit of study Molecular Biology and Genetics A (MBLG2071/2971). Students wishing to progress to the Senior units of study in Biochemistry and Molecular Biology need to have completed MBLG1001 and 12 CP of Intermediate BCHM/MBLG units of study.

Senior program
The Senior program consists of Molecular Biology and Biochemistry - Genes (BCHM3071/3971), Molecular Biology and Biochemistry Protein (BCHM3081/3981), Human Molecular Cell Biology (BCHM3072/3972), Medical and Metabolic Biochemistry, (BCHM3082/3982), Proteomics and Functional Genomics
The lectures in this unit of study introduce the "Central Dogma" of molecular biology and genetics - i.e., the molecular basis of life. The course begins with the information macromolecules in living cells: DNA, RNA and protein, and explores how their structures allow them to fulfill their various biological roles. This is followed by a review of how DNA is organised into genes leading to discussion of replication and gene expression (transcription and translation). The unit concludes with an introduction to the techniques of molecular biology and, in particular, how these techniques have led to an explosion of interest in molecular biology. The practical component complements the lectures by exposing students to experiments in which they explore the measurement of enzyme activity, the isolation of DNA and the 'cutting' of DNA using restriction enzymes. However, a key aim of the practicals is to give students higher level generic skills in computing, communication, criticism, data analysis/evaluation and experimental design.

MBLG1901
Molecular Biology and Genetics (Adv)
Credit points: 6
Teacher/Coordinator: Dr Dale Hancock
Session: Semester 2
Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight; four 1-hour seminars per semester. Prerequisites: UAI (or ATAR equivalent) of 95 or minimum Band 5 in HSC chemistry and biology or by invitation Prohibitions: AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2871, MBLG1901 Assumed knowledge: 6 credit points of Junior Biology and 6 cp of Junior Chemistry Assessment: One 2.5-hour exam, in-semester skills test and assignments (100%)

The lectures in this unit of study introduce the "Central Dogma" of molecular biology and genetics, i.e., the molecular basis of life. The course begins with the information macromolecules in living cells: DNA, RNA and protein, and explores how their structures allow them to fulfill their various biological roles. This is followed by a review of how DNA is organised into genes leading to discussion of replication and gene expression (transcription and translation). The unit concludes with an introduction to the techniques of molecular biology and, in particular, how these techniques have led to an explosion of interest in molecular biology. The practical component complements the lectures by exposing students to experiments in which they explore the measurement of enzyme activity, the isolation of DNA and the 'cutting' of DNA using restriction enzymes. However, a key aim of the practicals is to give students higher level generic skills in computing, communication, criticism, data analysis/evaluation and experimental design.

MBLG1001
Molecular Biology and Genetics (Intro)
Credit points: 6
Teacher/Coordinator: Dr Dale Hancock
Session: Semester 2
Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight Prohibitions: AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2871, MBLG1901 Assumed knowledge: 6 credit points of Junior Biology and 6 cp of Junior Chemistry Assessment: One 2.5-hour exam, in-semester skills test and assignments (100%)

This advanced unit of study introduces biochemistry by describing the physical and chemical activities of proteins and their functions in cells. The details of protein interactions with other cellular components are presented and the relationship of protein structure and function is discussed. Techniques in protein chemistry and analysis, including proteomics are introduced together with key experiments which reveal the physical basis of the functioning of proteins. This course builds on the protein science presented in MBLG1001 and is ideally suited to students studying Intermediate Chemistry together with Biochemistry. The practical course will nurture technical skills in biochemistry and will include protein preparation, the analysis of protein structure and enzymatic assays.

Textbooks

BCHM2972
Protein Chemistry (Advanced)
Credit points: 6
Teacher/Coordinator: A/Prof Gareth Denyer
Session: Semester 2
Classes: Two 1-hour lectures per week, one 1-hour tutorial and one 4-hour practical per fortnight. Prerequisites: 12 credit points of Junior Chemistry and Distinction in MBLG1001 or MBLG1901 Prohibitions: BCHM2011, BCHM2071 Assessment: One 2-hour theory and theory of practical exam, online quizzes, practical assignments and laboratory book reports (100%)

This unit of study aims to describe how cells work at the molecular level, with special emphasis on human biochemistry. The chemical reactions which occur inside cells are described in the first series of lectures, Cellular Metabolism. Aspects of the molecular architecture of cells which enable them to transduce messages and communicate are discussed in the second half of the unit of study. At every stage there is emphasis on the 'whole body' consequences of reactions, pathways and processes. Cellular Metabolism describes how cells extract energy from fuel molecules like fatty acids and carbohydrates, how the body controls the rate of fuel utilisation and how the mix of fuels is regulated (especially under different physiological circumstances such as starvation and exercise). The metabolic

Textbooks
Introduction to Molecular Biology MBLG1001 & MBLG1901, 2nd edition compiled by D. Hancock, G. Denyer and B. Lyon

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inter-relationships of the muscle, brain, adipose tissue and liver and the role of hormones in coordinating tissue metabolic relationships is discussed. The unit also discusses how the body lays down and stores vital fuel reserves such as fat and glycogen, how hormones modulate fuel partitioning between tissues and the strategic involvement in digestion and absorption and transport of nutrients. Signal Transduction covers how communication across membranes occurs (i.e. via surface receptors and signaling cascades). This allows detailed molecular discussion of the mechanism of hormone action and intracellular process targeting. The practical component complements the lectures by exposing students to experiments which investigate the measurement of glucose utilisation using radioactive tracers and the design of biochemical assay systems. During the unit of study, generic skills are nurtured by frequent use of computers and problem solving activities. However student exposure to generic skills will be extended by the introduction of exercises designed to teach oral communication, instruction writing and feedback articulation skills.

**BCHM2972**
Human Biochemistry (Advanced)

**Credit points:** 6

**Teacher/Coordinator:** A/Prof Gareth Denyer

**Session:** Semester 2 Classes: Two lectures per week, one tutorial per fortnight, and one 4-hour practical per fortnight. 
**Prerequisites:** Distinction in one of (BCHM (2071 or 2971) or MBLG(1001 or 2971)) or (Distinction in MBLG (1001 or 1901) and Distinction average in all other Junior Science Units of Study undertaken)

**Prohibitions:** BCHM2072, BCHM2002, BCHM2102, BCHM2092, BCHM2112

**Assessment:** One 3-hour exam, practical reports (100%) 

This advanced unit aims to describe how cells work at the molecular level, with special emphasis on human biochemistry. The chemical reactions which occur inside cells are described in the first series of lectures, Cellular Metabolism. Aspects of the molecular architecture of cells which enable them to transduce messages and communicate are described in the second half of the unit of study. At every stage there is emphasis on the ‘whole body’ consequences of reactions, pathways and processes. Cellular Metabolism describes how cells extract energy from fuel molecules like fatty acids and carbohydrates, how the body controls the rate of fuel utilization and how the mix of fuels is regulated (especially under different physiological circumstances such as starvation and exercise). The metabolic inter-relationships of the muscle, brain, adipose tissue and liver and the role of hormones in coordinating tissue metabolic relationships is discussed. The unit also discusses how the body lays down and stores vital fuel reserves such as fat and glycogen, how hormones modulate fuel partitioning between tissues and the strategies involved in digestion and absorption and transport of nutrients. Signal Transduction covers how communication across membranes occurs (i.e., via surface receptors and signaling cascades). This allows detailed molecular discussion of the mechanism of hormone action and intracellular process targeting. The practical component complements the lectures by exposing students to experiments which investigate the measurement of glucose utilisation using radioactive tracers and the design of biochemical assay systems. During the unit of study, generic skills are nurtured by frequent use of computers and problem solving activities. However, student exposure to generic skills will be extended by the introduction of exercises designed to teach oral communication, instruction writing and feedback articulation skills.

**BCHM3071**
Molecular Biology & Biochemistry- Genes

**Credit points:** 6

**Teacher/Coordinator:** Mrs Jill Johnston, Prof Iain Campbell

**Session:** Semester 1 Classes: Two 1-hour lectures per week and one 6-hour practical per fortnight. 
**Prerequisites:** MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMEdSc units, including BMED2802 and BMED2804. 
**Prohibitions:** BCHM3071, BCHM3001, BCHM3901

**Assessment:** One 2.5-hour exam, practical work (100%)

This unit of study is designed to provide a comprehensive coverage of the activity of genes in living organisms, with a focus on eukaryotic and particularly human systems. The lecture component covers the arrangement and structure of genes, how genes are expressed, promoter activity and enhancer action. This leads into discussions on the biochemical basis of differentiation of eukaryotic cells, the molecular basis of imprinting, epigenetics, and the role of RNA in gene expression. Additionally, the course discusses the effects of damage to the genome and mechanisms of DNA repair. The modern techniques for manipulating and analysing macromolecules such as DNA and proteins and their relevance to medical and biotechnological applications are discussed. Techniques such as the generation of gene knockout and transgenic mice are discussed as well as genomic methods of analysing gene expression patterns. Particular emphasis is placed on how modern molecular biology and biochemical methods have led to our current understanding of the structure and functions of genes within the human genome. The practical course is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in molecular biology laboratories. 

**Textbooks**

**BCHM3971**
Molecular Biology & Biochem- Genes (Adv)

**Credit points:** 6

**Teacher/Coordinator:** Mrs Jill Johnston, Prof Iain Campbell

**Session:** Semester 1 Classes: Two 1-hour lectures per week and one 6-hour practical per fortnight. 
**Prerequisites:** MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMEdSc units, including BMED2802 and BMED2804. 
**Prohibitions:** BCHM3071, BCHM3001, BCHM3901

**Assessment:** One 2.5-hour exam, practical work (100%)

This unit of study is designed to provide a comprehensive coverage of the activity of genes in living organisms, with a focus on eukaryotic and particularly human systems. The lecture component covers the arrangement and structure of genes, how genes are expressed, promoter activity and enhancer action. This leads into discussions on the biochemical basis of differentiation of eukaryotic cells, the molecular basis of imprinting, epigenetics, and the role of RNA in gene expression. Additionally, the course discusses the effects of damage to the genome and mechanisms of DNA repair. The modern techniques for manipulating and analysing macromolecules such as DNA and proteins and their relevance to medical and biotechnological applications are discussed. Techniques such as the generation of gene knockout and transgenic mice are discussed as well as genomic methods of analysing gene expression patterns. Particular emphasis is placed on how modern molecular biology and biochemical methods have led to our current understanding of the structure and functions of genes within the human genome. The practical course is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in molecular biology laboratories. 

**Textbooks**

**BCHM3081**
Mol Biology & Biochemistry- Proteins

**Credit points:** 6

**Teacher/Coordinator:** Mrs Jill Johnston, Prof Joel MacKay

**Session:** Semester 1 Classes: Two 2-hour lectures per week and one 6-hour practical per fortnight. 
**Prerequisites:** MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMEdSc units, including BMED2802 and BMED2804. 
**Prohibitions:** BCHM3981, BCHM3001, BCHM3901

**Assessment:** One 2.5 hour exam, practical work (100%)

This unit of study is designed to provide a comprehensive coverage of the functions of proteins in living organisms, with a focus on eukaryotic and particularly human systems. Its lecture component deals with how proteins adopt their biologically active forms, including discussions of protein structure, protein folding and how recombinant DNA technology can be used to design novel proteins with potential medical or biotechnology applications. Particular emphasis is placed on how modern molecular biology and biochemical methods have led to our current understanding of the structure and functions of proteins.
It also covers physiologically and medically important aspects of proteins in living systems, including the roles of chaperones in protein folding inside cells, the pathological consequences of misfolding of proteins, how proteins are sorted to different cellular compartments and how the biological activities of proteins can be controlled by regulated protein degradation. The practical course is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in molecular biology and protein biochemistry laboratories.

**Textbooks**

**BCHM3981**
Mol Biology & Biochemistry- Proteins Adv

Credit points: 6
Teacher/Coordinator: Mrs Jill Johnston, Prof Joel Mackay
Session: Semester 1 Classes: Two 1-hour lectures per week and one 6-hour practical per fortnight.
Prerequisites: MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972 or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804. Prohibitions: BCHM3081, BCHM3091 Assessment: One 2.5-hour exam, practical work (100%) This unit of study is designed to provide a comprehensive coverage of the functions of proteins in living organisms, with a focus on eukaryotic particularly human systems. Its lecture component deals with how proteins adopt their biologically active forms, including discussions of protein structure, protein folding and how recombinant DNA technology can be used to design novel proteins with potential medical or biotechnology applications. Particular emphasis is placed on how modern molecular biology and biochemical methods have led to our current understanding of the structure and functions of proteins. It also covers physiologically and medically important aspects of proteins in living systems, including the roles of chaperones in protein folding inside cells, the pathological consequences of misfolding of proteins, how proteins are sorted to different cellular compartments and how the biological activities of proteins can be controlled by regulated protein degradation. The practical course is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in molecular biology and protein biochemistry laboratories.

The lecture component of this unit of study is the same as BCHM3081. Qualified students will attend seminars/practical classes in which more sophisticated topics in protein biochemistry will be covered.

**Textbooks**

**BCHM3072**
Human Molecular Cell Biology

Credit points: 6
Teacher/Coordinator: Mrs Jill Johnston, Prof Iain Campbell
Session: Semester 2 Classes: Two 1-hour lectures per week and one 6-hour practical per fortnight.
Prerequisites: MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/MBLG2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804. Prohibitions: BCHM3082, BCHM3092, BCHM3002, BCHM3004, BCHM3004 Assessment: One 2.5-hour exam, practical work (100%) Note: BExSoBSc(Nutrition) students successfully progressing though the combined degree meet the pre-requisites for this unit of study

This unit of study will explore the responses of cells to changes in their environment in both health and disease. The lecture course consists of four integrated modules. The first will provide an overview of the role of signalling mechanisms in the control of human cell biology and then focus on cell surface receptors and the downstream signal transduction pathways that initiate the second will examine how cells detect and respond to pathogenic molecular patterns displayed by infectious agents and injured cells by discussing the roles of relevant cell surface receptors, cytokines and signal transduction pathways. The third and fourth will focus on the life, death and differentiation of human cells in response to intra-cellular and extra-cellular signals by discussing the eukaryotic cell cycle under normal and pathological circumstances and programmed cell death in response to abnormal extra-cellular and intra-cellular signals. In all modules emphasis will be placed on the molecular processes involved in human cell biology, how modern molecular and cell biology methods have led to our current understanding of them and the implications of them for pathologies such as cancer. The practical component is designed to complement the lecture course, providing students with experience in a wide range of techniques used in modern molecular cell biology.

The lecture component of this unit of study is the same as BCHM3072. Qualified students will attend seminars/practical classes in which more sophisticated topics in modern molecular cell biology will be covered.

**Textbooks**

**BCHM3082**
Medical and Metabolic Biochemistry

Credit points: 6
Teacher/Coordinator: Mrs Jill Johnston, A/Prof Gareth Deyner
Session: Semester 2 Classes: Two 1-hour lectures per week and one 6-hour practical per fortnight.
Prerequisites: MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/MBLG2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804. Prohibitions: BCHM3082, BCHM3002, BCHM3004, BCHM3092, BCHM3094 Assessment: One 2.5-hour exam, practical work (100%) Note: BExSoBSc(Nutrition) students successfully progressing though the combined degree meet the pre-requisites for this unit of study

This unit of study will explore the biochemical processes involved in the operation of cells and how they are integrated in tissues and in the whole human body in normal and diseased states. These concepts will be illustrated by considering whole-body aspects of energy utilisation, fat and glycogen storage and their regulation under normal conditions compared to obesity and diabetes. Key concepts that will be discussed include energy balance, regulation of metabolic rate,
control of food intake, tissue interactions in fuel selection, the role of adipose tissue and transport of fuel molecules from storage organs and into cells. Particular emphasis will be placed on how the modern concepts of metabolomics, coupled with new methods, including magnetic resonance techniques and molecular biology methods, as well as studies of the structure and function of enzymes, have led to our current understanding of how metabolic processes are normally integrated and how they become deranged in disease states. The practical component is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in modern medical and metabolic biochemistry.

**Textbooks**


**BCHM3982**

Medical and Metabolic Biochemistry (Adv)

**Credit points:** 6

**Teacher/Coordinator:** Mrs Jill Johnston, A/Prof Gareth Deyner

**Session:** Semester 2

**Classes:** Two 1-hour lectures per week and one 6-hour practical per fortnight.

**Prerequisites:** MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.

**Prohibitions:** BCHM3082, BCHM3002, BCHM3004, BCHM3902, BCHM3904

**Assessment:** One 2.5-hour exam, practical work (100%) –

This unit of study will explore the biochemical processes involved in the operation of cells and how they are integrated in tissues and in the whole human body in normal and diseased states. These concepts will be illustrated by considering whole-body aspects of energy utilisation, fat and glycogen storage and their regulation under normal conditions compared to obesity and diabetes. Key concepts that will be discussed include energy balance, regulation of metabolic rate, control of food intake, tissue interactions in fuel selection, the role of adipose tissue and transport of fuel molecules from storage organs and into cells. Particular emphasis will be placed on how the modern concepts of metabolomics, coupled with new methods, including magnetic resonance techniques and molecular biology methods, as well as studies of the structure and function of enzymes, have led to our current understanding of how metabolic processes are normally integrated and how they become deranged in disease states. The practical component is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in modern medical and metabolic biochemistry.

Qualified students will attend some lectures/practical classes in which more sophisticated topics in metabolic biochemistry will be covered.

**Textbooks**


**BCHM3992**

Proteomics and Functional Genomics

**Credit points:** 6

**Teacher/Coordinator:** A/Prof Stuart Cordwell, Mrs Jill Johnston

**Session:** Semester 2

**Classes:** Two 1-hour lectures per week and one 3-hour practical per fortnight.

**Prerequisites:** MBLG (1001 or 1901) and 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMedSc units, including BMED2802 and BMED2804.

**Prohibitions:** BCHM3992, BCHM3998

**Assessment:** One 2.5-hour exam, practical work (100%)

This unit of study will focus on the high throughput methods for the analysis of gene structure and function (genomics) and the analysis of proteins (proteomics), which are at the forefront of discovery in the biomedical sciences. The course will concentrate on the hierarchy of gene-protein-structure-function through an examination of modern technologies built on the concepts of genetics versus molecular biology, and proteomics versus biochemistry. Technologies to be examined include DNA sequencing, nucleic acid and protein microarrays, two-dimensional gel electrophoresis of proteins, uses of mass spectrometry for high throughput protein identification, isoforme tagging for quantitative proteomics, high-performance liquid chromatography, high-throughput functional assays, affinity chromatography and modern methods for database analysis. Particular emphasis will be placed on how these technologies can provide insight into the molecular basis of changes in cellular function under both physiological and pathological conditions as well as how they can be applied to biotechnology for the discovery of biomarkers, diagnostics, and therapeutics. The practical component is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in proteomics and genomics.

**Textbooks**


**Proteomics and Functional Genomics (Adv)**

**Credit points:** 6

**Teacher/Coordinator:** A/Prof Stuart Cordwell, Mrs Jill Johnston

**Session:** Semester 2

**Classes:** Two 1-hour lectures per week and one 3-hour practical per fortnight.

**Prerequisites:** MBLG (1001 or 1901) and Distinction in 12 CP of Intermediate BCHM/MBLG units (taken from MBLG2071/2971 or BCHM2071/2971 or BCHM2072/2972) or 42CP of Intermediate BMedSc units, with Distinction in BMED2802 and BMED2804.

**Prohibitions:** BCHM3992, BCHM3998

**Assessment:** One 2.5-hour exam, practical work (100%)

This unit of study will focus on the high throughput methods for the analysis of gene structure and function (genomics) and the analysis of proteins (proteomics) which are at the forefront of discovery in the biomedical sciences. The course will concentrate on the hierarchy of gene-protein-structure-function through an examination of modern technologies built on the concepts of genetics versus molecular biology, and proteomics versus biochemistry. Technologies to be examined include DNA sequencing, nucleic acid and protein microarrays, two-dimensional gel electrophoresis of proteins, uses of mass spectrometry for high throughput protein identification, isoforme tagging for quantitative proteomics, high-performance liquid chromatography, high-throughput functional assays, affinity chromatography and modern methods for database analysis. Particular emphasis will be placed on how these technologies can provide insight into the molecular basis of changes in cellular function under both physiological and pathological conditions as well as how they can be applied to biotechnology for the discovery of biomarkers, diagnostics, and therapeutics. The practical component is designed to complement the lecture course and will provide students with experience in a wide range of techniques used in proteomics and genomics.

The lecture component of this unit of study is the same as BCHM3092. Qualified students will attend seminars/practical classes in which more sophisticated topics in proteomics and genomics will be covered.

**Textbooks**


**Bioinformatics**

Bioinformatics is an interdisciplinary area of science, involving Computer Science, Computational Science, Mathematics, Statistics, and the Life Sciences (ie. biology, medicine, etc). It is responsible for the development and use of computer systems, databases, software, networks, and hardware to solve scientific problems in a wide variety of areas ranging from biology to medicine. Due to its interdisciplinary nature, the BSc (Bioinformatics) degree is composed of units of study that are offered also to students enrolled in other degrees, the general aim being to equip the students enrolled in the BSc (Bioinformatics) degree with knowledge in key areas of relevance to Bioinformatics.

**First Year**

In the first year of their study, students devote time to units of study offered by the School of Biological Sciences, School of Chemistry, School of Information Technologies, School of Mathematics and Statistics, and School of Molecular and Microbial Biosciences (see Table 1A in chapter 4).

**Second Year**

In the second and third year of their study, students divide time equally between the Life Sciences and the mathematical, statistical, and computational sciences, choosing units of study from those offered...
by the School of Biological Sciences, School of Information Technologies, School of Mathematics and Statistics, School of Molecular and Microbial Biosciences, School of Physics, and the Department of Pharmacology (see Table 1A).

### Third Year

In the third year of their study, students are highly recommended to enrol in BIOL3027/3927 (Bioinformatics and Genomics) and BCHM3092/3992 (Proteomics and Functional Genomics). Furthermore, students complete a unit of study - BINF3101 (Bioinformatics Project) - that is designed specifically to give them an opportunity to do real research, supervised by scientists from the bio-medical disciplines. For further information regarding third year requirements see Table 1A.

#### BINF3101

**Bioinformatics Project**

**Credit points:** 6

**Teacher/Coordinator:** Dr Michael Charleston, Dr Nathan Lo

**Session:** Semester 2

**Classes:** Meeting with academic supervisor 1 hour per week & class meeting 1 hour per week.

**Prerequisites:** 12 credit points from Intermediate Biology, Molecular Biology and Genetics, Biochemistry, Microbiology, Pharmacology

**Prohibitions:** COMP2206, BINF3003, INFO3600, SOFT3320, SOFT3600, SOFT3720, SOFT3700

**Assumed knowledge:** INFO2110 and (INFO1103 or INFO1903).

**Assessment:** Oral group presentations, individual and group reports (100%)

This unit will provide students an opportunity to apply the knowledge and practice the skills acquired in the prerequisite and qualifying units, in the context of designing and building a substantial bioinformatics application. Working in groups, students will carry out the full range of activities including requirements capture, analysis and design, coding, testing and documentation.

#### Biological Sciences

**Advice on units of study**

Any student needing advice before enrolling should make an appointment to see an adviser from the School of Biological Sciences. Phone 9351 5819 (First Year Biology Office) for enquiries about junior units; or 9351 2848 for enquiries about Intermediate and Senior units. Units of study in Biology include those with the prefixes BIOL (Biology), PLNT (Plant Sciences) and MBLG (Molecular Biology and Genetics), as well as ENV1211. Refer to the relevant sections of this handbook for details of PLNT, MBLG and ENVI units of study. For information on how to major in Biology or Plant Sciences, with advice on units of study, see sydney.edu.au/science/biology/studying_biology/undergraduate.shtml.

#### Assistance during semester

The offices of junior year Biology staff and the Biology Learning Centre are on the 5th floor of Carslaw. Staff are available for consultation throughout semester. The School maintains a website that provides access to resources for students: sydney.edu.au/science/biology.

**Summer School: January-February**

The School of Biological Sciences offers some junior units of study in the Sydney Summer School. Consult The Sydney Summer School website for more information: sydney.edu.au/summer. Students may enrol in junior units of study offered at Summer School before their first semester of university enrolment.

#### Biology Bridging Course

Students who have not completed HSC Biology or equivalent are strongly encouraged to attend the Biology Bridging Course before commencing any Biology study at university. Details are available each year from the School of Biological Sciences website: sydney.edu.au/science/biology/studying_biology/bridging-course.shtml

#### Junior units of study

Students may take up to four units of study in Junior Biology: BIOL1001 or 1911 (Concepts in Biology); BIOL1003 or 1903 (Human Biology); BIOL1002 or 1902 (Living Systems); and MBLG1001 or 1901 (Molecular Biology and Genetics).
discussion of reproduction and development, it concludes with modern studies and research prospectus in biotechnology and human genetics. This unit of study, together with BIOL (1001 or 1911 or 1002 or 1902), or MBLG (1001 or 1901), provides entry to Intermediate units of study in Biology, but the contents of BIOL (1002 or 1902) is assumed knowledge for BIOL (2011 or 2012) and PLNT 2003, and students entering these units with BIOL (1003 or 1903) will need to do some preparatory reading.

Textbooks

MBLG1903
Human Biology (Advanced)
Credit points: 6 Session: Semester 1 Classes: 2x1 hr lectures/week (3 lectures in some weeks), 1x3 hr practical class/fortnight, 1x1-2 hr workshop/fortnight, 6-9 hours HBO/Online work/fortnight covering online practical activities, prework and homework. Prerequisites: UAI (or ATAR equivalent) of at least 93 and HSC Biology result in the 90+, or Distinction or Better in an Intermediate level in the relevant area.
Assessment: 1x2 hr exam, assignment, group project presentation, discussion activities and quizzes (100%)

This unit of study is the same as BIOL1003 except for the addition of 3 special seminars from guest speakers, a three hour ethics and bioscience component and three student peer group case study presentations.

Textbooks
As for BIOL1003

MBLG1002
Living Systems
Credit points: 6 Session: Semester 2 Classes: 3x1 hr lectures/week, 1x2.5 hr practical/week. Prohibitions: BIOL1902 Assumed knowledge: HSC 2-unit Biology. Students who have not completed HSC biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). Assessment: 1x2 hr exam, assignments, quizzes (100%) Note: It is recommended that BIOL (1001 or 1911) be taken before this unit of study. This unit of study, together with BIOL (1001 or 1901) provides entry to all Intermediate units of study in biology in the School of Biological Sciences.

Living Systems deals with the biology of organisms, from bacteria to large plants and animals, and emphasises the ways in which they can live in a range of habitats. The importance of energy in living systems, and how elements are used and recycled in biological communities, are described. The unit of study includes lectures and laboratory classes on the physiology of nutrition and growth, basic physiological processes of animals and plants, the ways in which organisms control and integrate their activities, and their reproduction. Finally applications of knowledge of genetics and ecology to practical problems in agriculture and conservation are introduced.

Textbooks

MBLG1902
Living Systems (Advanced)
Credit points: 6 Session: Semester 2 Classes: 3x1 hr lectures/week, 1x2.5 hr practical/week. Prerequisites: UAI (or ATAR equivalent) of at least 93 and HSC Biology result in the 90+, or Distinction or Better in a University level Biology unit, or by invitation. Prohibitions: BIOL1902 Assumed knowledge: 1x2 hr exam, assignments, quizzes, independent project (100%)
Note: Department permission required for enrolment.

This unit of study shares lectures and practical classes with BIOL1002 but also includes more demanding alternative components of Living Systems.

Textbooks
As for BIOL1002.

MBLG1001
Molecular Biology and Genetics (Intro)
Credit points: 6 Teacher/Coordinator: Dr Dale Hancock Session: Semester 2 Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight Prohibitions: AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2871, MBLG1901 Assumed knowledge: 6 credit points of Junior Biology and 6 cp of Junior Chemistry Assessment: One 2.5-hour exam, in-semester skills test and assignments (100%)

The lectures in this unit of study introduce the "Central Dogma" of molecular biology and genetics - i.e., the molecular basis of life. The course begins with the information macromolecules in living cells: DNA, RNA and protein, and explores how their structures allow them to fulfill their various biological roles. This is followed by a review of how DNA is organised into genes leading to discussion of replication and gene expression (transcription and translation). The unit concludes with an introduction to the techniques of molecular biology and, in particular, how these techniques have led to an explosion of interest and research in Molecular Biology. The practical component complements the lectures by exposing students to experiments which explore the measurement of enzyme activity, the isolation of DNA and the 'cutting' of DNA using restriction enzymes. However, a key aim of the practicals is to give students higher level generic skills in computing, communication, criticism, data analysis/evaluation and experimental design.

MBLG1901
Molecular Biology and Genetics (Adv)
Credit points: 6 Teacher/Coordinator: Dr Dale Hancock Session: Semester 2 Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight; four 1-hour seminars per semester. Prerequisites: UAI (or ATAR equivalent) of 95 or minimum Band 5 in HSC chemistry and biology or by invitation Prohibitions: AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLG2001, MBLG2111, MBLG2771, MBLG2871, MBLG1901 Assumed knowledge: HSC Chemistry and Biology OR 6 credit points of Junior Biology and 6 cp of Junior Chemistry Assessment: One 2.5-hour exam, in-semester skills test and assignments (100%)

The lectures in this unit of study introduce the "Central Dogma" of molecular biology and genetics, i.e., the molecular basis of life. The course begins with the information macro-molecules in living cells: DNA, RNA and protein, and explores how their structures allow them to fulfill their various biological roles. This is followed by a review of how DNA is organised into genes leading to discussion of replication and gene expression (transcription and translation). The unit concludes with an introduction to the techniques of molecular biology and, in particular, how these techniques have led to an explosion of interest and research in Molecular Biology. The practical component complements the lectures by exposing students to experiments which explore the measurement of enzyme activity, the isolation of DNA and the 'cutting' of DNA using restriction enzymes. However, a key aim of the practicals is to give students higher level generic skills in computing, communication, criticism, data analysis/evaluation and experimental design.

The advanced component is designed for students interested in continuing in molecular biology. It consists of 7 advanced lectures (replacing 7 regular lectures) and 3 advanced laboratory sessions (replacing 3 regular practical classes). The advanced lectures will focus on the experiments which led to key discoveries in molecular biology. The advanced practical sessions will give students the opportunity to explore alternative molecular biology experimental techniques. Attendance at MBLG1999 seminars is strongly encouraged.

Textbooks
Introduction to Molecular Biology MBLG1001 & MBLG1901, 2nd edition compiled by D. Hancock, G. Denyer and B. Lyon

Intermediate units of study
Students who wish to take Intermediate Biology units of study should refer to the booklet 'Information for Students Considering Intermediate Biology Units of Study' which is available at the website sydney.edu.au/science/biology/studying_biology/undergraduate-intermediate.shtml from the School Office (Science Rd Cottage, A10). If you are considering going on to study Senior Biology you must satisfy the Intermediate qualifying and prerequisite units of study for the units of study you intend taking. Units of study in Intermediate Biology include those with the prefixes BIOL (Biology), PLNT (Plant Sciences) and MBLG (Molecular Biology and Genetics), as well as ENVIE111 (Conservation Biology). Refer to the relevant sections of this handbook.
for details of PLNT (Plant Science), MBLG (Molecular Biology and Genetics) and ENVI (Environmental Studies) units of study. Note that MBLG (2071 or 2971) and MBLG (2072 or 2972) are qualifying units for BIOL (3018, 3025, 3026, 3027). Note also that MBLG (2071 or 2971) is assumed knowledge for students wishing to enrol in MBLG (2072 or 2972). The following Intermediate units of study are offered:

Semester 1 units of study


Semester 2 units of study


Note:
Only one version of each unit of study may be credited towards the degree (e.g. only one of BIOL2011 or 2911 can be taken). Qualifying units of study for certain Senior Biology units of study are defined as combinations of 6 credit points of Intermediate Biology units of study (see the Senior unit of study descriptions or Information for Students booklets). For details of PLNT units please refer to the Plant Science entry in this chapter.

BIOL2011 Invertebrate Zoology

Credit points: 6  
Teacher/Coordinator: Dr E May  
Session: Semester 1  
Classes: 5 x 1 hr lectures/fortnight, 1 x 1 hr tutorial/fortnight, 1 x 2 hr practical/week  
Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (MBLG/MBLG/EDUH).  
Assessment: BIOL2911 Assumed knowledge: BIOL (1002 or 1902).  
Assessment: 1 x 1 hr mid-semester test, 1 x 1 hr theory exam, 1 x 1.5 hr practical exam, 1 assignment, 1 essay, 1 oral presentation (100%).

Note: This unit of study may be taken alone, but when taken with BIOL2012 provides entry into certain Senior Biology units of study. The content of BIOL (1002 or 1902) is assumed knowledge and students entering without BIOL (1002 or 1902) will need to do some preparatory reading. The completion of 6 credit points of MBLG units of study is highly recommended.

This unit of study provides a thorough grounding in the diversity of animals by lectures and detailed laboratory classes, which include dissections and demonstrations of the functional anatomy of invertebrates. The material is presented within the conceptual framework of evolution and the principles and use of phylogeny and classification. Tutorials further explore concepts of phylogeny, animal structure and function, and provide opportunity to develop oral and written communication skills. The unit of study is designed to be taken in conjunction with BIOL2012 Vertebrates and their Origins; the two units of study together provide complete coverage of the diversity of animals at the level of phylum.

BIOL2911 Invertebrate Zoology (Advanced)

Credit points: 6  
Teacher/Coordinator: Dr E May  
Session: Semester 1  
Classes: 5 x 1 hr lectures/fortnight, 1 x 1 hr tutorial/fortnight, 1 x 2 hr practical/week  
Prerequisites: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH).  
Assessment: See BIOL2011 except essay is replaced by a literature review (100%)

Note: The completion of 6 credit points of MBLG units of study is highly recommended.

Qualified students will participate in alternative components of BIOL2011 Invertebrate Zoology. The content and nature of these components may vary from year to year.

BIOL2012 Vertebrates and their Origins

Credit points: 6  
Teacher/Coordinator: Dr E L May  
Session: Semester 2  
Classes: 5 x 1 hr lectures/fortnight, 1 x 1 hr tutorial/fortnight, 1 x 2 hr practical/week, 1 x 3.5 day field trip (optional).  
Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH), 12 credit points of Junior Chemistry.  
Prohibitions: BIOL2812 Assumed knowledge: The content of BIOL (1002 or 1902) is assumed knowledge and students who have not completed BIOL (1002 or 1902) will need to do some preparatory reading.  
Assessment: 1 x 1 hr mid-semester test, 1 x 2 hr theory exam, 1 x 1.5 hr practical exam, 1 assignment, 1 essay, 1 oral presentation (100%).

Note: This unit of study may be taken alone, but when taken with BIOL2011 provides entry into certain Senior Biology units of study. The completion of MBLG1001 is highly recommended.

This unit of study completes the grounding in the diversity of animals at the level of phylum introduced in BIOL2011 Invertebrate Zoology, by lectures and detailed laboratory classes, which include dissections and demonstrations of the functional anatomy of vertebrates and related invertebrate phyla. Tutorials further explore concepts of phylogeny, animal structure and function, and provide opportunity to develop oral and written communication skills. Students may choose to attend an intensive 3.5 day field trip, which takes place in the July break preceding Semester 2. (Contact Dr May during Semester 1 if you wish to attend).

BIOL2912 Vertebrates and their Origins (Advanced)

Credit points: 6  
Teacher/Coordinator: Dr E May  
Session: Semester 2  
Classes: See BIOL2012 Prerequisites: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH), 12 credit points of Junior Chemistry. These requirements may be varied and students with lower averages should consult the Unit Executive Officer.  
Prohibitions: BIOL2812 Assumed knowledge: The content of BIOL (1002 or 1902) is assumed knowledge and students who have not completed BIOL (1002 or 1902) will need to do some preparatory reading.  
Assessment: See BIOL2012 (100%)  
Note: The completion of MBLG1001 is highly recommended.

Qualified students will participate in alternative components of BIOL2012 Vertebrates and their Origins. The content and nature of these components may vary from year to year.

BIOL2016 Cell Biology

Credit points: 6  
Teacher/Coordinator: Dr M Thomson  
Session: Semester 1  
Classes: 2 x 1 hr lectures/week, 1 x 4 hr practical/week.  
Prerequisites: 12 credit points of Junior Biology, e.g. any combination of 2 units made from the following options, BIOL (1001 or 1911), BIOL (1002 or 1902), BIOL (1003 or 1903), MBLG (1001 or 1901), EDUH1016, and 12 credit points of Junior Chemistry.  
Prohibitions: BIOL2916 Assessment: 1 x 3 hr theory exam, 1 project assignment, 1 practical report (100%).  
Note: The completion of MBLG1001 is highly recommended.

This unit of study focuses on contemporary principles in cell biology and development in plant and animals, with emphasis on cellular functions and favouring the molecular perspective. Topics include cancer and control of cell division and migration, pre-programmed cell death, molecular signaling and transport systems, cellular endocrinology and embryonic development. The practical component provides students with hands-on training in key research techniques using modern equipment and is therefore of immense benefit to students contemplating honours study or a career in molecular and cellular research. The unit of study is designed to complement intermediate Molecular Biology and Genetics units and leads ideally to various senior units of study in biology, including Plant Growth & Development, Applications of Recombinant DNA Technology, Evolutionary Genetics & Animal Behaviour, Fungi in the Environment, Animal Physiology, Bioinformatics and Genomics, as well as senior units of study in biochemistry.

Textbooks
BIO2916 Cell Biology (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Murray Thomson.
Session: Semester 2.
Enrolments: 1 Class.
Texts: 1 x 3 hr lectures/week, 1 x 4 hr practical/week.
Prerequisites: Distinction average in 12 credit points of Junior Biology or equivalent, e.g. any combination of 2 units made from the following options, BIOL (1001 or 1911), BIOL (1002 or 1902), BIOL (1003 or 1903), MBLG (1001 or 1901), EDUH1016, and 12 credit points of Junior Chemistry.
Assessment: 1 x 3 hr exam, 1 practical report, 1 project assignment (100%).
Note: The completion of MBLG1001 is highly recommended.
Qualified students will participate in alternative components of BIOL2016 Cell Biology.

Textbooks
As for BIOL2016.

BIOL2017 Entomology
Credit points: 6
Teacher/Coordinator: Dr Dieter Hochuli.
Session: Semester 2.
Enrolments: 2 Classes.
Texts: 1 x 2 hr lectures/week, 1 x 3 hr practical/week, 2 x field trips during semester.
Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH).
Prohibitions: BIOL2917 Assumed knowledge: Although not a prerequisite, knowledge obtained from BIOL (2011 or 2911) is recommended.
Assessment: 1 x 2 hr theory exam (50%), practical test (week 6) (5%), report on zoo trip (5%), 2 x practical reports (25%), insect collection (15%). The practical classes give students a working knowledge of the major orders of insects and species of importance, as well as principles of collection, preservation and identification. Project work considers forensic entomology, learning in social insects and insect behaviour. Field trips to the Australian Museum and Taronga Zoo will also consider insect husbandry and the role of insects in education. There will also be an introduction to entomological databases and an assignment that involves the making and presentation of a small collection of insects.
Note: This is a general but comprehensive introduction to Insect Biology taught in 3 integrated modules. The first module examines morphology, classification, life histories and development, physiology, ecology, behaviour, conservation, and the biology of prominent members of major groups. The other two modules examine new developments in entomological research, focusing on research strengths at the University of Sydney, the biology of social insects and insect behaviour.

BIOL2917 Entomology (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Dieter Hochuli.
Session: Semester 2.
Enrolments: 2 Classes.
Prerequisites: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH).
Assumed knowledge: Although not a prerequisite, knowledge obtained from BIOL (2011 or 2911) is recommended.
Assessment: 1 x 2 hr theory exam (50%), practical test (week 6) (5%), report on zoo trip (5%), 2 x practical reports (25%), insect collection (15%).
Qualified students will participate in alternative components of BIOL2017 Entomology. The content and nature of these components may vary from year to year.

BIOL2018 Introduction to Marine Biology
Credit points: 6
Teacher/Coordinator: Dr A Pile.
Session: Semester 2.
Enrolments: 2 Classes.
Texts: 2 x 1 hr lectures/week. Practical classes will comprise of 6 x 1 hr tutorials, 1 x 8 hr field excursion on a Saturday, 3 x 4 hr excursions, 1 x 3 hr practical. Excursions may be timetabled for weekends.
Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH), 12 credit points of Junior Chemistry.
Prohibitions: BIOL2918 Assumed knowledge: 12 credit points of Junior Biology.
Assessment: 1 x 2 hr theory exam (40%), 4 written reports (60%).
This unit will describe some of the ways in which the properties of the oceans affect marine organisms. It also introduces coral reefs and other marine ecosystems, together with their productivity, biological oceanography, the reproductive biology of marine organisms, and marine biological resources. The practical elements will provide the core skills and techniques that will equip students to perform laboratory and field studies in marine biology. The unit will introduce appropriate methodologies for the collection, handling and analysis of data; the scientific principles underlying experimental design; and the effective communication of scientific information.

Textbooks

BIO2918 Introduction to Marine Biology (Adv)
Credit points: 6
Teacher/Coordinator: A/Professor R Coleman.
Session: Semester 2.
Enrolments: 2 Classes.
Texts: 2 x 1 hr lectures per week, 6 x 1 hr tutorials, 1 x 8 hr field trip, 3 x 4 hr field trips and 1 x 3 hr practical.
Prerequisites: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH), 12 credit points of Junior Chemistry (or for BSc (Marine Science) students 6 credit points of Junior Chemistry and either an additional 6 credit points of Junior Chemistry or 6 credit points of Junior Physics). These requirements may be varied and students with lower averages should consult the Unit Executive Officer. Prohibitions: BIOL2018, MARS2006, MARS2007, MARS2097
Assumed knowledge: 12 credit points of Junior Biology.
Assessment: Two hour theory exam, four written reports (100%).
Note: Entry is restricted and selection is made from applicants on the basis of previous performance.

This unit has the same objectives as BIOL2018, Introduction to Marine Biology, and is suitable for students wishing to pursue aspects from the unit in greater depth. Students taking this unit will participate in alternatives to some components of the ordinary level course and will be required to pursue the unit objectives by more independent means. Specific details of the unit will be announced in meetings, during the first week of teaching.

Textbooks
As for BIOL2018.

Refer to the relevant sections of this handbook for details on the following units of study:


Senior units of study
Students who intend to proceed from Intermediate to Senior Biology should refer to the booklet Information for Students Considering Senior Biology Units of Study, which is available from the School Office (The Cottage, A10 Science Road) and at sydney.edu.au/science/biology/studying_biology/undergraduate-senior.shtml. A major in Biology comprises 24 credit points of Senior Biology units of study. Units of study followed by (MS) may be used to count towards a major in Marine Science.

Senior units of study offered: Pre-Semester 1
BIO3001 Tropical Wildlife Biology and Management - (Pre-Semester 1 intensive), BIO3017 Fungi in the Environment – (Summer Break and Semester 1), (Plus Advanced versions of the above – BIO39xx).

Senior units of study offered: Semester 1
BIO3006 Ecological Methods (MS), BIO3011 Ecophysiology (MS), BIO3012 Animal Physiology, BIO3013 Marine Biology (MS), BIO3018 Applications of Recombinant DNA Technology, BIO3027 Bioinformatics and Genomics, PLNT3003 Systematics and Evolution of Plants. (Plus advanced versions of the above - BIO39xx, PLNT39xx).

Senior units of study offered: Pre-Semester 2 intensive
BIO3008 Marine Field Ecology (MS) – (Pre-Semester 2 intensive), BIO3009 Terrestrial Field Ecology – (Pre-Semester 2 intensive), BIO3016 Coral Reef Biology (Pre-senior semester 2 intensive) (Plus Advanced versions of the above - BIO 39xx).

Senior units of study offered: Semester 2
BIO3007 Ecology (MS), BIO3025 Evolutionary Genetics and Animal Behaviour, BIO3026 Developmental Genetics, PLNT3002 Plant...
9. Undergraduate units of study

Growth and Development. (Plus advanced versions of the above - BIOL 39xx, PLNT 39xx).

Further information
Details of lectures and practical classes are given in the booklet: Information for Students Considering Senior Biology Units of Study. Any combination of units may be chosen subject to timetable and prerequisite constraints. Units of study are offered subject to student numbers, availability of staff and resources. Quotas exist on BIOL 3008/3908 Marine Field Ecology, and BIOL 3009/3909 Terrestrial Field Ecology and BIOL3016 Corel Reel Biology. When necessary, selection is based on academic merit. Students majoring in Marine Science must enrol in 24 credit points of Senior Marine Science, including at least 6 credit points of Senior Biology (from those marked MS) and 6 credit points from GEOS units. If these credit points are taken as part of Marine Science major they may not be counted towards a Biology major.

Selecting units of study
Select your units of study after checking (a) that you have passed the qualifying units of study stated for each unit of study, and (b) checking your timetable. You are strongly advised to check the most up-to-date information (including details of quotas in Marine modules) in the booklet: Information for Students Considering Senior Biology Units of Study, available from the School Office (The Cottage, A10, Science Road).

Textbooks
A list of textbooks and reference books is provided in the booklet: Information for Students Considering Senior Biology Units of Study.

BIOL3006
Ecological Methods
Credit points: 6 Teacher/Coordinator: Dr Clare McArthur Session: Semester 1
Classes: 2x1 hr lectures/week, 1x3 hr practical/week. Prerequisites: 12 credit points of Intermediate Biology, or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3906
Assumed Knowledge: BIOL (2011 or 2911 or 2012 or 2912) or PLNT (2002 or 2902). Assessment: 1x2 hr exam (40%), practical assignments (including calculations, reports and reviews) (60%)

This unit will consider ecology as a quantitative, experimental and theoretical science. It is concerned with the practical skills and philosophical background required to explore questions and test hypotheses in the real world. Application of ecological methods and theory to practical problems will be integrated throughout the unit of study. Lectures will focus on sound philosophical and experimental principles, drawing on real examples for demonstration of concepts, and will be useful as one basis for informed conservation and management of natural populations and habitats. Practical sessions will be used to gain experience in effective sampling, determining patterns of distribution and abundance, estimating ecological variables, and statistically analysing ecological data. Computer simulations and statistical packages for analyses will be used where appropriate.

Textbooks

BIOL3906
Ecological Methods (Advanced)
Credit points: 6 Teacher/Coordinator: Dr C McArthur Session: Semester 1
Classes: 2x1 hr lectures/week, 1x3 hr practical/week. Prerequisites: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3906
Assumed Knowledge: BIOL (2011 or 2911 or 2012 or 2912) or PLNT (2002 or 2902). Assessment: 1x2 hr exam (40%), practical assignments (including calculations, reports and reviews) (60%)

This unit has the same objectives as BIOL3006 Ecological Methods, and is suitable for students who wish to pursue certain aspects in greater depth. Entry is restricted, and selection is made from the applicants on the basis of their previous performance. Students taking this unit of study will participate in alternatives to some elements of the standard course and will be required to pursue the objectives by more independent means. Specific details of this unit of study and assessment will be announced in meetings with students in week 1 of semester 1. This unit of study may be taken as part of the BSc (Advanced) program.

Textbooks
As for BIOL3006

BIOL3007
Ecology
Credit points: 6 Teacher/Coordinator: Dr D Hochuli Session: Semester 2
Classes: 2x1 hr lectures/week, 1x3 hr practical/week. Prerequisites: 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL, and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3907
Assumed knowledge: Although not prerequisites, knowledge obtained from BIOL3006/3906, and BIOL3008/3908 and/or BIOL3009/3909. Assessment: 1x2hr exam, group presentations, 1xessay, 1xproject report (100%)

This unit explores the dynamics of ecological systems, and considers the interactions between individual organisms and populations, organisms and the environment, and ecological processes. Lectures are grouped around four dominant themes: Interactions, Evolutionary Ecology, The Nature of Communities, and Conservation and Management. Emphasis is placed throughout on the importance of quantitative methods in ecology, including sound planning and experimental designs, and on the role of ecological science in the conservation, management, exploitation and control of populations. Relevant case studies and examples of ecological processes are drawn from marine, freshwater and terrestrial systems, with plants, animals, fungi and other life forms considered as required. Students will have some opportunity to undertake short term ecological projects, and to take part in discussions of important and emerging ideas in the ecological literature.

Textbooks

BIOL3907
Ecology (Advanced)
Credit points: 6 Teacher/Coordinator: Dr D Hochuli Session: Semester 2
Classes: See BIOL3007 Prerequisites: Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3907
Assumed Knowledge: Although not prerequisites, knowledge obtained from BIOL3006/3906, and BIOL3008/3908 and/or BIOL3009/3909, is strongly recommended. Students entering this unit of study should have achieved Distinction average. Assessment: 1x2hr exam, presentations, 1xessay, 1xproject report (100%)

This unit has the same objectives as BIOL3007 Ecology, and is suitable for students who wish to pursue certain aspects in greater depth. Entry is restricted, and selection is made from the applicants on the basis of their previous performance. Students taking this unit of study will participate in alternatives to some elements of the standard course and will be encouraged to pursue the objectives by more independent means. Specific details of this unit of study and assessment will be announced in meetings with students in week 1 of semester 2. This unit of study may be taken as part of the BSc (Advanced) program.

Textbooks
As for BIOL3007

BIOL3008
Marine Field Ecology
Credit points: 6 Teacher/Coordinator: A/Prof Ross Coleman Session: S2
Classes: Intensive 8 day-field course held in the pre-semester break. Prerequisites: 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3908 Assumed knowledge: BIOL2018 or GEOS2115. BIOL (3006 or 3906). Prior completion of one of these units is very strongly recommended. Assessment: Discussion groups, research project proposal, biodiversity survey report, data analysis and checking, research project report (100%)

Note: Dates: 28 June - 5 July 2011.
This field course provides a practical introduction to the experimental analysis of marine populations and assemblages. Students gain experience using a range of intertidal sampling techniques and develop a detailed understanding of the logical requirements necessary for manipulative ecological field experiments. No particular mathematical or statistical skills are required for this subject. Group experimental research projects in the field are the focus of the unit during the day, with presentations by students and discussion groups about the analysis of experimental data and current issues in experimental marine ecology occurring in the evening.

Textbooks

BIOL3908 Marine Field Ecology (Advanced)
Credit points: 6 Teacher/Coordinator: A/Prof R Coleman. Session: S2 Intensive Classes: One 8 day field course held in the pre-semester break, plus 4x1 hr tutorials during semester 2. Prerequisites: Distinction average in 12 credit points of Intermediate Biology, or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3008. Assumed knowledge: BIOL2018 or GEOS2115. Prior completion of BIOL (3006 or 3906) is very strongly recommended. Assessment: Discussion groups, research project proposal, biodiversity report, data analysis and checking, research project report (100%). Note: Dates: 28 June - 5 July 2011.

This unit has the same objectives as Marine Field Ecology BIOL3008, and is suitable for students wishing to pursue certain aspects of marine field ecology in a greater depth. Entry is restricted and selection is made from applicants on the basis of past performance. Students taking this unit of study will be expected to take part in a number of additional tutorials after the field course on advanced aspects of experimental design and analysis and will be expected to incorporate these advanced skills into their analyses and project reports. This unit may be taken as part of the BSc(Advanced).

Textbooks
As for BIOL 3008.

BIOL3009 Terrestrial Field Ecology
Credit points: 6 Teacher/Coordinator: Dr G Wardle. Session: S2 Intensive Classes: Note: 1x6 day field trip held in the pre-semester break and 4x4 hr practical classes during weeks 1-4 in Semester 2. Prerequisites: 12 credit points of Intermediate Biology or ANSC2004 and BIOM2001. Prohibitions: BIOL12/2912, BIOL20/2912 and BIOL30/3906. Prior completion of one of these units is very strongly recommended. Assessment: Discussions and quiz (10%), research project proposal and field presentation (10%), sampling project proposal and data analysis (20%), specimen collection (10%), and research project report (50%). Note: One 6 day field trip held in the pre-semester break (17 - 22 July 2011) and 4x4 hr practical classes during weeks 1-4 in Semester 2.

This field course provides practical experience in terrestrial ecology suited to a broad range of careers in ecology, environmental consulting and wildlife management. Students learn a broad range of ecological sampling techniques and develop a detailed understanding of the logical requirements necessary for manipulative ecological field experiments. The field work incorporates survey techniques for plants, small mammals and invertebrates and thus provides a good background for ecological consulting work. Students attend a week-long field course and participate in a large-scale research project as well as contributing to their own small research project. Invited experts contribute to the lectures and discussions on issues relating to the ecology, conservation and management of Australia's terrestrial flora and fauna.

BIOL3009 Terrestrial Field Ecology (Advanced)
Credit points: 6 Teacher/Coordinator: Dr G Wardle. Session: S2 Intensive Classes: See BIOL3009. Prerequisites: Distinction average in 12 credit points of Intermediate Biology or ANSC2004 and BIOM2001. Prohibitions: BIOL3009. Assumed knowledge: BIOL (3006 or 3906). Prior completion of one of these units is very strongly recommended. Assessment: Discussions and quiz (10%), and research project proposal and brief presentation (10%), sampling project report (20%), specimen collection (10%), research project report (50%). Note: One 6 day field trip held in the pre-semester break (17 - 22 July 2011) and 4x4 hr practical classes during weeks 1-4 in Semester 2.

This unit has the same objectives as BIOL3009 Terrestrial Field Ecology, and is suitable for students who wish to pursue certain aspects in greater depth. Entry is restricted, and selection is made from applicants on the basis of previous performance. Students taking this unit of study will complete an individual research project on a topic negotiated with a member of staff. It is expected that much of the data collection will be completed during the field trip but some extra time may be needed during semester 2. Specific details of this unit of study and assessment will be announced in meetings with students at the beginning of the unit. This unit of study may be taken as part of the BSc(Advanced) program.

BIOL3010 Tropical Wildlife Biology and Management
Credit points: 6 Teacher/Coordinator: Dr J Webb. Session: S1 Intensive Classes: 5 day Field School, followed by 5 days of classes at Sydney University. Prerequisites: 12 credit points of Intermediate Biology (BIOL/ENV/PLNT), or equivalent. Prohibitions: BIOL3910. Assumed knowledge: None, although BIOL20/2912 (Vertebrates and their Origins) would be useful. Assessment: 1x2 hr theory exam, 1x1 hr practical exam, 1x2 page report, 1x2000 word paper, 1x15 minute oral presentation (100%). Note: Department permission required for enrolment. Note: Dates: 13 February - 18 February 2011 Northern Territory, followed by tutorials and practical classes at the University of Sydney 21 February - 25 February 2011.

Australia has a unique terrestrial vertebrate fauna, but also has the worst record of recent mammalian extinctions. Because of Australia's unusual climate, landforms, and the rarity of many species, the management of our native wildlife presents special challenges for biologists, conservationists and land managers. This unit of study addresses the biogeography, ecology and management of Australia's terrestrial fauna. The subject comprises of a five-day field course at Mary River Park in the Northern Territory. During the course, students will learn how to carry out wildlife surveys, how to identify animals, and how to track wildlife. The field trip will be complemented by lectures from experts in the evolution, ecology and management of wildlife. A one day field trip to Litchfield National Park will be held on the last day of the field course.

BIOL3910 Tropical Wildlife Biol & Management Adv
Credit points: 6 Session: S1 Intensive Classes: See BIOL3010. Prerequisites: Distinction average in 12 credit points of Intermediate Biology (BIOL/ENV/PLNT). Prohibitions: BIOL3010. Assumed knowledge: None, although BIOL20/2912 (Vertebrates and their Origins) would be useful. Assessment: 1x2 hr theory exam, 1x1 hr practical exam, 1x2000 word practical report, 1x200 word paper, 1x15 minute oral presentation (100%). Note: Department permission required for enrolment. Note: Dates: 13 - 18 February 2011 Northern Territory followed by tutorials and practical classes at the University of Sydney 21 - 25 February 2011.

This unit has the same objectives as BIOL3010 Tropical Wildlife Biology and Management, and is suitable for students who wish to pursue certain aspects in greater depth. Entry is restricted, and selection is made from the applicants on the basis of their previous performance. Students taking this unit of study will participate in alternatives to some elements of the standard course and will be required to pursue the objectives by more independent means. Specific details of this unit of study and assessment will be announced in meetings with students at the beginning of the unit. This unit of study may be taken as part of the BSc(Advanced) program.

BIOL3011 Ecophysiology
Credit points: 6 Teacher/Coordinator: A/Prof Seebacher. Session: Semester 1 Classes: 2x1 hr lectures/week, 1x4 hr practical/week. Prerequisites: 12 credit points of Intermediate Biology or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). Prohibitions: BIOL3911. Assumed knowledge: BIOL (2012 or 2912 or 2016 or 2916) or PLNT (2003 or 2903). Assessment: 1x1.5 hr exam, field trip, seminar, laboratory report (100%). Note: The completion of 6 credit points of MBLG units is highly recommended.
Ecophysiology is a conceptually based unit of study that covers physiological interactions between organisms and their environments. The unit focuses on the evolution of physiological capacities and how these may explain the ecology and biogeography of organisms. Lectures are based on the current primary literature. Lecturers have active research programs on the topics they cover and will present original research findings where appropriate. Examples are mainly from insects, vertebrates, and marine organisms. As part of the practical component, students design their own original research projects to be conducted during a week-end long field trip, and during self-directed laboratory sessions.

**BIOL3911 Ecophysiology (Advanced)**

**Credit points:** 6

**Teacher/Coordinator:** A/Prof Seebecher

**Session:** Semester 1

**Classes:** See BIOL3011. **Prerequisites:** Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and ENVI (2111 or 2911) or GEOS (2115 or 2915). These requirements may be varied and students with lower averages should consult the Unit Executive Officer. **Prohibitions:** BIOL3011 **Assumed knowledge:** BIOL (2012 or 2912 or 2016 or 2916) or PLNT (2003 or 2903). **Assessment:** 1x1.5 hr exam, field trip seminar, independent project report (100%)

**Note:** The completion of 6 credit points of MBLG units is highly recommended.

Ecophysiology (Advanced) shares the same lectures as BIOL 3011 Ecophysiology, but it includes an independent project in place of the laboratory report (equivalent of 30% of Ecophysiology). The content and nature of the independent project varies and students are encouraged to design their own project.

**BIOL3012 Animal Physiology**

**Credit points:** 6

**Teacher/Coordinator:** Dr M Thomson

**Session:** Semester 1

**Classes:** 2x1 hr lectures/week, 1x4 hr practical/week. **Prerequisites:** 12 credit points of Intermediate Biology. **Prohibitions:** BIOL3912 **Assessment:** 1x3 hr exam, laboratory/library reports (100%)

**Note:** The completion of 6 credit points of MBLG units is highly recommended.

In this unit of study students explore how animal physiology is influenced by environmental factors. There is a strong emphasis on how modern research is expanding the field of physiology throughout a diverse array of vertebrates and invertebrates and the unit is designed to complement Ecophysiology. Particular emphasis will be placed on nutrition, animal behaviour, energy metabolism, endocrinology and neurobiology, as well as more exotic animal physiology such as electro-reception in sharks and infra-red detection of prey in snakes.

**BIOL3912 Animal Physiology (Advanced)**

**Credit points:** 6

**Teacher/Coordinator:** Dr M Thomson

**Session:** Semester 1

**Classes:** See BIOL3012. **Prerequisites:** Distinction average in 12 credit points of Intermediate Biology. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. **Prohibitions:** BIOL3012 **Assessment:** 1x3 hr exam, laboratory reports, independent project report (100%)

Animal Physiology (Advanced) shares the same lectures as Animal Physiology, but it includes an independent project in place of one or more components of the laboratory classes to the equivalent of 30% of Animal Physiology. The content and nature of the independent project may vary from year to year.

**BIOL3013 Marine Biology**

**Credit points:** 6

**Teacher/Coordinator:** Dr W Figueira

**Session:** Semester 1

**Classes:** 2x1 hr lectures/week, 1x4 hr practical/week. **Prerequisites:** 12 credit points of Intermediate Biology, or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). **Prohibitions:** BIOL3913 **Assumed knowledge:** BIOL2018 or GEOS2115. **Assessment:** Practical reports, paper criticisms and other assignments (100%)

**Note:** The completion of 6 credit points of MBLG units is highly recommended.

We will examine in detail processes that are important for the establishment and maintenance of marine communities. Lectures will expose students to the key ideas, researchers and methodologies within selected fields of marine biology. Laboratory sessions will complement the lectures by providing students with hands-on experience with the organisms and the processes that affect them. Students will develop critical analysis and scientific writing skills while examining the current literature.

**BIOL3913 Marine Biology (Advanced)**

**Credit points:** 6

**Teacher/Coordinator:** Dr W Figueira

**Session:** Semester 1

**Classes:** See BIOL3013. **Prohibitions:** Distinction average in 12 credit points of Intermediate Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). **Prohibitions:** BIOL3013 **Assumed knowledge:** BIOL2018 or GEOS2115 **Assessment:** Practical reports, paper criticisms and other assignments (100%)

**Note:** The completion of 6 credit points of MBLG units is highly recommended.

Qualified students will participate in alternative components of the BIOL3013 Marine Biology unit. The content and nature of these components may vary from year to year.

**BIOL3016 Coral Reef Biology**

**Credit points:** 6

**Session:** S2

**Classes:** Fieldwork 80 hours block mode. **Prerequisites:** 12 credit points from Intermediate science units of study which must include at least 6 credit points of BIOL units; or 6 credit points of BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). **Prohibitions:** BIOL3916, NTMP3001 **Assessment:** Participation in field work, essays, project report and an exam (100%)

**Note:** Department permission required for enrolment. **Note:** 9-15 July 2011

Coral Reef Biology is an intensive unit held at a research station on the Great Barrier Reef, usually One Tree Island Research Station. The unit focuses on the dominant taxa in coral reef environments and the linkages between them. Emphasis is placed on the biological adaptations for life in tropical waters and the ecological, oceanographic and physiological processes involved. Aspects covered include: processes influencing the distribution of coral reefs, symbiosis, reef connectivity, lagoon systems, nutrient cycling and the impacts of climate change and other anthropogenic pressures on the world’s corals reefs.

**BIOL3916 Coral Reef Biology (Advanced)**

**Credit points:** 6

**Teacher/Coordinator:** Professor Maria Byrne

**Session:** S2

**Classes:** See BIOL3016. **Prohibitions:** Distinction average in 12 credit points from Intermediate science units of study which must include at least 6 credit points of Biology; or 6 credit points of Intermediate BIOL and one of ENVI (2111 or 2911) or GEOS (2115 or 2915). **Prohibitions:** BIOL3006, NTMP3001 **Assumed knowledge:** BIOL2018 or GEOS2115 **Assessment:** 1x2 hr exam, 2x1500wd essays, project presentation and report (100%)

**Note:** Department permission required for enrolment. **Note:** 9-15 July 2011

This unit has the same objectives as BIOL3016, Coral Reef Biology, and is suitable for students who wish to pursue certain aspects of tropical marine biology in greater depth, with a focus on the GBR. Entry is restricted, and selection is made from the applicants on the basis of their previous performance. Students taking this unit of study will pursue individual projects in consultation with, and under the guidance of, the course coordinator. The aim is to design a project relating to the particular interests of the student. The nature of these projects will vary from year to year. This unit of study may be taken as part of the BSc (Advanced) program.

**BIOL3017 Fungi in the Environment**

**Credit points:** 6

**Teacher/Coordinator:** A/Prof P McGee

**Session:** S1

**Classes:** 40 hours of practicals in a two week intensive program held immediately prior to semester one (laboratory component each morning from 14-25 February 2011), plus the equivalent of 30 hours self-guided study during the semester. **Prohibitions:** 12 credit points of Intermediate Biology or Plant Science, or 6 credit points of Intermediate Biology, or Plant Science, and 6 Intermediate credit points of either Microbiology or Geography. **Prohibitions:** BIOL3917 **Assessment:** Selected from 1x2 hr take home exam, laboratory component and written assignments (100%)

**Note:** Dates: 14-25 February 2011. The completion of 6 credit points of MBLG units is highly recommended.
The unit is designed to develop understanding of fungal ecology in relation to environmental and rehabilitation biology, biological control of pests and pathogens, and soil microbiology. Emphasis will be placed on the function of fungi, and the benefit provided by fungi in symbiotic interactions with plants, including mycorrhizal fungi and shoot-borne endophytes. Physiological and ecological implications of the interactions will also be considered. Each student will design and implement a research project. Analytical thinking and research-led activity will be encouraged. Using broad scientific approaches, each student will gain the capacity to work cooperatively to find and analyse information from primary sources, develop approaches to test their understanding, and to present their work in a scientifically acceptable manner. Students will develop a deep understanding of one area of fungal biology through independent study. Part of the learning material will be available on the internet.

BIOL3917
Fungi in the Environment (Advanced)
Credit points: 6
Teacher/Coordinator: A/Prof P McGee
Session: S1 Intensive
Classes: See BIOL3017.
Prerequisites: Distinction average in 12 credit points of Intermediate Biology and Plant Science, or 6 credit points of Intermediate Biology, or Plant Science, and Intermediate credit points of either Microbiology or Geography. Prohibitions: BIOL3017 Assessment: Selected from 1x2 hr take home exam, laboratory and written assignments (100%)
Note: The completion of 6 credit points of MBLG units is highly recommended.
Qualified students will be encouraged to develop a research project under supervision. The content and nature of the research will be agreed on with the executive officer.

BIOL3018
Applications of Recombinant DNA Tech
Credit points: 6
Teacher/Coordinator: Dr B Lyon
Session: Semester 1
Classes: 2x1 hr lectures/week, 1x4 hr practical/week. Prerequisites: 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSc students: 36 credit points of Intermediate BMED units including BMED 2602. Prohibitions: BIOL3918 Assessment: 1x2 hr exam, practical reports, assignment/seminar (100%)
A unit of study with lectures, practicals and tutorials on the application of recombinant DNA technology and the genetic manipulation of prokaryotic and eukaryotic organisms. Lectures cover the applications of molecular genetics in biotechnology and consider the impact and implications of genetic engineering. Topics include the cloning and expression of foreign genes in bacteria, yeast, animal and plant cells, novel human and animal therapeutics and vaccines including human gene therapy, new diagnostic techniques for human and veterinary disease, the transformation of animal and plant cells, the genetic engineering of animals and plants, and the environmental release of genetically-modified (transgenic) organisms. Practical work may include nucleic acid isolation and manipulation, gene cloning and PCR amplification, DNA sequencing and computer analysis of gene sequences, immunological detection of proteins, and the genetic transformation and assay of plants.

BIOL3918
Applications of Recombinant DNA Tech Adv
Credit points: 6
Teacher/Coordinator: Dr B Lyon
Session: Semester 1
Classes: See BIOL3018. Prerequisites: Distinction average in 12 credit points from MBLG (2071/2971), MBLG (2072/2972) and Intermediate Biology units. For BMedSc students: 36 credit points of Intermediate BMED units including BMED 2602. Prohibitions: BIOL3018 Assessment: 1x2 hr exam, assignment/seminar (100%)
Qualified students will participate in alternative components of BIOL3018 Applications of Recombinant DNA Technology. The content and nature of these components may vary from year to year.

BIOL3025
Evolutionary Genetics & Animal Behaviour
Credit points: 6
Teacher/Coordinator: Prof Olford, A/Prof Beekman.
Session: Semester 2
Classes: 2x1 hr lectures/week, 1x4 hr practical/week. Prerequisites: 12 credit points from MBLG (2071/2971), MBLG (2072/2972) or Intermediate Biology or Intermediate PLNT units. For BMedSc students: 36 credit points of Intermediate BMED units including BMED2602. Prohibitions: BIOL3925 Assessment: 1x1.5 hr exam, assignments, seminar (100%)
The unit of study covers the main themes of modern evolutionary theory including population genetics. In the practicals, students use molecular methods to quantify genetic variation in natural populations. Using these skills we will search for population subdivision and discuss how this can lead to specialization in the resulting species. We will consider how the evolution of traits can be tracked using the comparative method. We will consider how studies of sex ratios, sexual selection, kin selection, game theory and quantitative genetics can illuminate the mechanisms by which animals have evolved, and explain why they behave as they do. We will then consider if these themes have any relevance to human sociobiology. The unit also covers the role of genetics in conservation. There will be a field trip to collect organisms for population genetic analysis. There will be plenty of opportunity in the student seminars to examine the more controversial aspects of modern evolutionary thought.
The aim of the course is to introduce to students basic concepts of the pathogenesis, natural biological mechanisms governing disease pathogenesis in human tissue responses to exogenous factors, adaptive responses to foreign pathogenesis of disease. Areas covered in theoretical modules include: to explain cellular aspects of certain pathological processes. Together with CPAT3202, the unit of study would be appropriate for those who intend to proceed to Honours research, to professional degrees or to careers in biomedical areas such as hospital science. Together with CPAT3202, it fulfills the Pathology requirements for the Centre for Chiropractic at Macquarie University.

Textbooks

CPAT3202
Pathogenesis of Human Disease 2
Credit points: 6 Teacher/Coordinator: A/Prof Bob Bao Session: Semester 2 Classes: One 2 hour practical per week and one 2 hour museum practical. Prerequisites: At least 6cp intermediate of one of the following: ANAT or BCHM or MBLG or BIOL or HPSC or MICR or PCOL or PHSI, or as the head of department determines. Corequisites: CPAT3201 Assessment: One 2 hour exam (70%), Museum Practical Reports (30%).

The Pathogenesis of Human Disease 2 unit of study modules will provide a practical background to the scientific basis of the pathogenesis of disease. Areas covered in practical modules include disease specimen evaluation on a macroscopic and microscopic basis.

The aim of the course is
- To enable students to gain an understanding of how different organ systems react to injury and to apply basic concepts of disease processes.
- To equip students with skills appropriate for careers in the biomedical sciences and for further training in research or professional degrees.

At the end of the course students will:
- Have acquired practical skills in the use of a light microscope.
- Have an understanding of basic investigative techniques for disease detection in pathology.
- Be able to evaluate diseased tissue at the macroscopic and microscopic level.
- Have the ability to describe, synthesise and present information on disease pathogenesis.
- Transfer problem-solving skills to novel situations related to disease pathogenesis.

The unit of study would be appropriate for those who intend to proceed to Honours research, to professional degrees or to careers in biomedical areas such as hospital science. Together with CPAT3201, it fulfills the Pathology requirements for the Centre for Chiropractic at Macquarie University.

Textbooks

Chemical Engineering
The School of Chemical and Biomolecular Engineering is part of the Faculty of Engineering and Information Technologies. In addition to providing professional training in this branch of engineering it offers CHNG1103 Introduction to Material and Energy Transformations to students enrolled in the Faculty of Science. Details regarding this unit of study can be obtained from the Faculty of Engineering and Information Technologies Handbook. This unit of study is intended to give a science student some insight into the principles which control the design and performance of large scale industrial processing plants. Faculty of Science students are invited to enrol in any other chemical engineering unit of study, provided they have the appropriate prerequisites and have consulted with the Head of School.

Chemistry
Study plan for a major
First Year Junior units of study aim to provide students with an understanding of the molecular basis of the physical properties of materials, the reasons chemical reactions occur and the energy
changes involved. Units are offered at different levels depending on whether chemistry was studied at the HSC level or equivalent and the results obtained. Second Year Intermediate core units Molecular Reactivity & Spectroscopy and Chemical Structure & Stability provide the mainstream chemistry essential for students planning to major in chemistry and other chemical-related sciences. Elective units in Forensic & Environmental Chemistry and in the Chemistry of Biological Molecules are also available. Third Year Senior units allow students to specialise in particular areas of chemistry and cover such areas as: biomolecules; organic structure and reactivity; materials; catalysis and sustainable processes; metal complexes in medicines and materials; synthetic medicinal chemistry; membranes, self assembly and surfaces; and molecular spectroscopy and quantum theory.

Further study
Eligible students may apply for admission to a BSc Honours year in chemistry. The Honours year gives students the opportunity to get involved in a research program in an area that is of interest to them and provides training in research techniques and experience in using modern research instrumentation. It adds a new dimension to the skills that students have acquired during their undergraduate years. The research experience gained during the Honours year often leads students on to postgraduate study as a MSc or PhD research student. The MSc or PhD degree programs involve undertaking a major research project working under the supervision of a member of the academic staff.

Related Majors
Nanoscience, Medicinal Chemistry

Graduate opportunities
There are many different employment opportunities for chemists including the chemical industry, government laboratories, the education sector, and corporate management. The industrial sector includes polymers, petrochemicals, pharmaceuticals, drug design and development, food and drink technologies, sports drug testing, computing, and scientific journalism. The emerging areas of biotechnology and nanoscience rely on chemical principles and employ large numbers of scientifically trained chemists. The whole industrial sector is being transformed as it moves to a molecular level understanding of materials and embraces environmentally sustainable technologies through the use of ‘green chemistry’. Chemistry graduates are essential to the success of these transformations.

Course accreditation
Sydney Bachelor of Science graduates who hold a major in chemistry may be admitted as professional members of the Royal Australian Chemical Institute (RACI) and may become a ‘Chartered Chemist’.

Ask a question
enquiries@chem.usyd.edu.au

Junior units of study
Details on Chemistry Junior Units of Study is available at the Chemistry First Year website (sydney.edu.au/science/chemistry/firstyear). This information is also provided in a booklet: ‘Information for Students’, which is distributed to students at the time of enrolment, and is also available from the Chemistry First Year Office. The coordinator for all Junior Chemistry units of study is A/Prof Adam Bridgeman.

CHEM1001
Fundamentals of Chemistry 1A
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. Prohibitions: CHEM1101, CHEM1901, CHEM1109, CHEM1903 Assumed knowledge: There is no assumed knowledge for chemistry of this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. Assessment: Theory examination (60%), laboratory exercises and continuous assessment quizzes (40%). Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.

The aim of the unit of study is to provide those students whose chemical background is weak (or non-existent) with a good grounding in fundamental chemical principles together with an overview of the relevance of chemistry. There is no prerequisite or assumed knowledge for entry to this unit of study. Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks

CHEM1002
Fundamentals of Chemistry 1B
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. Prerequisites: CHEM1001 or equivalent Assumed knowledge: HSC Chemistry and Mathematics. Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%). Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.

CHEM1002 builds on CHEM1001 to provide a sound coverage of inorganic and organic chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks

CHEM1101
Chemistry 1A
Credit points: 6 Session: Semester 1, Semester 2, Summer Main Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. Corequisites: Recommended concurrent units of study: CHEM1002, CHEM1109, CHEM1903 Assumed knowledge: HSC Chemistry and Mathematics. Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%). Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.

Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks

CHEM1102
Chemistry 1B
Credit points: 6 Session: Semester 1, Semester 2, Summer Main Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. Prerequisites: CHEM1001 or equivalent Assumed knowledge: HSC Chemistry and Mathematics. Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%). Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.

Chemistry 1B is built on a satisfactory prior knowledge of Chemistry 1A and covers inorganic and organic chemistry. Successful completion of Chemistry 1B is an acceptable prerequisite for entry into Intermediate Chemistry units of study. Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks

CHEM1108
Chemistry 1A Life Sciences
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. Corequisites: Recommended concurrent units of study: CHEM1002, CHEM1109, CHEM1903 Assumed knowledge: HSC Chemistry and Mathematics. Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%). Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.

Note: This unit of study is available to students enrolled in the Bachelor of Medical Science, the Bachelor of Science (Molecular Biology and Genetics), the Bachelor of Science (Nutrition) and the Bachelor of Science (Molecular Biotechnology) only.
9. Undergraduate units of study

Lectures (39 hrs): A strong background in junior chemistry is essential for understanding molecular structures and processes. This unit of study provides the basis for understanding fundamental chemical processes and structures at an advanced level, with particular emphasis on how these apply to the life sciences. Topics to be covered include: atomic structure, chemical bonding and organic chemistry of functional groups with applications in life sciences.

Tutorials (12 hrs): These will provide aspects of problem solving relevant to the theory.

Textbooks
A booklet is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM1109 Chemistry 1B Life Sciences
Credit points: 6
Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks.
Prerequisites: CHEM1108 Corequisites: Recommended concurrent units of study: 6 credit points of Junior Mathematics Prohibitions: CHEM1001, CHEM1101, CHEM1901, CHEM1903 Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%) Note: This unit of study is available to students enrolled in the Bachelor of Medical Science, the Bachelor of Science (Biology and Genetics), the Bachelor of Science (Nutrition) and the Bachelor of Science (Molecular Biotechnology) only.

Lectures (39 hrs): A strong background in junior chemistry is essential for understanding molecular structures and processes. This unit of study provides the basis for understanding fundamental chemical processes and structures at an advanced level, with particular emphasis on how these apply to the life sciences. Topics to be covered include: chemical equilibria, solutions, acids and bases, ions in solution, redox reactions, colloids and surface chemistry, the biological periodic table, chemical kinetics and radiochemistry with applications to life sciences.

Tutorials provide aspects of problem solving relevant to the unit of study.

Textbooks

CHEM1901 Chemistry 1A (Advanced)
Credit points: 6
Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks.
Prerequisites: ATAR of at least 95.4 and HSC Chemistry result in band 5 or 6, or by invitation. Corequisites: Recommended concurrent unit of study: 6 credit points of Junior Mathematics Prohibitions: CHEM1001, CHEM1101, CHEM1901, CHEM1903 Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%) Practical field work: A series of 10 three-hour laboratory sessions, one per week for 10 weeks of the semester.
Note: Department permission required for enrolment.

Chemistry 1A (Advanced) is available to students with an excellent school record in Chemistry. The practical work syllabus for Chemistry 1A is different from that for Chemistry 1A and Chemistry 1B (Advanced) and consists of special project-based laboratory exercises. All other unit of study details are the same as those for Chemistry 1A (Advanced). A Distinction in Chemistry 1A (Special Studies Program) is an acceptable prerequisite for entry into Chemistry 1B (Special Studies Program).

Textbooks

CHEM1903 Chemistry 1A (Special Studies Program)
Credit points: 6
Session: Semester 1 Classes: Three 1 hour lecture, one 1 hour tutorial per week and one 3 hour practical per week. Prerequisites: ATAR of at least 99.0 and HSC Chemistry result in Band 6 Corequisites: Recommended concurrent unit of study: 6 credit points of Junior Mathematics Prohibitions: CHEM1001, CHEM1101, CHEM1109, CHEM1901 Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%) Note: Department permission required for enrolment. Note: Entry is by invitation. This unit of study is deemed to be an Advanced unit of study.

Entry to Chemistry 1A (Special Studies Program) is restricted to students with an excellent school record in Chemistry. The practical work syllabus for Chemistry 1A (Special Studies Program) is very different from that for Chemistry 1A and Chemistry 1B (Advanced) and consists of special project-based laboratory exercises. All other unit of study details are the same as those for Chemistry 1A (Advanced). A Distinction in Chemistry 1A (Special Studies Program) is an acceptable prerequisite for entry into Chemistry 1B (Special Studies Program).

Textbooks

CHEM1904 Chemistry 1B (Special Studies Program)
Credit points: 6
Session: Semester 2 Classes: Three 1-hour lectures, one 1-hour tutorial per week, one 3-hour practical per week for 12 weeks.
Prerequisites: Distinction in CHEM1903 Corequisites: Recommended concurrent units of study: 6 credit points of Junior Mathematics Prohibitions: CHEM1002, CHEM1102, CHEM1108, CHEM1902 Assessment: Theory examination (70%), laboratory exercises and continuous assessment quizzes (30%) Note: Department permission required for enrolment. Note: Entry is by invitation. This unit of study is deemed to be an Advanced unit of study.

Entry to Chemistry 1B (Special Studies Program) is restricted to students who have gained a Distinction in Chemistry 1A (Special Studies Program). The practical work syllabus for Chemistry 1B (Special Studies Program) is very different from that for Chemistry 1B and Chemistry 1B (Advanced) and consists of special project-based laboratory exercises. All other unit of study details are the same as those for Chemistry 1B (Advanced). Successful completion of Chemistry 1B (Special Studies Program) is an acceptable prerequisite for entry into Intermediate Chemistry units of study.

Textbooks

Intermediate units of study
The School of Chemistry offers a number of units of study to cater for the differing needs and interests of students. The following 6 credit point units of study are offered: CHEM2401 Molecular Reactivity and Spectroscopy, CHEM2402 Chemical Structure and Stability, CHEM2403 Chemistry of Biological Molecules, CHEM2404 Forensic and Environmental Chemistry, CHEM2911 Molecular Reactivity and Spectroscopy (Adv), CHEM2912 Chemical Structure and Stability (Adv), CHEM2915 Molecular Reactivity and Spectroscopy (SSP), CHEM2916 Chemical Structure and Stability (SSP). Note: The core Intermediate Chemistry units CHEM (2401 or 2911 or 2915) and
CHEM (2402 or 2912 or 2916) are prerequisites for all Senior Chemistry units of study.

CHEM2401
Molecular Reactivity and Spectroscopy
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 1 Classes: Three 1-hour lectures per week, seven 1-hour tutorials per semester, eight 4-hour practicals per semester. Prerequisites: CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2201, CHEM2202, CHEM2302, CHEM2902, CHEM2912. Assessment: One 3-hour examination, quizzes, lab reports (100%)
Note: This is a required chemistry unit of study for students intending to major in chemistry. Students who have passed CHEM(1001 or 1907 or 1908 or 1108) and CHEM (1002 or 1901 or 1109) may enroll in this unit after obtaining Departmental permission.

This is one of the two core units of study for students considering majoring in chemistry, and for students of other disciplines who wish to acquire a good general background in chemistry. The unit considers fundamental questions of molecular structure, chemical reactivity, and molecular spectroscopy. What are chemical reactions and what makes them happen? How can we follow and understand them? How can we exploit them to make useful molecules? This course includes the organic and medicinal chemistry of aromatic and carbonyl compounds, organic reaction mechanisms, molecular spectroscopy, quantum chemistry, and molecular orbital theory.

CHEM2911
Molecular Reactivity & Spectroscopy Adv
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 1 Classes: Three 1-hour lectures per week, seven 1-hour tutorials per semester and eight 4-hour practicals per semester. Prerequisites: Credit average or better in CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2201, CHEM2302, CHEM2902, CHEM2903, CHEM2911. Assessment: One 3-hour examination, quizzes, lab reports (100%)

The syllabus for this unit is the same as that of CHEM2401 together with special Advanced material presented in the practical program. The lectures cover fundamental consideration of molecular electronic structure and its role in molecular reactivity and spectroscopy and include applications of spectroscopy, the organic chemistry of aromatic systems, molecular orbital theory and quantum chemistry. For more details of the lecture syllabus, please read the entry for CHEM2401.

CHEM2915
Molecular Reactivity & Spectroscopy SSP
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 1 Classes: Three 1-hour lectures per week, twelve 1-hour SSP seminars per semester, eight 4-hour practicals per semester. Prerequisites: By invitation. High WAM and a Distinction average in CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2201, CHEM2202, CHEM2301, CHEM2901, CHEM2903, CHEM2915. Assessment: One 3-hour examination, quizzes, lab reports (100%)

The lectures for this unit comprise the lectures for CHEM2401 and the Advanced practical program together with additional SSP seminars. Two streams of SSP seminars are offered: Series One comprises three seminar series on state of the art topics in chemistry (in 2010, these included Advanced Kinetics, Quantum Theory and Organofluorine Chemistry). Series Two is devoted to Advanced Theoretical Chemistry.

CHEM2402
Chemical Structure and Stability
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 2 Classes: Three 1-hour lectures per week, seven 1-hour tutorials per semester, eight 4-hour practicals per semester. Prerequisites: CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2202, CHEM2302, CHEM2902, CHEM2912, CHEM2916. Assessment: One 3-hour examination, quizzes, lab reports (100%)
Note: This is a required chemistry unit of study for students intending to major in chemistry. Students who have passed CHEM(1001 or 1907 or 1908 or 1108) and CHEM (1002 or 1901 or 1109) may enroll in this unit after obtaining Departmental permission.

This is the second core unit of study for students considering majoring in chemistry, and for students seeking a good general background in chemistry. The unit continues the consideration of molecular structure and chemical reactivity. Topics include the structure and bonding of inorganic compounds, the properties of metal complexes, materials chemistry and nanotechnology, thermodynamics and kinetics.

CHEM2912
Chemical Structure and Stability (Adv)
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 2 Classes: Three 1-hour lectures per week, seven 1-hour tutorials per semester, eight 4-hour practicals per semester. Prerequisites: Credit average or better in CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2202, CHEM2302, CHEM2402, CHEM2902, CHEM2916. Assessment: One 3-hour examination, quizzes, lab reports (100%)

The syllabus for this unit is the same as that of CHEM2402 together with special Advanced material presented in the practical program. The lectures include the properties of inorganic compounds and complexes, statistical thermodynamics, the chemistry of carboxyls, nucleophilic organometallic reagents, and synthetic methods. For more details of the lecture syllabus, please read the entry for CHEM2402.

CHEM2916
Chemical Structure and Stability (SSP)
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 2 Classes: Three 1-hour lectures per week, twelve 1-hour SSP seminars per semester, eight 4-hour practicals per semester. Prerequisites: By invitation. High WAM and a Distinction average in CHEM (1101 or 1901 or 1903) and CHEM (1102 or 1902 or 1904), 6 credit points of Junior Mathematics. Prohibitions: CHEM2202, CHEM2302, CHEM2402, CHEM2902, CHEM2912. Assessment: One 3-hour examination, quizzes, assignments, lab reports (100%)
Note: Department permission required for enrolment. Note: The number of places in this unit of study is strictly limited and entry is by invitation only. Enrolment is conditional upon available places.

The lectures for this unit comprise the lectures for CHEM2402 and the Advanced practical program together with additional SSP seminars comprising three seminar series on state of the art topics in chemistry (in 2010, these included chemical simulation, molecular nanomaterials and Palladium in organic synthesis).

CHEM2404
Forensic and Environmental Chemistry
Credit points: 6 Teacher/Coordinator: Dr P J Rutledge Session: Semester 1 Classes: Three 1-hour lectures per week, six 1-hour tutorials and five 4-hour practical sessions per semester. Prerequisites: 12 credit points of Junior Chemistry; 6 credit points of Junior Mathematics. Prohibitions: CHEM3107, CHEM3197. Assessment: One 3-hour examination, quizzes, lab reports (100%)
Note: To enrol in Senior Chemistry students are required to have completed CHEM (2401 or 2911 or 2916) and CHEM (2402 or 2912 or 2916). Students are advised that combinations of Intermediate Chemistry units that do not meet this requirement will generally not allow progression to Senior Chemistry.

The identification of chemical species and quantitative determination of how much of each species is present are the essential first steps in solving all chemical puzzles. In this course students learn analytical techniques and chemical problem solving in the context of forensic and environmental chemistry. The lectures on environmental chemistry cover atmospheric chemistry (including air pollution, global warming and ozone depletion), and water/soil chemistry (including bio-geochemical cycling, chemical speciation, catalysis and green chemistry). The forensic component of the course examines the gathering and analysis of evidence, using a variety of chemical techniques, and the development of specialised forensic techniques in the analysis of trace evidence. Students will also study forensic analyses of inorganic, organic and biological materials (dust, soil, inks, paints, documents, etc) in police, customs and insurance investigations and learn how a wide range of techniques are used to examine forensic evidence.
CHEM2403
Chemistry of Biological Molecules
Credit points: 6  Teacher/Coordinator: Dr P J Rulledge  Session: Semester 2
Classes: Three 1-hour lectures per week, six 1-hour tutorials per semester. Prerequisites: 12 credit points of Junior Chemistry, 6 credit points of Junior Mathematics. Prohibitions: CHEM2001, CHEM2901, CHEM2311, CHEM2903, CHEM2913  Assessment: One 3-hour examination, quizzes, lab reports (100%).
Note: To enrol in Senior Chemistry, students are required to have completed CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916). Students are advised that combinations of Intermediate Chemistry units that do not meet this requirement will generally not allow progression to Senior Chemistry.

Life is chemistry, and this unit of study examines the key chemical processes that underlie all living systems. Lectures cover the chemistry of carbohydrates, lipids and DNA, the mechanisms of organic and biochemical reactions that occur in biological systems, chemical analysis of biological systems, the inorganic chemistry of metalloproteins, biomaterialisation, polymers and biocatalysts, and the application of spectroscopic techniques to biological systems. The practical course includes the chemical characterisation of biopolymers, experimental investigations of iron binding proteins, organic and inorganic chemical analysis, and the characterisation of anti-inflammatory drugs.

Senior units of study
The School of Chemistry offers a choice of 6 credit point units of study to cater for the differing needs and interests of students. Each unit involves two lectures and 4 hours of lab each week.

CHEM3110
Biomolecules: Properties and Reactions  Credit points: 6  Session: Semester 1
Classes: Two 1-hour lectures and one 4-hour practical per week. Prerequisites: CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916. Prohibitions: CHEM3910  Assessment: One 2-hour exam, prac reports (100%).

DNA, proteins and carbohydrates represent three classes of essential biomolecules present in all biological systems. This unit will cover the structure, reactivity and properties of biomolecules and the building blocks from which these molecules are assembled. Interactions between biomolecules and metal ions, small molecules and other biomolecules will be covered and the chemical tools for studying biomolecules highlighted. The design and synthesis of small molecules which mimic the functions of biomolecules will also be illustrated.

CHEM3910
Biomolecules: Properties & Reactions Adv  Credit points: 6  Session: Semester 1
Classes: Two 1-hour lectures, one 1-hour seminar and one 4-hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916). Prohibitions: CHEM3110  Assessment: One 2-hour exam, prac reports (100%).

DNA, proteins and carbohydrates represent three classes of essential biomolecules present in all biological systems. This unit will cover the structure, reactivity and properties of biomolecules and the building blocks from which these molecules are assembled. Interactions between biomolecules and metal ions, small molecules and other biomolecules will be covered and the chemical tools for studying biomolecules highlighted. The design and synthesis of small molecules which mimic the functions of biomolecules will also be illustrated. CHEM3910 students attend the same lectures as CHEM3110 students but attend an additional advanced seminar series comprising one lecture a week for 12 weeks.

CHEM3111
Organic Structure and Reactivity  Credit points: 6  Session: Semester 2
Classes: Two 1-hour lectures and one 4-hour practical per week. Prerequisites: CHEM2401 or 2911 or 2915 and CHEM2402 or 2912 or 2916. Prohibitions: CHEM3911  Assessment: One 2-hour exam, written assignments, prac reports (100%)

This course concerns the inorganic chemistry of solid-state materials: compounds that possess ‘infinite’ bonding networks. The extended structure of solid materials gives rise to a wide range of important chemical, mechanical, electrical, magnetic and optical properties. Consequently such materials are of enormous technological significance as well as fundamental curiosity. In this course you will learn how chemistry can be used to design and synthesise novel materials with desirable properties. The course will start with familiar molecules such as C60 and examine their solid states to understand how the nature of chemical bonding changes in the solid state, leading to new properties such as electronic conduction. This will be the basis for a broader examination of how chemistry is related to structure, and how structure is related to properties such as catalytic activity, mechanical strength, magnetism, and superconductivity. The symmetry of solids will be used explain how their structures are classified, how they can transform between related structures when external conditions such as temperature, pressure and electric field are changed, and how this can be exploited in technological applications such as sensors and switches. Key techniques used to characterise solid-state materials will be covered, particularly X-ray diffraction, microscopy, and physical property measurements.
This course concerns the inorganic chemistry of solid-state materials: compounds that possess "infinite" bonding networks. The extended structure of solid materials gives rise to a wide range of important chemical, mechanical, electrical, magnetic and optical properties. Consequently, such materials are of enormous technological significance as well as fundamental curiosity. In this course you will learn how chemistry can be used to design and synthesize novel materials with desirable properties. The course will start with familiar molecules such as C60 and examine their solid states to understand how the nature of chemical bonding changes in the solid state, leading to new properties such as electronic conduction. This will be the basis for a broader examination of how chemistry is related to structure, and how structure is related to properties such as catalytic activity, mechanical strength, magnetism, and superconductivity. The symmetry of solids will be used explain how their structures are classified, how they can transform between related structures when external conditions such as temperature, pressure and electric field are changed, and how this can be exploited in technological applications such as sensors and switches. Key techniques used to characterise solid-state materials will be covered, particularly X-ray diffraction, microscopy, and physical property measurements. CHEM3912 students attend the same lectures as CHEM3112 students, but attend an additional advanced seminar series comprising one lecture a week for 12 weeks.

CHEM3113
Catalysis and Sustainable Processes

Credit points: 6 Session: Semester 1 Classes: Two 1-hour lectures and one 4-hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916). Prohibitions: CHEM3112 Assessment: One 2-hour exam, written assignments, prac reports (100%)

At present rates of consumption, the resources of 5 planets would be needed for everyone on earth to enjoy our standard of living. Since so much of our consumption and waste involves chemical processes in some way, more efficient chemical processes are needed in a sustainable tomorrow. Catalysis is and will increasingly be at the heart of these sustainable processes. This unit examines the fundamentals of catalysis and its use to design sustainable processes. The course will initially focus on the organometallic fundamentals in order to show how they can be used to understand and design homogeneous catalytic processes from a molecular perspective, which, in turn, leads on to biocatalytic conversions where the enzyme is treated like a large ligand with a special surface, pointing towards the surface chemistry involved in supported catalysts - the next topic. Within this general discussion, the special case of the three-dimensional surface found in zeotypes will be developed and the acid/base and redox catalysis (the mainstay of the majority of industrial processes) in such confined spaces of molecular dimensions will be examined. The course will continue with examining the production of polymers as an example of a major industrial process. An introduction on polymer chemistry and polymer properties will be given, followed by the examination of the various synthetic routes and processes that yield to the production of polymers. The recent advances in polymer synthesis and the design of new materials of improved properties and function will be reviewed. The last part of this section will explore the various approaches designed to improve the sustainability of polymer synthesis, in particular for the specific case of free radical polymerization, with an emphasis on the design of novel catalysts. The course will conclude by examining a variety of case studies. All the preceding topics find their way into the discussion of the key role of catalysts in the design of sustainable chemical processes, rationalizing the choices behind catalyst design.

CHEM3913
Catalysis and Sustainable Process (Adv)

Credit points: 6 Session: Semester 1 Classes: Two 1-hour lectures, one 1-hour seminar and one 4-hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916). Prohibitions: CHEM3113 Assessment: One 2-hour exam, written assignments, prac reports (100%)

At present rates of consumption, the resources of 5 planets would be needed for everyone on earth to enjoy our standard of living. Since so much of our consumption and waste involves chemical processes in some way, more efficient chemical processes are needed in a sustainable tomorrow. Catalysis is and will increasingly be at the heart of these sustainable processes. This unit examines the fundamentals of catalysis and its use to design sustainable processes. The course will initially focus on the organometallic fundamentals in order to show how they can be used to understand and design homogeneous catalytic processes from a molecular perspective, which, in turn, leads on to biocatalytic conversions where the enzyme is treated like a large ligand with a special surface, pointing towards the surface chemistry involved in supported catalysts - the next topic. Within this general discussion, the special case of the three-dimensional surface found in zeotypes will be developed and the acid/base and redox catalysis (the mainstay of the majority of industrial processes) in such confined spaces of molecular dimensions will be examined. The course will continue with examining the production of polymers as an example of a major industrial process. An introduction on polymer chemistry and polymer properties will be given, followed by the examination of the various synthetic routes and processes that yield to the production of polymers. The recent advances in polymer synthesis and the design of new materials of improved properties and function will be reviewed. The last part of this section will explore the various approaches designed to improve the sustainability of polymer synthesis, in particular for the specific case of free radical polymerization, with an emphasis on the design of novel catalysts. The course will conclude by examining a variety of case studies. All the preceding topics find their way into the discussion of the key role of catalysts in the design of sustainable chemical processes, rationalizing the choices behind catalyst design.

CHEM3114
Metal Complexes: Medicine and Materials

Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures and one 4-hour practical per week. Prerequisites: CHEM/2401 or 2911 or 2915) and CHEM/(2402 or 2912 or 2916). Prohibitions: CHEM3914 Assessment: One 2-hour exam, written assignments, prac reports (100%)

Coordination compounds, with bonds between a central metal atom and surrounding ligands, play critical roles in biology, biochemistry and medicine, controlling the structure and function of many enzymes and their metabolism. They play similarly vital roles in many industrial processes and in the development of new materials with specifically designed properties. Building on the foundation of crystal field theory, this course offers a comprehensive treatment of the structures and properties of coordination compounds, with a qualitative molecular orbital description of metal-ligand bonds, and their spectroscopic, magnetic and dynamic effects. The exploitation of these properties in medicine and materials will be emphasized. Medical topics include descriptions of the essential and toxic elements of the Periodic Table, metal complexes as anti-bacterial, anti-inflammatory and anti-cancer drugs, and their use as tumour imaging and radiotherapeutic agents. Materials topics include metal-directed self assembly into unique structures, ligand design and control of the synthesis of nanoporous materials with new electronic and magnetic properties and applications in catalysis and molecular separations.

CHEM3914
Metal Complexes: Medic. & Mater. (Adv)

Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures, one 1-hour seminar and one 4-hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916).
Coordination compounds, with bonds between a central metal atom and surrounding ligands, play critical roles in biology, biochemistry and medicine, controlling the structure and function of many enzymes and their metabolism. They play similarly vital roles in many industrial processes and in the development of new materials with specifically designed properties. Building on the foundation of crystal field theory, this course offers a comprehensive treatment of the structures and properties of coordination compounds, with a qualitative molecular orbital description of metal-ligand bonds, and their spectroscopic, magnetic and dynamic effects. The exploitation of these properties in medicine and materials will be emphasized. Medical topics include descriptions of the essential and toxic elements of the Periodic Table, metal complexes as anti-bacterial, anti-inflammatory and anti-cancer drugs, and their use as tumour imaging and radiotherapeutic agents. Materials topics include metal directed self assembly into unique structures, ligand design and control of the synthesis of nanoscopic materials with new electronic and magnetic properties and applications in catalysis and molecular separations. CHEM3914 students attend the same lectures as CHEM3114 students, but attend an additional advanced seminar series comprising one lecture a week for 12 weeks.

CHEM3115
Synthetic Medicinal Chemistry
Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures and one 4-hour practical per week. Prerequisites: CHEM(2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916). Prohibitions: CHEM3915 Assessment: One 2-hour exam, written assignments, prac reports (100%)

The development of new pharmaceuticals fundamentally relies on the ability to design and synthesize new compounds. Synthesis is an enabling discipline for medicinal chemistry - without it, the development of new drugs cannot progress from design to implementation, and ultimately to a cure. This unit will tackle important factors in drug design, and will highlight the current arsenal of methods used in the discovery of new drugs, including rational drug design, high throughput screening and combinatorial chemistry. We will develop a logical approach to planning a synthesis of a particular target structure. The synthesis and chemistry of heterocycles, which comprise some 40% of all known organic compounds and are particularly common in pharmaceuticals, will be outlined. Examples will include important ring systems present in biological systems, such as pyrimidines and purines (DNA and RNA), imidazole and thiazole (amino acids and vitamins) and porphyrins (natural colouring substances and oxygen carrying component of blood). Throughout the course, the utility of synthesis in medicinal chemistry will be illustrated with case studies such as anti-influenza (Relenza), anaesthetic (benzocaine), anti-inflammatory (Vioxx), antihypertensive (pinacidil) and cholesterol-lowering (Lovastatin) drugs.

CHEM3915
Synthetic Medicinal Chemistry (Adv)
Credit points: 6 Session: Semester 2 Classes: Two 1 hour lectures, one 1 hour seminar and one 4 hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM(2402 or 2912 or 2916). Prohibitions: CHEM3115 Assessment: One 2 hour exam, written assignments, prac reports (100%)

The development of new pharmaceuticals fundamentally relies on the ability to design and synthesize new compounds. Synthesis is an enabling discipline for medicinal chemistry - without it, the development of new drugs cannot progress from design to implementation, and ultimately to a cure. This unit will tackle important factors in drug design, and will highlight the current arsenal of methods used in the discovery of new drugs, including rational drug design, high throughput screening and combinatorial chemistry. We will develop a logical approach to planning a synthesis of a particular target structure. The synthesis and chemistry of heterocycles, which comprise some 40% of all known organic compounds and are particularly common in pharmaceuticals, will be outlined. Examples will include important ring systems present in biological systems, such as pyrimidines and purines (DNA and RNA), imidazole and thiazole (amino acids and vitamins) and porphyrins (natural colouring substances and oxygen carrying component of blood). Throughout the course, the utility of synthesis in medicinal chemistry will be illustrated with case studies such as anti-influenza (Relenza), anaesthetic (benzocaine), anti-inflammatory (Vioxx), antihypertensive (pinacidil) and cholesterol-lowering (Lovastatin) drugs.
treatment of the science behind vision, flames, solar cells and photochemical smog.

CHEM3917
Mol. Spectroscopy & Quantum Theory (Adv)
Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures, one 1-hour seminar and one 4-hour practical per week. Prerequisites: WAM of 65 or greater and a Credit or better in: CHEM (2401 or 2911 or 2915) and CHEM (2402 or 2912 or 2916). Prohibitions: CHEM3117 Assessment: One 2-hour exam, written assignments, prac reports (100%)

This course will cover the fundamentals of molecular spectroscopy as a modern research tool and as a theoretical basis with which to understand everyday phenomena. This course is aimed at the student wishing a rigorous understanding of the fabric of nature -- electronic structure -- and the interaction between light and matter. The course teaches the quantum theory needed to understand spectroscopic phenomena (such as the absorption of light) at the empirical and deeper levels. A student completing this course will take with him/her an understanding of spectroscopy as both a phenomenon and a research tool. The course teaches application and theory, with descriptions of applied spectroscopic techniques. Alongside the coverage of modern spectroscopy, the course provides an accessible treatment of the science behind vision, flames, solar cells and photochemical smog. CHEM3917 students attend the same lectures as CHEM3117 students, but attend an additional advanced seminar series comprising one lecture a week for 12 weeks.

Civil Engineering
The School of Civil Engineering is part of the Faculty of Engineering and Information Technologies. In addition to providing professional training in this branch of engineering it offers units of study to students enrolled in the Faculty of Science majoring in Mathematics, Physics, Chemistry, Geology, Computer Science or Soil Science. The most relevant units of study are CIVL2201 - Structural Mechanics, CIVL2230 - Introduction to Structural Concepts and Design, CIVL2410 Soil Mechanics, and CIVL2611 Fluid Mechanics. Details regarding these units of study can be obtained from the Faculty of Engineering and Information Technologies Handbook. These units of study are intended first to demonstrate the application of scientific principles in an engineering context. The second intention is to introduce the application of this understanding to analysis and design in civil engineering. As well as the above units of study, Faculty of Science students are invited to enrol in other civil engineering units of study, provided they have the appropriate pre-requisites and assumed knowledge.

Computational Science
Coordinator: Dr Pulin Gong

Junior units of study
COSC1001
Computational Science in C
Credit points: 3 Session: Semester 2 Classes: One 2-hour practical per week. Prerequisites: UAI (or ATAR equivalent) of at least 90, or COSC1901, or a distinction or better in COSC1001, INFO1003 or INFO1903. Prohibitions: COSC1901 Assumed knowledge: HSC Mathematics Assessment: One assignment, practical work, including practical exams, theory exam (100%)

This unit of study focuses on scientific problem-solving using computers and is complementary to COSC1001. Students will learn how to solve problems arising in the natural sciences and mathematics using core features of the language C, with a choice of problems from various areas of science at each stage. No previous knowledge of programming is assumed.

COSC1002
Computational Science in C
Credit points: 3 Session: Semester 2 Classes: One 2-hour practical per week. Prerequisites: UAI (or ATAR equivalent) of at least 90, or COSC1901, or a distinction or better in COSC1001, INFO1903. Prohibitions: COSC1002 Assumed knowledge: HSC Mathematics Assessment: One assignment, practical work, including practical exams, theory exam (100%)

This unit of study focuses on scientific problem-solving using computers and is complementary to COSC1001. Students will learn how to solve problems arising in the natural sciences and mathematics using core features of the language C, with a choice of problems from various areas of science at each stage. No previous knowledge of programming is assumed.

Senior units of study
For a major in Computational Science, the minimum requirement is 24 credit points chosen from the core or elective senior units of study listed for this subject area, of which at least 12 credit points must be from the following core senior units of study: COSC3011 Scientific Computing; COSC3911 Scientific Computing (Advanced); MATH3076 Mathematical Computing*; MATH3976 Mathematical Computing (Advanced)*. For Senior elective units see Table 1.

Notes
* Refer to Mathematics listing in this chapter for descriptions of these units of study. Senior elective units of study for a major in Computational Science are listed in Table 1.

COSC3011
Scientific Computing
Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures and one 3-hour practical per week. Prerequisites: 12 credit points chosen from Junior Mathematics and Statistics, 12 credit points of Intermediate units in Science subject areas. Prohibitions: COSC3911, COSC3001, COSC3001, PHYS3301, PHYS3901 Assumed knowledge: Programming experience in MATLAB. Assessment: Assignments, lab, project work and written exam (100%)

This unit of study provides a senior-level treatment of scientific problem solving using computers. Students will understand and apply a wide range of numerical schemes for solving ordinary and partial differential equations. Linear algebra is used to provide detailed insight into stability analysis, relaxation methods, and implicit integration. A variety of scientific problems are considered, including planetary motion, population demographics, heat diffusion, traffic flow and quantum mechanics. All coding is performed with MATLAB, and basic programming experience is assumed.

Textbooks
**COSC3911**  
Scientific Computing (Advanced)  
**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures and one 3-hour practical per week.  
**Prerequisites:** 12 credit points from Junior Mathematics and Statistics, 12 credit points of Intermediate units in Science subject areas with a credit average.  
**Prohibitions:** COSC3011, COSC3001, COSC3901, PHYS3301, PHYS3901.  
**Assumed knowledge:** Programming experience in MATLAB.  
**Assessment:** Assignments, lab, project work and written exam (100%)  

This unit is the Advanced version of COSC3011. The subject matter is very similar, but more challenging problems will be covered.  

**Textbooks**  

**MATH3076**  
Mathematical Computing  
**Credit points:** 6  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures and one 1 hour laboratory per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics and one of MATH1001 or 1003 or 1901 or 1903 or 1906 or 1907.  
**Prohibitions:** MATH3976, MATH3016, MATH3916  
**Assessment:** One 2 hour exam, assignments, quizzes (100%)  

This unit of study provides an introduction to Fortran 95 programming and numerical methods. Topics covered include computer arithmetic and computational errors, systems of linear equations, interpolation and approximation, solution of nonlinear equations, quadrature, initial value problems for ordinary differential equations and boundary value problems.  

**MATH3976**  
Mathematical Computing (Advanced)  
**Credit points:** 6  
**Teacher/Coordinator:** Dr J Ivers  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics and one of MATH1903 or 1907 or in MATH1003  
**Prohibitions:** MATH3076, MATH3016, MATH3916  
**Assessment:** One 2 hour exam, assignments, quizzes (100%)  

See entry for MATH3076 Mathematical Computing.  

**ENVI2911**  
**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures/practical per week, 1x2 hour field trip during the semester.  
**Prerequisites:** Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH).  
**Prohibitions:** 12 credit points of Junior Chemistry. These requirements may be varied and students with lower averages should consult the Unit Executive Officer.  
**Assessment:** ENVI2111. Assessment: 1x2 hr exam, 1 field report, 1 oral presentation (100%)  

Qualified students will participate in alternative components of ENVI2111, Conservation Biology, including an independent research project.  

**Textbooks**  

**GEOS2121**  
Environmental and Resource Management  
**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures per week, 6 one hour tutorials and 2 six hour practicals, one fieldtrip.  
**Prerequisites:** 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002.  
**Prohibitions:** GEOS2421, GEOL2202, GEOS2921  
**Assessment:** One 2 hour exam, two tutorial/practical class papers, one fieldtrip report, one lab report (100%)  

This unit of study explores cultural constructions of nature and resources, the evolution of environmental thought and the debates about sustainable development and climate change. It integrates environmental, economic, cultural and social considerations in respect to natural resource management in Australia and across Southeast Asia. The environmental considerations extend to an understanding of climatic responses over the long term that provide constraints on resource management today, and how these responses are projected to vary in future. These environmental constraints include air, land, vegetation and water resources and are examined in relation to current issues driving contemporary debate on the politics of climate change that must now be considered in environmental management and competition for resources. The principles are brought to life through a fieldtrip to the Hunter Valley to look at geographical issues pertaining to mines, wines and the thoroughbred breeding industries in this region. The unit of study enables students to learn about the social, cultural and environmental considerations that must be taken into account when developing and implementing environmental and resource management policies in climate-change society.  

**GEOS2921**  
Environmental & Resource Management Adv  
**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures, one 1 hour tutorial per week and one fieldtrip.  
**Prerequisites:** 24 credit points of Junior units of study, including a distinction in 6 credit points of Junior Geoscience or in ECOP1001 or ECOP1002. This requirement may be varied and students should consult the unit of study coordinator.  
**Assessment:** GEOS2421, GEOL2202, GEOS2921  
**Assessment:** One 2 hour exam, one media report, one tutorial / practical class paper, one written report (100%)  

This topic examines the role of conservation biology and applied ecology in environmental science, examining pattern and process in natural systems and evaluating how these are being affected by pervasive anthropogenic impacts. Focusing on the conservation, assessment of impacts and the restoration of natural systems, we consider the range of ecological issues environmental scientists must address. We examine the extent of environmental problems; derive explanations of why and how they are occurring and address management options for resolving them. We will derive general principles for these by addressing case studies, chosen from Australian examples when possible. The aim of this unit is for you to understand the processes that go into solving environmental problems from an ecological perspective and how to identify management options.
This unit of study covers topics in environmental law and ethics. The environmental law component provides an overview of laws in Australia pertaining to environmental matters and looks at a number of environmental issues at the various levels of analysis, policy making, implementation of policy, enforcement, and dispute resolution. It also provides a broad background to the political and economical issues as they relate to the legal issues involved. It also examines international environmental law, particularly examining how these influence and affect our local policies. The ethics component helps students develop thoughtful and informed positions on issues in environmental ethics using arguments derived from traditional ethics as well as environmentally specific theories. Ethical conflicts are often inevitable and difficult to resolve but using the resources of philosophical ethics and regular reference to case studies, students can learn to recognize the values and considerations at stake in such conflicts, acknowledge differing viewpoints and defend their own well considered positions.

**ENVI3112 Environmental Assessment**

**Credit points:** 6  
**Teacher/Coordinator:** Dr John Dee  
**Session:** Semester 2  
**Classes:** Two 2 hour lectures per week  
**Prerequisites:** 12 credit points of Intermediate Science or Agriculture units  
**Prohibitions:** ENVI3002, ENVI3004  
**Assumed knowledge:** Intermediate Environmental Science.  
**Assessment:** Essays, tutorial papers, report (100%)  

This unit of study is composed of two components: environmental impact assessment and risk assessment. The former is generally concerned with issues related to environmental impact assessment and builds toward the process of producing an EIS/EIA. More specifically it seeks to establish a critical understanding of the theory and practice of environmental impact studies/statements (EIS) and environmental impact assessment processes (EIA) from both the positive (scientific) and normative (value) perspectives. Emphasis is placed on gaining skills in writing and producing an assessment report, which contains logically ordered and tightly structured argumentation that can stand rigorous scrutiny by political processes, the judiciary, the public and the media. The risk assessment component considers a more chemical approach to the assessment of risk and issues of safety with respect to chemicals, ecotoxicology and the environment. It draws on current environmental management practice to investigate what constitutes risk and to demonstrate how risk may be managed.

**ENVI3114 Energy and the Environment**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Chris Dey  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures and one 1 hour tutorial per week  
**Prerequisites:** 12 credit points of Intermediate Science or Agriculture units  
**Prohibitions:** ENVI3001, PHYS3600  
**Assumed knowledge:** Junior Physics or Intermediate Environmental Science.  
**Assessment:** Essays, tutorial papers and presentation, and short test (100%)  

This unit covers the following aspects of energy and the environment: energy resources and use; electrical power generation including alternate methods such as wind turbines; the environmental impact of energy use and power generation including the enhanced greenhouse effect; transportation and pollution; energy management in buildings; solar thermal energy, photovoltaics, and nuclear energy; and, socio-economic and political issues related to energy use and power generation.

**GEOS3513 Regional Development and Environment**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Bill Pritchard, Dr Michael Harris  
**Session:** Semester 1  
**Classes:** Two 2 hour lectures per week and 2 hours of tutorials/practicals per week  
**Prerequisites:** 24 credit points of intermediate and/or senior units of study including 6 credit points of Intermediate units of study in Geography.  
**Prohibitions:** ENVI3113, GEOS3511, GEOS3911, GEOS3913  
**Assessment:** In-class tests, one 1500 word essay, one GIS report (100%)  

This unit of study acquaints students with debates and tools associated with regional development and the economic analysis of environmental issues. It provides a useful preparation for professional employment in the field of regional development, environmental policy and management, and is relevant for students interested in economic and social issues in regional Australia. Co-taught by a geographer and an economist, the unit addresses four key areas of relevance: (i) regional development theory and practice; (ii) the economics of efficiently utilising and managing the environment; (iii) debates on regional development in Australia (including consideration of the farm sector, Indigenous communities and environmental sustainability), and (iv) the use of GIS to analyse population census data. The unit requires no prior knowledge of economic theory or GIS software.

**GEOS3913 Regional Development & Environment (Adv)**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Bill Pritchard  
**Session:** Semester 1  
**Classes:** Two 2 hours of lectures per week and 2 hours of tutorials/practicals per week  
**Prerequisites:** 24 credit points of intermediate and/or senior units of study including 6 credit points of intermediate units of study in Geography with a grade of Credit or better  
**Prohibitions:** ENVI3113, GEOS3511, GEOS3913  
**Assessment:** In-class tests, essay, report (100%)  

This unit of study is a more advanced version of GEOS3513. It includes more challenging assessment tasks.

**Financial Mathematics and Statistics**

This is an interdisciplinary major offered in the Faculty of Science consisting of several core units and a number of elective units from mathematics, statistics and information technologies. The program is designed to meet the need for high level quantitative and modelling skills in the banking, insurance, stockbroking and finance industries without constraining students to a full major in mathematics or statistics. Graduates with specifically strong mathematical and statistics backgrounds are in very high demand. The core units Optimisation and Financial Mathematics (MATH2070/2970) and Financial Mathematics (MATH3075/3975) are the backbone of the program and introduce the student to important financial concepts within a mathematical and statistical framework. The core mathematics and statistics units provide the technical base that is required by a quantitative analyst, while the elective units offer the student increased flexibility and additional opportunities to develop related skills. Students completing the program at the Advanced Level may continue into Fourth Year Honours where a number of further Financial Mathematics and Statistics units are on offer. It is envisaged that students completing the Honours program will not only be highly trained in quantitative finance, but will also be well prepared for active research in the field. Students should refer to Table 1 for an enrolment guide and to entries under the contributing Schools for unit of study descriptions.

**Geosciences**

The School of Geosciences offers units of study in the discipline areas of Geography, Geology and Geophysics. Students may take a major in either of these disciplines, and many Geoscience units are key components of the Environmental Studies, marine Geoscience and Marine Science majors. The junior units GEOS1001, GEOS1002 and GEOS1003 provide a comprehensive introduction to both Geography and Geology and Geophysics. A major can be included within many undergraduate degree programs, including the Bachelor of Science, Arts, Liberal Studies, Liberal Arts and Sciences, Arts and Sciences, Science and Technology, Economics and Social Sciences.
Geography

Geography is the study of earth as the home of people. As the need to find solutions to issues of environmental sustainability, population change and globalisation have become more challenging, the skills and knowledge of geographers have come to the forefront. Students of Geography are interested in their world, and are taught to think critically about the relationships between people, environments and places. The knowledge and skills gained from studying Geography at the University of Sydney provide a launch pad to a professional career in an array of fields including environmental management, planning, overseas development and consulting research. Our Geography program has strong linkages with various national and international organisations that provide pathways for further studies at Honours and post-graduate levels, and into the work force. It differs from High School Geography in that it provides more opportunities for independent learning, introduces new techniques and skills, offers flexibility for you to follow your interests and is tailored to real world events and issues.

Geology and Geophysics

Geology and Geophysics provides a unifying context for understanding the surface and internal planetary processes that determine how the earth functions as a system. Global climate change, an increasing population and shrinking mineral and energy resources have heightened our sense of dependence on our earth’s complex natural systems and increased our need to understand the dynamic structural relationships between the continents and oceans which provide the physical habitat for the earth’s various ecosystems. Geology and Geophysics provides students with an understanding of change on Earth, its origin, plate tectonics, surface processes, evolution of life and geologic time. Intermediate units highlight the role of the earth system in all natural phenomena, including those of concern to humans such as geo-biodiversity, salinity, seismicity, volcanic hazards, climate and sea level change. Senior units of study cover methods of field data collection and provide access to cutting edge computing and data resources used for turning such observations into knowledge. Students will acquire the skills necessary for employment in all areas of sustainable exploration and management of our natural, mineral and energy resources.

Geosciences Advice

As a Geoscience student at the University of Sydney, you will participate in an array of learning environments that complement traditional lecture and tutorial classes; for example, studies can include field trips to destinations in Australia and overseas. Students who wish to obtain advice concerning the units of study described below should approach School advisers during the enrolment week or the unit coordinators during semester. Further information is available at sydney.edu.au/science/geosciences, as well as in the Geosciences’ student handbook available from the School’s administrative office (Room 348, Madsen Building).

Website

The School of Geosciences website is: sydney.edu.au/science/geosciences.

Location

The School of Geosciences is located in the Madsen Building (F09). All student enquiries can be made at the Madsen Building, Room 348 - 9 am to 4.30pm, Mon to Fri.

Further information

Further information is available at sydney.edu.au/science/geosciences, as well as in the Geosciences’ student handbook available from the School’s administrative office.

Geosciences junior units of study

Students are encouraged to commence their studies of Geography, Geology and Geophysics, Environmental Studies or Marine Science by enrolling in GEOS1001 (Earth, Environment and Society) (February semester). This unit of study provides an overarching introduction to issues and themes taught across the School of Geosciences. In the second (July) semester, students intending to major in Geography should enroll in GEOS1002 (Introductory Geography); students intending to major in Geology and Geophysics or Marine Geoscience should enrol in GEOS1003 (Introduction to Geology). Entry into any of these units of study does not require any prior knowledge.

GEOS1001

Earth, Environment and Society

Credit points: 6 Teacher/Coordinator: Dr Tom Hubble, Dr Jody Webster, A/Prof Bill Pritchard Session: Semester 1 Classes: Two 1 hour lectures and one 2 hour practical per week. Prohibitions: GEOS1901, GEOG1001, GEOS1002, GEOLE1001, GEOLE1002, GEOLE1902 Assessment: One 2 hour exam, 2000 word essay, field and prac reports (100%)

This is the gateway unit of study for Human Geography, Physical Geography and Geology. Its objective is to introduce the big questions relating to the origins and current state of the planet: climate change, environment, landscape formation, and the growth of the human population. During the semester you will be introduced to knowledge, theories and debates about how the world’s physical and human systems operate. The first module investigates the system of global environmental change, specifically addressing climate variability and human impacts on the natural environment. The second module presents Earth as an evolving and dynamic planet, investigating how changes take place, the rate at which they occur and how they have the potential to dramatically affect the way we live. Finally, the third module, focuses on human-induced challenges to Earth’s future. This part of the unit critically analyses the relationships between people and their environments, with central consideration to debates on population change and resource use.

GEOS1002

Introductory Geography

Credit points: 6 Teacher/Coordinator: Dr Kurt Iverson Session: Semester 2 Classes: Two 1 hour lectures and one 2 hour practical per week. Prohibitions: GEOS1902, GEOG1001, GEOS1002 Assessment: One 2 hour exam, one 1000 word essay, two online quizzes, one practical report (100%)

This Unit of Study provides an introductory geographical analysis of the ways in which people and physical processes/features are produced, behave and interact. The Unit focuses on the physical and human processes that generate spatial variation and difference, as well as tracing the interactions between these processes. It includes an investigation of Earth’s surface features, exploring the distribution of different landforms across Earth and interpreting their evolutionary histories. Several landscapes will be examined, such as those formed by rivers, wind, and glaciers. But physical landscapes evolve under the influence of and affect human operations. Therefore, the Unit of Study will also consider the political, economic, cultural and urban geographies that shape contemporary global society. Each of these themes will be discussed with reference to key examples (such as Hurricane Katrina, the Kashmir Earthquake, the conflict in Darfur, and sea-level rise in the Pacific), in order to consider the ways in which the various processes (both physical and human) interact. The Unit of Study will also include a short field trip to localities surrounding the university to observe processes of spatial change and conflict. The Unit of Study is designed to attract and interest students who wish to pursue geography as a major within their undergraduate degree, but also has relevance to students who wish to consider the way geographers understand the contemporary world.

GEOS1003

Introduction to Geology

Credit points: 6 Teacher/Coordinator: Dr Tom Hubble, Prof Geoff Clarke Session: Semester 2, Summer Late Classes: Three 1 hour lectures and one 1 hour practical per week. Prohibitions: GEOS1903, GEOLE1002, GEOLE1902, GEOLE1501 Assessment: One 2 hour exam, practical reports, field report (100%)

The aim of this unit of study is to examine the chemical and physical processes involved in mineral formation, the interior of the Earth, surface features, sedimentary environments, volcanoes, and metamorphism. Lectures and laboratory sessions on mountain building
processes and the formation of mineral deposits will lead to an understanding of the forces controlling the geology of our planet. Processes such as weathering, erosion and nature of sedimentary environments are related to the origin of the Australian landscape. In addition to laboratory classes there is a one-day excursion to the western Blue Mountains and Lithgow to examine geological objects in their setting.

Textbooks

GEOL1501
Engineering Geology 1
Credit points: 6
Teacher/Coordinator: Dr Tom Hubble
Session: Semester 2
Classes: 39 hours lectures, 26 hours laboratory. Field excursions in the Sydney region, as appropriate. Prohibitions: GEOL1002, GEOL1902, GEOS1003, GEOS1903 Assumed knowledge: No previous knowledge of Geology assumed Assessment: Practical laboratory work, assignment, and a combined theory and practical exam (100%)

Course objectives: To introduce basic geology and the principles of site investigation to civil engineering students.

Expected outcomes: Students should develop an appreciation of geologic processes as they influence civil engineering works, acquire knowledge of the most important rocks and minerals and be able to identify them, and interpret geological maps with an emphasis on making construction decisions.

Syllabus summary: Geological concepts relevant to civil engineering and the building environment. Introduction to minerals; igneous, sedimentary and metamorphic rocks, their occurrence, formation and significance. General introduction to physical geology and geomorphology, structural geology, plate tectonics, and hydrogeology. Associated laboratory work on minerals, rocks and mapping.

Textbooks
Approved readings will be provided via WebCT

GEOS1901
Earth, Environment and Society Advanced
Credit points: 6
Teacher/Coordinator: Dr Tom Hubble, Dr Jody Webster, A/Prof Bill Pritchard
Session: Semester 1
Classes: Two 1 hour lectures and one 2 hour practical per week. Prerequisites: Departmental permission is required for enrolment. This requirement may be varied and students should consult the unit of study coordinator.
Assessment: GEOS1001, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902 Assessment: One 2 hour exam, 2000 word essay, field and prac reports (100%)

Note: Department permission required for enrolment.

Advanced students will complete the same core lecture material as for GEOS1001, but will be required to carry out more challenging practical assignments.

GEOS1902
Introductory Geography (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Kurt Iverson
Session: Semester 2
Classes: Two 1 hour lectures and one 2 hour practica per week. Prerequisites: Departmental permission is required for enrolment. A UAI (orATAR equivalent) above 93 is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.
Assessment: GEOS1002, GEOG1001, GEOG1002 Assessment: One 2 hour exam, one 1000 word essay, two online quizzes, one practical report (100%)

Note: Department permission required for enrolment.

Advanced students will complete the same core lecture material as for GEOS1002, but will be required to carry out more challenging practical assignments.

GEOS1903
Introduction to Geology (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Tom Hubble, Prof Geoff Clarke
Session: Semester 2
Classes: Three 1 hour lectures and one 1 hour practical per week. Prerequisites: Departmental permission is required for enrolment. A UAI (or ATAR equivalent) above 93 is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.
Assessment: GEOL1002, GEOL1902, GEOS1003 Assessment: One 2 hour exam, practical reports, field report (100%)

Note: Department permission required for enrolment.

This unit has the same objectives as GEOS1003 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their ATAR or UAI and/or their university performance at the time of enrolment. Students that elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. This unit may be taken as part of the BSc (Advanced).

Geosciences intermediate units of study
Geoscience intermediate units of study are listed below. Students interested in different areas of the Geoscience disciplines might select intermediate units of study as follows: physical and environmental Geography: GEOS2113 (Feb semester); GEOS2121 and/or GEOG2321 (July semester), human and environmental Geography: GEOS2112 (Feb semester); GEOS2122 and/or GEOS2111 (July semester), Geology and Geophysics: GEOL2112 and/or GEOS2114 (Feb semester); GEOS2124 and/or GEOS2121 (July semester).

Regardless, subject to the prerequisites for each individual unit of study, students may vary their enrolment across these streams. The School of Geosciences encourages students to construct a sequential ordering of units that best meets their interests and aspirations.

GEOG2321
Fluvial and Groundwater Geomorphology
Credit points: 6
Teacher/Coordinator: Dr Alison Gates, Dr Willem Verwoot
Session: Semester 2
Classes: Two 1 hour lectures and one 2 hour practical per week. Prerequisites: 24 credit points of Junior units of study including 6 credit points of Junior Geoscience. Students in the BEEnSys should have ENSY1001, 12 credit points of Chemistry, 6 credit points of Biogeology, BGCN1003 or ENVS2001. Prohibitions: GEOG2002, GEOG2502, GEOG2503, MARS2002, MARS2006 Assessment: One 2 hr exam, two quizzes, one field report, practical exercises (100%)

This unit of study provides an introduction to the fundamentals of fluvial geomorphology (the study of surface water as an agent of landscape change) and groundwater hydrology. The fluvial geomorphology section of the unit will describe the movement of water in stream channels and investigate the landscape change associated with that movement. Topics to be covered will include open channel flow hydraulics, sediment transport processes and stream channel morphology. Practical work will focus on the collection and analysis of field data. The quantity and quality of the groundwater resources are closely linked to geology and fluvial geomorphology. The groundwater section of this unit is based around four common groundwater issues: contamination, extraction, dryland salinity and groundwater-surface water interaction. In the practical component, common groundwater computer models such as FLOWTUBE and MODFLOW will be used to further explore these problems.

Textbooks

GEOS2112
Economic Geography of Global Development
Credit points: 6
Teacher/Coordinator: A/Prof Bill Pritchard, Prof Philip Hirsch
Session: Semester 1
Classes: One 2 hour exam, two quizzes, one field report, practical exercises (100%)

In this unit of study, students will be introduced to the sub-discipline of economic geography by way of debates on the spatial character of global development. We focus on questions relating to who are the winners and losers from contemporary patterns of global economic change. This includes the analysis of relevant conceptual approaches to these questions (including comparative advantage, global commodity chain theory, regionalism, economic governance etc), plus 'hands-on' examination of the key institutions (such as the WTO and ADB) driving these changes. In general, issues are tailored to themes being played out in Asia-Pacific countries. Students are expected to participate in a variety of practical class exercises throughout the
semester, which will include presenting the fruits of independent research activities. This unit provides an especially relevant feeder-unit into GEO3303/3054, the Asia-Pacific Field School.

**GEOS2114 Volcanoes, Hot Rocks and Minerals**

Credit points: 6  
Teacher/Coordinator: Dr Derek Wyman, Dr Patrice Rey  
Session: Semester 1  
Classes: Two 1 hour lectures and one 3 hour practical per week.  
Prerequisites: One of (GEOG1001, GEO1001, GEO1002, GEO1103, GEO11003, GEO1903, ENV1102, GEO1902, GEO1501) and 24 credit points of Junior Science units of study.  
Prohibitions: GEO2111, GEO2911, GEO2914  
Assessment: One 2 hour exam, practical reports, field trip report, group presentation (100%)

This unit of study relates the plate tectonics of subduction zones to a) volcanoes and their hazards; b) geological processes in the deep crust; and c) the formation of precious metal and gemstone ores around the Pacific Rim. A problem solving approach is used to develop the skills required to understand the history of individual volcanoes and predict their future activity and hazards. The unit includes a two to three day field trip to study an extinct volcano in NSW. Practical work includes independent study of igneous systems, rocks and minerals employing both microscope-based techniques and computer modeling. The unit provides relevant knowledge for GEO3006/3906 - Mineral Deposits and Spatial Data Analysis.

**GEOS2115 Oceans, Coasts and Climate Change**

Credit points: 6  
Teacher/Coordinator: Dr Maria Seton, A/Prof Peter Cowell, Dr Ana Vila Concejo, Dr Jody Webster  
Session: Semester 1  
Classes: 26 one hour lectures, 6 one hour workshops, 1 four hour field work, 6 two hour practical classes.  
Prerequisites: 48 credit points from Junior Units of Study  
Prohibitions: GEO2915, MARS2006  
Assumed knowledge: At least one of (GEO1001, GEO1001, GEO1002, GEO1003, GEO1903, ENV1102, GEO1902, GEO1501)  
Assessment: Web-based on-line reports (30%), One lab report (20%), One 2 hour exam (50%)

This unit of study introduces core concepts about how the formation of ocean basins and their influence on climate govern the development of coasts and continental margins, and related environmental processes responsible for physical hazards. These concepts provide a framework for understanding the geographic variation of coasts, continental shelves and sediment accumulations in the deep ocean. Ocean-basin evolution is explained in terms of movements within the Earth's interior and how these movements determine the geometry of ocean basins, and their Alpine counterparts, which interact with the global circulation of the ocean and atmosphere. Affects of this interaction on energy regimes and hydrology are described in accounting for regional controls that govern supply and dispersal of sediments on continental margins and in ocean basins. These controls also govern environmental conditions determining development of coral reefs and other ecosystems that play a key role in marine sedimentation. The Unit of Study systematically outlines how these factors have played out with climate change to produce by gradual change the coasts we see today, as well as the less familiar deposits hidden beneath the sea and coastal lands. These gradual changes are compared to the sudden effects of more catastrophic geophysical events. The Unit thereby outlines how knowledge of responses to climate change in the past allow us to predict environmental responses to accelerated climate change occurring now and in the future due to the industrial greenhouse effect, but places these responses into perspective against natural hazards that already occur. Overall therefore, the Unit aims to provide familiarity with fundamental phenomena central to the study of marine geoscience and environmental impacts, introduced through process-oriented explanations. The Unit of Study is structure around problem-based project work, for which lectures provide the theoretical background.

**Textbooks**  
On line reading material provided via Fisher Library

**GEOS2121 Environmental and Resource Management**

Credit points: 6  
Teacher/Coordinator: Dr Dan Penny, A/Prof Phil McManus  
Session: Semester 2  
Classes: Two 1 hour lectures per week, 6 one hour tutorials and 6 two hour practical, one fieldtrip  
Prerequisites: 24 credit points of junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002  
Prohibitions: GEO2924, GEOL2123, GEOL2124  
Assessment: One 2 hour exam, two tutorial/practical class papers, one fieldtrip report, one lab report (100%)

This unit of study explores cultural constructions of nature and resources, the evolution of environmental thought and the debates about sustainable development and climate change. It integrates environmental, economic, cultural and social considerations in respect to natural resource management in Australia and across Southeast Asia. The environmental considerations extend to an understanding of climatic responses over the long term that provide constraints on resource management today, and how these responses are projected to vary in future. These environmental constraints include air, land, vegetation and water resources and are examined in relation to current issues driving contemporary debate on the politics of climate change that must now be considered in environmental management and competition for resources. The principles are brought to life through a fieldtrip to the Hunter Valley to look at geographical issues pertaining to mines, wines and the thoroughbred breeding industries in this region. The unit of study enables students to learn about the social, cultural and environmental considerations that must be taken into account when developing and implementing environmental and resource management policies in climate-change society.

**GEOS2122 Urban Geography**

Credit points: 6  
Teacher/Coordinator: Dr Kurt Iveson  
Session: Semester 2  
Classes: Two 1 hour lecture and one 1 hour tutorial per week.  
Prerequisites: 24 credit points of Junior units of study, including 6 credit points of Junior Geoscience or ECOP1001 or ECOP1002  
Prohibitions: GEO2922, GEOS2921  
Assessment: One 90 minute exam, one in class test, one 2000 word essay, tutorial papers (100%)

By their very nature, cities are intense assemblages of different people doing all sorts of different things. For this reason, urban geographies are highly dynamic. Urban inhabitants engaged in different activities use urban space in different ways, and in the process they continually remake their cities. Inevitably, different uses and users of urban spaces sometimes come into conflict with each other and with the urban authorities who try to shape and regulate cities. This Unit of Study aims to understand some of these dynamic urban geographies, primarily (but not exclusively) in western cities. We will do this by thinking critically about urban places and practices that we often take for granted. As we will see, we can learn a lot about processes of urban change by considering apparently 'everyday' things like going to the shopping mall, eating out, driving, skateboarding, using mobile phones and computers, policing, participating in a protest or a religious ceremony - even hopping in a lift!

**GEOS2124 Fossils and Tectonics**

Credit points: 6  
Teacher/Coordinator: Dr Adriana Dutkiewicz (coordinator), A/Prof Patrice Rey  
Session: Semester 2  
Classes: Two 1 hour lectures plus one 2 hour practical each week.  
Prerequisites: 24 credit points of Junior units of study, including GEO51003 or GEO51903 or GEO1002 or GEO1502 or GEO1501  
Prohibitions: GEOS2924, GEOL2123, GEOL2124  
Assessment: One 2 hour exam, practical reports, field report (100%)

The unit aims to convey how fossils, stratigraphic and structural data are used together to determine ages and environments and the deformation history of rock layers. It covers an introduction to historical geology and the evolution of the major fossils groups. Methods of stratigraphic age determination include litho-, bio-, chemo-, magneto-stratigraphy, as well as radiometric geochronology and the stratigraphic characteristics of the main geological time intervals. Structural methods are focused on brittle deformation in the upper crust and sediments. Students will gain familiarity with the most important fossil groups and how to identify them, and with the most important types of faults and folds. The formation of fossil fuels such as coal, oil and gas will also be covered in an earth history and resource exploration context. The simultaneous use of fossils, stratigraphy and structure to unravel the
new perspectives on metropolitan change. It will examine how a range of everyday practices use and shape urban space - including shopping, eating, moving around, protesting, playing sport, having sex, religious observance, and hanging out. We’ll also consider the role of technology in these activities, thinking about how people relate to things like cars, elevators, mobile phones and networked sensors in the context of the everyday life in cities. In considering these various practices, we will investigate how different people perceive space and construct urban space, primarily in Western contexts. We will also think critically about the regulation of urban space, and consider the efforts of urban authorities to manage conflicts between different groups and activities in the city.

GEOS2924
Fossils and Tectonics (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Adriana Dutkiewicz (co-ordinator), A/Prof Patrice Rey
Session: Semester 2
Classes: Two 1 hour lectures plus one 2 hour practical per week.
Prerequisites: Distinction in GEOS1003 or Distinction average in 12 credit points of Junior Geoscience units (Geoscience is the disciplines of Geography, Geology and Geophysics) Prohibitions: GEOS2124, GEOL2123, GEOL2124 Assessment: One 2 hour exam, practical reports, field report (100%)

This unit has the same objectives as GEOS2124 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance to date. Students that elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. This unit may be taken as part of the BSc (Advanced).

Textbooks
Class notes will be available for purchase from The University Copy Centre

Geosciences senior units of study
Geosciences Senior units of study provide specialist themes or topics relevant to ongoing studies or professions. Students may select from any of the units listed below.

Geography Major
The requirements for a Major in Geography are defined in Table 1. Students are required to complete 24 credit points from Senior units of study in Geography that must include either GEOG3513/3913 OR GEOS3053/3953 OR GEOG3521/3921

Geology and Geophysics Major
The requirements for a major in Geology and Geophysics are defined in Table 1. Students are required to take two compulsory units, GEOS3101/3801 and the field studies unit GEOS3008/3908, as well as two of GEOS3102/3902, GEOS3103/3903, GEOS3104/3804. These units provide students with a foundation training that prepares them for further study in an Honours or postgraduate coursework program as well as enabling them to enter the main professional fields of the discipline, eg. Resource and Energy Exploration, Engineering Geology, and Environmental Geology.

GEOS3008
Field Geology and Geophysics
Credit points: 6
Teacher/Coordinator: Prof Geoffrey Clarke
Session: Semester 2
Classes: Two 1 hour lectures plus one 2 hour tutorial per week.
Prerequisites: Distinction average in 12 credit points of Junior Geoscience units (Geoscience is the disciplines of Geography, Geology and Geophysics) Prohibitions: GEOL3103, GEOS3908 Assessment: The field work will be assessed by written reports (up to 10 pages in total), field exercises and practical tests (100%)

This unit is considered an essential component all Geology and Geophysics majors. All students will undertake a range of exercises, but concentrate on aspects that emphasise their chosen major: (1) field mapping and the analysis of geological objects in the field, in weakly to complexly deformed sedimentary and volcanic sequences; (2) field investigations of mineral deposits and their relationships to host rocks; and (3) the practical application of geophysical methods in field mapping. The field course complements other subject areas in Geology & Geophysics and will provide students experience in the field identification of rocks and minerals, regional geology, stratigraphy, structure and rock relationships. Students will be required to pay the
cost of hostel-style accommodation during field work, which may involve camping.

**GEOS3008**  
**Field Geology and Geophysics (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** Prof Geoffrey Clarke  
**Session:** Semester 2a  
**Classes:** 14 days of fieldwork.  
**Prerequisites:** GEOS2124 or GEOS2924 with a mark of 65% or greater  
**Prohibitions:** GEOS3008  
**Assessment:** Written reports and field exercises (100%)  
**Note:** Department permission required for enrolment.

This unit has the same objectives as GEOS3008 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week prior to the field camp which is usually in the break between semester 1 and 2. This unit of study may be taken as part of the BSc (Advanced).

**GEOS3009**  
**Coastal Environments and Processes**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Ana Vila-Concejo, Dr Jody Webster  
**Session:** Semester 1  
**Classes:** Two 1 hour lectures and one 2 hour practical per week; weekend excursion.  
**Prerequisites:** (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))  
**Prohibitions:** MARS3009, MARS3003, MARS3105  
**Assessment:** One 2 hour exam, two 1500 word reports (100%)  
**Note:** * Geoscience is the disciplines of Geography, Geology and Geophysics.

The aim of this course is to introduce students to a variety of Coastal Environments and the major physical and chemical processes which control the morphodynamic evolution of these systems. The course offers a unique opportunity of learning the full spectrum of marine sedimentary environments from siliciclastic, temperate, highly urbanised and impacted estuarine ecosystems to carbonate, tropical, pristine and undeveloped/protected coastal and continental margin environments. The course includes field work at two of the Universities research stations, i.e. at Chowder Bay, Port Jackson and One Tree Island on the Great Barrier Reef (GBR). The two parts of the course comprise physical and chemical processes in estuarine and carbonate-dominated coastal and continental margin environments. The first part of the course covers basic morphodynamics and physical processes in estuarine environments and focuses on methods of assessing the magnitude of human impact on these valuable and sensitive ecosystems and judging the risks of sedimentary contaminants on benthic animals. A major part of this section is a project aimed at assessing the environmental status of a major embayment of the Sydney estuary.

The second part of the course covers the basic morphodynamics and processes impacting carbonate-dominated coastal and continental margin environments. The focus is on carbonate reefal and margin systems and their geologic and biologic responses to past, present and future environmental changes. These systems will be also be studied in the field at The University of Sydney One Tree Island Research Station and on Heron Island in the GBR. This fieldtrip is not compulsory but is strongly recommended as it will expose students first hand to a pristine, world class coral reef system. Students who are unable participate in the GBR field trip will be given an alternative assignment.

**Textbooks**  
Recommended:  
Course notes will be available from the Photocopy Centre.

**GEOS3009**  
**Coastal Environments and Processes (Adv)**

**Credit points:** 6  
**Teacher/Coordinator:** A Prof Gavin Birch, Dr Ana Vila Concept  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures, two 3 hour practicals per week.  
**Prerequisites:** Distinction average in (6 credit points of Intermediate Geoscience* units) and (6 further credit points of Intermediate Geosciences or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or (MARS2005 or MARS2905) and (MARS2006 or MARS2906))  
**Prohibitions:** GEOS3009, MARS3003, MARS3105  
**Assessment:** One 2 hour exam, two 1500 word reports (100%)  
**Note:** A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.

Advanced students will complete the same core lecture material as for GEOS3009 but will carry out more challenging projects, practicals, assignments and tutorials.

**GEOS3014**  
**GIS in Coastal Management**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Eleanor Bruce, Dr Ana Vila Concept  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures and one 3 hour practical per week.  
**Prerequisites:** MARS(2005 or 2905) and MARS(2006 or 2906), or 12 credit points of Intermediate Geoscience* units, or (GEOS(2115 or 2915) and BIOL(2018 or 2918))  
**Prohibitions:** GEOS3914, MARS3104  
**Assessment:** One 2 hour exam, two project reports, quizzes (100%)  
**Note:** * Geoscience is the disciplines of Geography, Geology and Geophysics.

Coastal Management is about how scientific knowledge is used to support policy formulation and planning decisions in coastal environments. The course links coastal science to policy and practice in management of estuaries, beaches and the coastal ocean. The principles are exemplified through specific issues, such as coastal erosion, pollution, and impacts of climate change. These issues are dealt with in terms of how things work in nature, and how the issues are handled through administrative mechanisms. These mechanisms involve planning strategies like Marine Protected Areas and setback limits on civil development in the coastal zone. The coastal environments and processes that are more relevant to coastal management including: rocky coasts; beaches, barriers and dunes; and coral reefs will also be introduced. At a practical level, the link between science and coastal management is given substance through development and use of decision-support models. These models involve geocomputing methods that entail application of simulation models, remotely sensed information, and Geographic Information Systems (GIS). The course therefore includes both principles and experience in use of these methods to address coastal-management issues. (It thus also involves extensive use of computers.) Although the focus is on the coast, the principles and methods have broader relevance to environmental management in particular, and to problem-solving in general. That is, the course has vocational relevance in examining how science can be exploited to the benefit of society and nature conservation.

**Textbooks**  

**GEOS3014**  
**GIS in Coastal Management (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Eleanor Bruce, Dr Ana Vila Concept  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures and one 3 hour practical per week comprising one 1 hour practical demonstration and one 2 hour practical.  
**Prerequisites:** Distinction average in 12 credit points of Intermediate geography or geology units or GEOS (2115 or 2915) and BIOL (2018 or 2918). Department permission required for enrolment.  
**Prohibitions:** GEOS3014, MARS3104  
**Assessment:** One 2 hour exam, project work, two practical-based project reports, fortnightly progress quizzes (100%)  
**Note:** Department permission required for enrolment. Note: A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.

Advanced students will complete the same core lecture material as for GEOS3014 but will carry out more challenging projects, practicals, assignments and tutorials.

**GEOS3018**  
**Rivers: Science, Policy and Management**

**Credit points:** 6  
**Teacher/Coordinator:** Prof Philip Hirsch, Dr Tom Hubble  
**Session:** Semester 1  
**Classes:** One 2 hour lecture and one 2 hour tutorial per week comprising one 1 hour practical demonstration and one 2 hour practical.  
**Prerequisites:** EEOS2009 or (GEOS2924 with a mark of 65% or greater)  
**Prohibitions:** GEOS3014, MARS3104  
**Assessment:** 60% For 13 credit points of Intermediate Geoscience* units, or (GEOS(2115 or 2915) and BIOL(2018 or 2918))  
**Note:** * Geoscience is the disciplines of Geography, Geology and Geophysics.
week. Prerequisites: 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience (GEOG or GEOS) units of study. Prohibitions: GEOS3918 Assessment: One 2 hour exam, one 1500 word essay, one group project (100%)

This unit of study aims to decipher the multi-faceted nature of river management by examining how rivers function, from both natural science and social science perspectives. The physical condition of rivers is assessed by considering issues such as catchment hydrology, water quality, the structure and role of riparian vegetation and the functioning of aquatic ecosystems. This information is then combined to examine the science underpinning river rehabilitation projects and environmental assessment of river basin development. The ability to rehabilitate rivers and their management for social and economic goals is also controlled by a range of social and political factors. Therefore, water resource policies and institutions, both within Australia and globally, are also examined in terms of their influences on fluvial systems.

GEOS3918
Rivers: Science and Management (Adv)
Credit points: 6 Teacher/Coordinator: Prof Philip Hirsch, Dr Tom Hubble Session: Semester 1 Classes: one 2 hr lecture, one 2 hour tutorial, fieldwork Prerequisites: Distinction average in 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience (GEOG or GEOS) units of study. Prohibitions: GEOS3018 Assessment: One 2 hour exam, one group project, one individual field report (100%)

Advanced students will complete the same core lecture material as for GEOS3018, but will carry out more challenging projects and reports.

GEOS3513
Regional Development and Environment
Credit points: 6 Teacher/Coordinator: A/Prof Bill Pritchard, Dr Michael Harris Session: Semester 1 Classes: 2 hours of lectures per week and 2 hours of tutorials/practicals per week. Prerequisites: 24 credit points of intermediate and/or senior units of study including 6 credit points of Intermediate units of study in Geography. Prohibitions: ENVI3131, GEO3511, GEO3911, GEO3913 Assessment: Two in-class tests, one 1500 word essay, one GIS report (100%)

This unit of study acquaints students with debates and tools associated with regional development and the economic analysis of environmental issues. It provides a useful preparation for professional employment in the field of regional development, the economic policy and management, and is relevant for students interested in economic and social issues in regional Australia. Co-taught by a geographer and an economist, the unit addresses four key areas of relevance: (i) regional development theory and practice; (ii) the economics of efficiently utilising and managing the environment; (iii) debates on regional development in Australia (including consideration of the farm sector, Indigenous communities and environmental sustainability), and (iv) the use of GIS to analyse population census data. The unit requires no prior knowledge of economic theory or GIS software.

GEOS3913
Regional Development & Environment (Adv)
Credit points: 6 Teacher/Coordinator: A/Prof Bill Pritchard Session: Semester 1 Classes: 2 hours of lectures per week and 2 hours of tutorials/practicals per week. Prerequisites: 24 credit points of intermediate and/or senior units of study including 6 credit points of Intermediate units of study in Geography with a grade of Credit or better. Prohibitions: ENVI3131, GEO3511, GEO3913 Assessment: In-class tests, essay, report (100%)

This unit of study is a more advanced version of GEOS3513. It includes more challenging assessment tasks.

GEOS3101
Earth’s Structure and Evolution
Credit points: 6 Teacher/Coordinator: A/Prof Patrice Roy, Prof Geoff Clarke Session: Semester 1 Classes: Two 1 hour lectures and one 3 hour tutorial/practical class per week, and a 3-day excursion. Prerequisites: GEOS2114 or 2914) and GEOS2124 or 2924); or 24 credit points of Intermediate Science units of study and GEOS1003 with permission of the Head of School Prohibitions: GEOS3801, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3906, GEOS3017, GEOS3917 Assumed knowledge: GEOS2114, GEOS2124 Assessment: One 2 hour exam, practical and field reports (100%)

The Earth’s crust and upper mantle, or lithosphere, are a consequence of dynamic and thermal processes operating since the beginning of the Archaean. This unit focuses on information and techniques that enable an understanding of these processes. The main topics presented in this unit include: the formation and evolution of oceanic and continental lithosphere; tectonic deformation, magmatism and metamorphism at plate boundaries; and the mesoscopic and microscopic analysis of igneous and metamorphic rocks. Practical classes and field exercises are designed to enable students to competently and independently identify the common crystalline rocks in hand-specimen; and to gather and interpret the structural field data which enables the determination of the structural style and deformational history presented in particular tectonic settings. The concepts and content presented in this unit are generally considered to be essential knowledge for geologists and geophysicists and provide a conceptual framework for their professional practice. Students wishing to specialise in the field and become professional geologists will normally need to expand upon the knowledge gained from this unit and either complete an honours project or progress to postgraduate coursework in this field.

GEOS3102
Global Energy and Resources
Credit points: 6 Teacher/Coordinator: Dr Derek Wyman, A/Prof Gavin Birch Session: Semester 1 Classes: Two 1-hour lectures and one 2-hour tutorial/practicals per week. Prerequisites: GEOS2114 or 2914) and GEOS2124 or 2924); or 24 credit points of Intermediate Science units of study and GEOS1003 with permission of the Head of School Prohibitions: GEOS3802, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3006, GEOS3906, GEOS3017, GEOS3917 Assumed knowledge: GEOS2114 and GEOS2124 Assessment: One 2-hour exam, practical and field reports (100%)

This unit examines the processes that form energy and mineral resources, outlines the characteristics of major fossil fuel and metal ore deposits and introduces the principles that underpin exploration strategies used to discover and develop geological resources. The unit will focus on a variety of topics including: coal; petroleum formation and migration, hydrocarbon traps and maturation; precious metal, base metal and gemstone deposit types; and exploration strategies. An integrated approach will relate tectonic processes through time to the formation of fossil fuel and mineral provinces. Practical exercises will introduce students to the techniques used to identify economically viable geological resources using a variety of exercises based on actual examples of resource exploration drawn from both the petroleum and minerals industry.

GEOS3103
Environmental and Sedimentary Geology
Credit points: 6 Teacher/Coordinator: Dr Adriana Dutkiewicz (co-ordinator), Dr Dan Penny Session: Semester 2 Classes: Two 1 hour lectures and one 3 hour tutorial/practical class per week. Prerequisites: GEOS2124 or 2924) and GEOS2111 or 2911 or 2914 or 2913 or 2911 or 2913 or 2913 or 2913); or GEOS1003 or 1903 and 24 credit points of Intermediate Science units of study with permission of the Head of School Prohibitions: GEOS3803 Assumed knowledge: GEOS1003, GEOS2124 Assessment: One 2 hour exam, practical and field reports (100%)

Sediments and sedimentary rocks cover most of the Earth’s surface, record much of the Earth’s geological and climatic history and host important resources such as petroleum, coal, water and mineral ores. The aim of this unit is to provide students with the skills required to examine, describe and interpret sediments and sedimentary rocks for a variety of different purposes. Specific foci of the unit will be the identification of the recent or ancient environment in which sedimentary materials were deposited, the environmental controls which produce sedimentary structures, and the processes that control the production, movement and storage of sediment bodies. On completion of this unit students will be familiar with the natural processes that produce and modify sediments across a range of environments at the Earth’s surface, including fluvial, aeolian, lacustrine, marginal marine and deep marine environments. The various controls on the sedimentary record such as climate and sea-level change, as well as diagenesis 129
and geochemical cycles will also be discussed. Practical exercises will require students to examine global datasets, and determine the properties and significance of sediments and sedimentary rocks. The course is relevant to students interested in petroleum or mineral exploration, environmental and engineering geology as well as marine geoscience.

Textbooks

Course notes will be available from the Copy Centre and an appropriate set of reference texts will be placed on special reserve in the library.

GEOS3104

Geophysical Methods

Credit points: 6 Teacher/Coordinator: Dr Christian Heine (co-ordinator), Dr Gabriele Morra, Dr Simon Williams Session: Semester 2 Classes: Two hour lectures and one 3 hour practical class per week. Prerequisites: 24 credit points of Intermediate units of study or (GEOS(2114/2914) and GEO5(2124/2924)) Prohibitions: GEOS3004, GEOS3804, GEOS3003, GEOS3903, GEOS3006, GEOS3906, GEOS3016, GEOS3916, GEOS3017, GEOS3917 Assessment: One 2 hour exam (50%), practical work (50%)

This unit introduces the common geophysical methods used to investigate the interior and dynamics of the Earth and focuses on the techniques used for mineral and hydrocarbon exploration. On completion of this unit students will have developed a thorough understanding of the common geophysical methods utilised in academia and the resource exploration industry. They will be able to evaluate and critically assess most forms of geophysical data as well as actively participate in geophysical explorations. Furthermore the course will provide the students with the computational skills to process different geophysical data in an applied, resource exploration-centered perspective. The unit is aimed at students with interests in land-based and marine resource exploration, plate tectonics, internal Earth structure/dynamics, and near-surface investigations of groundwater resources and environmental pollution. Students wishing to specialise in the field and become professional geophysicists will normally need to expand upon the geophysics knowledge gained from this unit and either complete an honours project or progress to postgraduate coursework in this field.

GEOS3053

Asia-Pacific Field School-Assessment A

Credit points: 6 Teacher/Coordinator: Dr Jeff Neilson Session: S1 Intensive Classes: Five weeks intensive, six modules of 3 lectures each, ten full days equivalent fieldwork, 20 hours small group work. Prerequisites: 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. Corequisites: GEOS3054 Prohibitions: GEOS3953 Assessment: One group activity, one field diary, one extended field research report, one exam (100%)

Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.

The unit of study can be taken only in coincidence with GEOS3054 and with prior permission from the unit of study coordinator. It constitutes a Field School run over a five- week period in January-February, prior to the commencement of the semester. In 2011 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on two main themes: i) rural economic development and integration with the global economy; and ii) community-based natural resource management and environmental governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and students interested in the 2011 Field School should indicate expression of interest to jeffrey.neilson@sydney.edu.au before the end of May 2010.

GEOS3054

Asia-Pacific Field School-Assessment B

Credit points: 6 Teacher/Coordinator: Dr Jeff Neilson Session: S1 Intensive Classes: Five weeks intensive, six modules of 3 lectures each, ten full days equivalent fieldwork, 20 hours small group work. Prerequisites: 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. Corequisites: GEOS3053 Prohibitions: GEOS3954 Assessment: One group activity, one field diary, one extended field research report, one exam (100%)

Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.

The unit of study can be taken only in coincidence with GEOS3054 and with prior permission from the unit of study coordinator. It constitutes a Field School run over a five- week period in January-February, prior to the commencement of the semester. In 2011 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on two main themes: i) rural economic development and integration with the global economy; and ii) community-based natural resource management and environmental governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and students interested in the 2011 Field School should indicate expression of interest to jeffrey.neilson@sydney.edu.au before the end of May 2010.

GEOS3953

Asia-Pacific Field School-A (Adv)

Credit points: 6 Teacher/Coordinator: Dr Jeff Neilson Session: S1 Intensive Classes: Five weeks intensive, six modules of 3 lectures each, ten full days equivalent fieldwork, 20 hours small group work. Prerequisites: 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. Corequisites: GEOS3954 Prohibitions: GEOS3953 Assessment: One group activity, one field diary, one extended field research report, one exam (100%)

Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than the end of May in the year before taking this Unit.

The unit of study can be taken only in coincidence with GEOS3953 and with prior permission from the unit of study coordinator. It constitutes a Field School run over a five- week period in January-February, prior to the commencement of the semester. In 2011 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on two main themes: i) rural economic development and integration with the global economy; and ii) community-based natural resource management and environmental governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and
students interested in the 2011 Field School should indicate expression of interest to jeffrey.neilton@sydney.edu.au before the end of May 2010.

GEOS3801
Earth's Structure and Evolutions (Adv)
Credit points: 6 Teacher/Coordinator: A/Prof Patrice Roy, Prof Geoff Clarke Session: Semester 1 Classes: Two 1 hour lectures and one 3 hour tutorial/practical class per week. Prerequisites: Distinctions in GEOS(2114/2914) and GEOS(2124/2924); Students who have a credit average for all Geoscience units may enrol in this unit with permission of the Head of School. Prohibitions: GEOS3101, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3906, GEOS3908, GEOS3917, GEOS3917. Assumed knowledge: GEOS2114, GEOS2124. Assessment: One 2 hour exam, practical and field reports (100%)

This unit has the same objectives as GEOS3101 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

GEOS3802
Global Energy and Resources (Adv)
Credit points: 6 Teacher/Coordinator: Dr Derek Wyman, A/Prof Gavin Birch Session: Semester 1 Classes: Two 1 hour lectures and one 3 hour tutorial/practical class per week. Prerequisites: Distinction in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School. Prohibitions: GEOS3102, GEOS3003, GEOS3903, GEOS3004, GEOS3904, GEOS3906, GEOS3908, GEOS3917, GEOS3917. Assumed knowledge: GEOS2114 and GEOS2124. Assessment: One 2 hour exam, practical and field reports (100%)

This unit has the same objectives as GEOS3102 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

GEOS3803
Environmental & Sedimentary Geology(Adv)
Credit points: 6 Teacher/Coordinator: Dr Adam Dutkiewicz (coordinator), Dr Dan Penny Session: Semester 2 Classes: Two 1 hour lectures and one 3 hour tutorial/practical class per week. Prerequisites: Distinctions in GEOS(2114 or 2914) and GEOS(2124 or 2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School. Prohibitions: GEOS3103. Assumed knowledge: GEOS3103, GEOS3214. Assessment: One 2 hour exam, practical and field reports (100%)

This unit has the same objectives as GEOS3103 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

Textbooks
Course notes will be available from the copy centre and appropriate set of reference texts will be placed on special reserve in the library.

GEOS3804
Geophysical Methods (Advanced)
Credit points: 6 Teacher/Coordinator: Dr Christian Heine (coordinator), Dr Gabriele Morra, Dr Simon Williams Session: Semester 2 Classes: Two 1 hour lectures and one 3 hour practical class per week. Prerequisites: Distinction in GEOS2114 or GEOS2914 and GEOS2124 or GEOS2924; Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School. Prohibitions: GEOS3104, GEOS3003, GEOS3903, GEOS3906, GEOS3916, GEOS3916, GEOS3917, GEOS3917. Assessment: One 2 hour exam, practical work (100%)

This unit has the same objectives as GEOS3104 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

ENVI3112
Environmental Assessment
Credit points: 6 Teacher/Coordinator: Dr John Dee Session: Semester 2 Classes: Two 2 hour lectures per week. Prerequisites: 12 credit points of Intermediate Science or Agriculture units. Prohibitions: ENVI3002, ENVI3004. Assumed knowledge: Intermediate Environmental Science. Assessment: Essays, tutorial papers, report (100%)

This unit of study is composed of two components: environmental impact assessment and risk assessment. The former is generally concerned with issues related to environmental impact assessment and builds toward the process of producing an EIS/EIA. More specifically it seeks to establish a critical understanding of the theory and practice of environmental impact studies/statements (EIS) and environmental impact assessment processes (EIA) from both the positive (scientific) and normative (value) perspectives. Emphasis is placed on gaining skills in writing and producing an assessment report, which contains logically ordered and tightly structured argumentation that can stand rigorous scrutiny by political processes, the judiciary, the public and the media. The risk assessment component considers a more chemical approach to the assessment of risk and issues of safety with respect to chemicals, ecotoxicology and the environment. It draws on current environmental management practice to investigate what constitutes risk and to demonstrate how risk may be managed.

History and Philosophy of Science
History and Philosophy of Science (HPS) allows students to enrich and deepen their knowledge of science and stand back from the specialised concerns of their other subjects by gaining a broader perspective on what science is, how it acquired its current form and how it fits into contemporary society. HPS is particularly relevant for students hoping to make careers in science policy, science administration, science education and science journalism. Any student with a genuine interest in science will derive benefit from study in HPS.

Advice
An adviser will be available in the Unit for History and Philosophy of Science during the enrolment period. The Unit is located on Level 4 of the Carslaw Building. More detailed information on units of study is available either in a handbook from the Unit office or electronically via the Unit website http://sydney.edu.au/science/hps/. The Unit for History and Philosophy of Science offers the Junior unit of study Bioethics (HPSC1000), which analyses and discusses the ethical concerns raised by scientific accomplishments in modern society. Students interested in related topics should consider taking the unit Concepts and Issues in Physical Science (PHYS1600) offered in the School of Physics. This unit serves as useful background for further studies in HPS and is offered as an Arts unit for all students, including students enrolled in the Faculty of Science.

Junior units of study
HPSC1000
Bioethics
Credit points: 6 Teacher/Coordinator: Dr Catherine Mills Session: Semester 1 Classes: One 1 hour and one 2 hour lecture and one 1 hour tutorial per week. Prerequisites: HPSC1900. Assessment: Short essays, tutorial work, tests (100%)

Note: This Junior unit of study is highly recommended to Intermediate and Senior Life Sciences students.

Science has given us nearly infinite possibilities for controlling life. Scientists probe the origins of life through research with stem cells
and embryos. To unlock the secrets of disease, biomedicine conducts cruel experiments on animals. GM crops are presented as the answer to hunger. Organ transplantation is almost routine. The international traffic in human body parts and tissues is thriving. The concept of brain death makes harvesting organs ethically more acceptable. It may also result in fundamental changes in our ideas about death. Science has provided new ways of controlling and manipulating life and death. As a consequence, difficult ethical questions are raised in increasingly complex cultural and social environments. This course will discuss major issues in the ethics of biology and medicine, from gene modification to Dolly the sheep. This unit will be introductory, but a small number of topical issues will be studied in depth. No scientific background beyond School Certificate level will be assumed.

Textbooks

**HPSC1000**  
*Bioethics (Advanced)*

**Credit points: 6**  
**Teacher/Coordinator:** Dr Catherine Mills  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures, one 1 hour tutorial per week.  
**Prerequisites:** 24 credit points of Junior units of study.  
**Prohibitions:** HPSC2001, HPSC2901  
**Assessment:** Tutorial work, essays, exam, tutorial participation (100%)  
**Note:** Department permission required for enrolment.

The topics covered by HPSC1000 - Bioethics will be treated in more depth, in a special tutorial set aside for Advanced students.

Textbooks

**Intermediate units of study**

There are two Intermediate units of study offered by the Unit for History and Philosophy of Science. They provide a broad background in the history and the philosophy of science, and a solid background for students in arts and science who wish to acquaint themselves with principles and methods in the history and philosophy of science. For students who wish to major in HPS, they provide essential background knowledge.

**HPSC2100**  
*The Birth of Modern Science*

**Credit points: 6**  
**Teacher/Coordinator:** A/Prof Ofer Gal  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures, one 1 hour tutorial per week.  
**Prerequisites:** 24 credit points of Junior units of study.  
**Prohibitions:** HPSC2002, HPSC2900  
**Assessment:** 4xquizzes (30%) and 6x100wd questions (30%) and 3x750wd essays (30%) and class participation (10%)  
**Modern culture is a culture of science and modern science is the outcome of a historical process of 2,500 years. In this course we investigate how traditional knowledge gradually acquired the characteristics of 'science': the social structure, contents, values and methods we are familiar with. We will look at some primary chapters of this process, from antiquity to the end of the seventeenth century, and try to understand their implications to understanding contemporary science in its culture. Special emphasis will be given to the scientific revolution of the seventeenth century, which is often described as the most important period in the history of science and as one of the most vital stages in human intellectual history.*

Textbooks


**HPSC2101**  
*What Is This Thing Called Science? (Advanced)*

**Credit points: 6**  
**Teacher/Coordinator:** Dr Dominic Murphy  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 24 credit points of Junior units of study.  
**Prohibitions:** HPSC2001, HPSC2901  
**Assessment:** 2x1500 wd essays (50%) and 1x3000 wd essay (50%)  
**Philosophers of science aim to define what distinguishes creationism from evolutionary theory, or astrology from astronomy. They give reasons why we can believe that today's theories are improvements over those that preceded them and how we know that what we see and do in scientific practice reflects the nature of reality. This course critically examines the most important attempts to define the scientific method, to draw a line dividing science from non-science, and to justify the high status generally accorded to scientific knowledge. The philosophies of science studied include Karl Popper's idea that truly scientific theories are falsifiable, Thomas Kuhn's proposal that science consists of a series of paradigms separated by scientific revolutions; and Feyerabend's anarchist claim that there are no objective criteria by which science can be distinguished from pseudo-science. This unit of study also explores contemporary theories about the nature of science and explores ideas about the nature of the experimental method and concepts such as underdetermination, the nature of scientific explanation, theory confirmation, realism, the role of social values in science, sociological approaches to understanding science, and the nature of scientific change.*

Textbooks


**HPSC2900**  
*The Birth of Modern Science (Advanced)*

**Credit points: 6**  
**Teacher/Coordinator:** Dr Ofer Gal  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** Enrolment in the Talented Student Program or 24 credit points of Junior study with a Distinction average.  
**Prohibitions:** HPSC2002, HPSC2100  
**Assessment:** 2x1500wd essays (45%) and 1x3000 wd essay (45%) and class presentation (10%)  
**Note:** Department permission required for enrolment.

The topics covered in 'The Birth of Modern Science' will be covered in more depth, in a special tutorial set aside for advanced students.

Textbooks


**Course reader**

**HPSC2901**  
*What Is This Thing Called Science? (Adv)*

**Credit points: 6**  
**Teacher/Coordinator:** Dr Dominic Murphy  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** Enrolment in the Talented Student Program or 24 credit points of Junior study with a Distinction average.  
**Prohibitions:** HPSC2002, HPSC2100  
**Assessment:** 2x1500 wd essays (45%) and 1x3000 wd essay (45%) and class presentation (10%)  
**Note:** Department permission required for enrolment.

The topics covered in 'What Is This Thing Called Science?' will be covered in more depth, in a special tutorial set aside for advanced students.

Textbooks

*Alan F Chalmers, What Is This Thing Called Science? 3rd edition.*

**Course reader**

**Senior units of study**

Students wishing to major in History and Philosophy of Science in either the BSc, BA or BLibSt must take 24 credit points from the following Senior units of study. Our Intermediate courses provide students with a background in the history and philosophy of science. HPSC3022 Science and Society, provides students with an essential background in the sociology of science. This unit of study is compulsory for majors in history and philosophy of science. HPSC3021 Philosophy and Sociology of Biology is unavailable in 2011.

**HPSC3002**  
*History of Biological/Medical Sciences*

**Credit points: 6**  
**Teacher/Coordinator:** Dr Hans Pols  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures and two 1 hour tutorials per week.  
**Prerequisites:** HPSC(2100 or 2900) and HPSC(2101 or 2901)  
**Assessment:** 2x300-400wd reports (25%) and 1xclass presentation (25%) and class questions (10%) and 1x2500-3000 wd essay (40%)  
**Throughout the ages people have been born, have died, and in between have lived in various stages of sickness or health. In this unit of study we shall look at how these states of being were perceived in different times and places throughout history, while at the same time noting the increasing medicalisation of everyday life, together with the irony that the "miracles" of modern medicine appear to have created...**
Modern Western science has a number of characteristics which distinguish it from other scientific cultures. It ascribes its tremendous success to sophisticated experiments and meticulous observation. It understands the universe in terms of tiny particles in motion and the forces between them. It is characterised by high-powered mathematical theorising and the rejection of any intention, value or purpose in Nature. Many of these characteristics were shaped in the 17th century, during the so-called scientific revolution. We will consider them from an integrated historical-philosophical perspective, paying special attention to the intellectual motivations of the canonical figures of this revolution and the cultural context in which they operated.

Topics will include: experimentation and instrumentation, clocks, mechanistic philosophy, and the changing role of mathematics.

**Textbooks**

Course reader

**HPSC3002**

Science and Society

**Credit points:** 6

**Teacher/Coordinator:** Dr Chris Degeling

**Session:** Semester 1

**Classes:** Two 1 hour lectures and two 1 hour tutorials per week.

**Prerequisites:** HPSC(2100 or 2900) and HPSC(2101 or 2901)

**Prohibitions:** HPSC3003, HPSC3106

**Assessment:** 2x1500wd questions (50%) and 1x3000wd essay (50%)

Note: This unit is a requirement for HPS majors.

Science has become an essential element of Western societies. It is impossible to imagine our lives today without the achievements of science, technology, and medicine. Many scientists and laypeople think that scientific knowledge transcends political, social, cultural, and economic conditions. Sociologists of science think otherwise. In this unit, we will investigate the nature of science, the position of science in society, and the internal dynamics of science.

Sociologists of science have compared scientific knowledge to a ship in a bottle: if you see the finished product, you can’t understand how it came about, and you can’t believe that it is not what it claims to be: the empirically-determined truth about the world. In this unit, we will have a close look at some of these ships in bottles and examine how they got there. When observing science-in-the-making, rather than the finished product, the factors that influence science become much clearer. We will introduce some of the most exciting and innovative ideas about what science is and how it works by examining the sociological and anthropological approaches to science that have become the basis for research in the social studies of science, technology, and medicine, including: the norms of science, scientists’ images of themselves, the boundaries between science and other subjects, the rhetoric of scientific writing, laboratory work, science museums and science in the media.

**Textbooks**

S. Siamundo, An Introduction to Science and Technology Studies

**HPSC3023**

Psychology & Psychiatry: History & Phil

**Credit points:** 6

**Teacher/Coordinator:** Dr Hans Pals and Dr Fiona Hibberd

**Session:** Semester 1

**Classes:** Two 1 hour lectures and one 2 hour tutorial per week.

**Prerequisites:** at least 12 credit points of Intermediate HPSC Units of study

**Prohibitions:** (at least 12 credit points of Intermediate HPSC Units of study) OR (a CR or above in one HPSC intermediate Unit of Study) OR (12 intermediate credit points in psychology)

**Assessment:** 2x short essays (40%) and 1x journal (30%) and 1x tutorial assignment (20%) and class participation (10%)

HPSC2101 OR knowledge of the various sub-disciplines within Psychology.

Assessment: 1x2500wd essay (45%) and 1x2hr exam (45%) class participation (10%)

Across the unit we examine one of the most interesting aspects of the history and philosophy of science, viz., the scientific practices and assumptions involved in making human beings an object of study. We will examine the ways in which psychologists and psychiatrists have investigated human nature, the kinds of experimental approaches they have developed to that end, the major controversies in this field, and the basic philosophical assumptions that have been made in the sciences of human nature. We investigate the developments of psychological theories and investigative methods as well as the development of psychiatric theory, treatment methods, and institutions.

**Textbooks**

Course reader


**HPSC3024**

Science and Ethics

**Credit points:** 6

**Teacher/Coordinator:** Dr Jane Johnson

**Session:** Semester 2

**Classes:** Two 1 hour lectures and two 1 hour tutorials per week.

**Prerequisites:** At least 24 credit points of Intermediate or Senior units of study; HPSC(2100 or 2900) Prohibitions: HPSC3007

**Assessment:** 2x short essays (40%) and 1x journal (30%) and 1x tutorial assignment (20%) and class participation (10%)

Science is a powerful institution but its reputation as a noble pursuit of truth was tarnished by a number of developments in the twentieth century, like the dropping of the atomic bombs in WWII and the involvement of doctors in Nazi medicine. These incidents shook the faith of many scientists and others in the direction of science and the ethics of its practitioners. While science can furnish a strong factual account of the world, it lacks the internal resources to deal with many normative questions it raises. On its own science cannot answer questions about right and wrong, about how we ought to make decisions and act. Instead it must appeal to ethics to help formulate adequate responses. Throughout the semester we will use the lens of scientific responsibility to frame and explore a number of questions intended to help expose important ethical issues in science, and to help you develop and articulate thoughtful answers and arguments. Such questions will include: Is science objective and value free? What is scientific fraud and does the very nature of the practice of science make fraud more likely? Do scientists have an obligation to disseminate their findings, and how does the increasing role of commercialization effect the responsibilities of scientists? Can we separate out science from its applications and thereby absolve scientists of ethically problematic outcomes? Should some scientific questions simply not be pursued, i.e. do they constitute forbidden knowledge? Can the methods of scientists be unethical and does unethical practice equate to bad science?

**Textbooks**

Course reader

**Immunobiology major**

The Discipline of Infectious Diseases and Immunology administers the Immunobiology Major. Our location is on Level 6, Blackburn Building D06. Further information from Dr Allison Abendroth (phone: (02) 93516867, email: alison.abendroth@sydney.edu.au) or Dr Scott Byrne (phone: (02)93517308, email: scott.byrne@sydney.edu.au). A major in Immunobiology requires successful completion of 12 credit points of Senior study in Immunobiology plus 12 credit points from the elective Senior units of study in Biochemistry, Biology, Cell Pathology, Molecular Biology and Genetics, Microbiology, Physiology or Virology listed in Table I. Participants in the Immunobiology major will select accompanying Senior units according to their particular interest. Concurrent study in the life science disciplines will add a depth of understanding in a particular aspect of immunology. Participants are invited to consult with either Dr Allison Abendroth or Dr Scott Byrne as well as with elected unit of study co-ordinators before selecting concurrent study units and should note that a unit of study taken as...
part of the Immunobiology Major cannot count towards a major in another Science discipline area.

**Immunology**

Immunology is offered as Introductory Immunology (IMMU2101) at Intermediate level, Molecular and Cellular Immunology (IMMU3102/3902) and Immunology in Human Disease (IMMU3202/3903) at Senior level, and Immunology Honours. Further information can be obtained from Dr Allison Abendroth (phone: (02) 93516887, email: alison.abendroth@sydney.edu.au) or Dr Scott Byrne (phone: (02)93517308, email: scott.byrne@sydney.edu.au).

**Immunology intermediate units of study**

**IMMU2101 Introductory Immunology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Scott Byrne  
**Session:** Semester 1  
**Classes:** Two 1 hour lectures per week, one 3 hour tutorial or practical, and one independent study per week.  
**Prerequisites:** 24 credit points of Junior units of study from any of the Science discipline areas.  
**Prohibitions:** Immu2001, Bmed2506, Bmed2807  
**Assumed knowledge:** Junior Biology and Junior Chemistry.  
**Assessment:** Progressive assessment: includes written, practical and oral based assessments (50%); Formal assessment: one 2 hour examination (50%).  

**Note:** This is a prerequisite unit of study for IMMU3102 and IMMU3202. The completion of 6 credit points of MBLG units of study is highly recommended.

Our immune system not only protects us from viruses, bacteria, and parasites, it can prevent the growth of tumours. Sometimes our immune system can be the cause of diseases like multiple sclerosis, Type 1 diabetes and rheumatoid arthritis. If you are interested in studying how our immune system works to keep us alive, then Introductory Immunology is for you. This unit of study will provide an overview of the immune system and the essential features of immune responses. You will be treated to a lecture course delivered by cutting edge immunologists that begins with a study of immunology as a basic research science. This includes an introduction to the nature of the cells and molecules involved in the immune response. We build on this foundation by introducing the immunological principles underlying the eradication of infectious diseases, successful vaccination strategies, organ transplantation, combating autoimmune diseases and treating cancer. The integrated tutorials will build on the lecture material and introduce you to four "Immunological Legends" of Australian research. The practical sessions will further illustrate particular concepts introduced in the lecture program and provide you with valuable exposure to a variety of very important immunotechnical techniques.

**Textbooks**


**Immunology senior units of study**

**IMMU3102 Molecular and Cellular Immunology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Allison Abendroth  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one tutorial and one practical per fortnight.  
**Prohibitions:** Bmed2807 or IMMU2101 and 6cp of Intermediate units of study from Biochemistry or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology.  
**Prohibitions:** IMMU3002, Bmed3003  
**Assumed knowledge:** Intermediate biochemistry and molecular biology and genetics.  
**Assessment:** Progressive assessment: includes practical assignment, portfolio of case studies, poster presentation, tutorial presentation (40%), Formal examination: one 2 hour exam (60%).  

**Note:** The completion of 6CP of MBLG units of study is highly recommended. Concurrent study of IMMU3102 Molecular and Cellular Immunology is very strongly recommended.

This study unit builds on the series of lectures that outlined the general properties of the immune system, effector lymphocytes and their functions, delivered in the core courses, IMMU2101 - Introductory Immunology and Bmed2807 - Micrbes & Body Defences (formerly IMMU2001 and Bmed2506). In this unit the molecular and cellular aspects of the immune system are investigated in detail. We emphasise fundamental concepts to provide a scientific basis for studies of the coordinated and regulated immune responses that lead to elimination of infectious organisms. Guest lectures from research scientists eminent in particular branches of immunological research are a special feature of the course. These provide challenging information from the forefront of research that will enable the student to become aware of the many components that come under the broad heading 'Immunology'. Three lectures (1 hour each) will be given each fortnight: 2 lectures in one week and one lecture the following week, for the duration of the course. This unit directly complements the unit "Immunology in human disease IMMU3202" and students are strongly advised to undertake these study units concurrently.

**Textbooks**


**IMMU3202 Immunology in Human Disease**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Allison Abendroth  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one tutorial and one practical per fortnight.  
**Prohibitions:** Bmed2807 or IMMU2101 and 6cp of Intermediate units of study from Biochemistry or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology.  
**Prohibitions:** IMMU3002, Bmed3003  
**Assumed knowledge:** Intermediate biochemistry and molecular biology and genetics.  
**Assessment:** Progressive assessment: includes practical assignment, portfolio of case studies, poster presentation, tutorial presentation (40%), Formal examination: one 2 hour exam (60%).  

**Note:** The completion of 6CP of MBLG units of study is highly recommended. Concurrent study of IMMU3102 Molecular and Cellular Immunology is very strongly recommended.

This study unit builds on the series of lectures that outlined the general properties of the immune system, effector lymphocytes and their functions, delivered in the core courses, IMMU2101 - Introductory Immunology and Bmed2807 - Micrbes & Body Defences (formerly IMMU2001 and Bmed2506). We emphasise fundamental concepts to provide a scientific basis for studies in clinical immunology; dysfunctions of the immune system e.g. autoimmune disease, immunodeficiencies, and allergy, and immunity in terms of host-pathogen interactions. This unit has a strong focus on significant clinical problems in immunology and the scientific background to these problems. This unit includes lectures from research scientists and clinicians covering areas such as allergy, immunodeficiency, autoimmune disease and transplantation. This course provides challenging information from the forefront of clinical immunology and helps the student develop an understanding of immune responses in human health and disease. Three lectures (1 hour each) will be given each fortnight: 2 lectures in one week and one lecture the following week, for the duration of the course. This unit directly complements the unit "Molecular and Cellular Immunology" and students are very strongly advised to undertake these study units concurrently.

**Textbooks**

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IMMU3903

Immunology in Human Disease (Advanced)

Credit points: 6
Teacher/Coordinator: Dr Allison Abendroth and Dr Scott Byrne
Session: Semester 2 Classes: 3 lectures (1hr each) and 1 seminar/tutorial (2 hours) per week. 1 practical (4 hours) every 2 weeks.
Prerequisites: At least 6 credit points intermediate immunology including a Distinction in Intermediate Immunology (IMMU2101) and 6 credit points of intermediate units of study from (Biochemistry or Biology or Microbiology or Molecular Biology and Genetics or Pharmacology or Physiology). For BMedSci students: 42 credit points of intermediate BMED units including Distinction in BMED2908 or BMED2808. Prohibitions: IMMU3202
Assumed knowledge: Intermediate biochemistry and molecular biology and genetics
Assessment: Progressive assessment: (40%) includes practical work and poster presentation, lab assignment and tutorial presentation; (60%) 2 hour formal examination

This unit is available to students who have performed well in Intermediate Immunology (IMMU2101). Advanced students will complete the same core lecture material as students in IMMU3202 but carry out advanced level practical work and a series of specialized seminar based tutorial classes.

Textbooks
Cellular and Molecular Immunology 6th edition 2009. Ak Abbas, AH Lichtman and S Pillai. WB Saunders Company

Information Technologies

Information Technologies in the Bachelor of Science degree

The School of Information Technologies is part of the Faculty of Engineering and Information Technologies. In addition to providing professional training in Computer Science and Information Systems leading toward bachelor level degrees, it offers many units of study that students who are enrolled in the Faculty of Science may take as a part of a major in either Information Systems or Computer Science or a minor in Information Technology. Details regarding the units of study required for the award of a Science major in Information Systems or Computer Science can be obtained from the Faculty of Science Handbook or from the website sydney.edu.au/engineering/it.

Special consideration applications for illness or misadventure

Students should note that applications for special consideration on grounds of illness or misadventure for COMP, INFO, ISYS or ELEC units are processed by the Faculty of Engineering and IT.

Minor in IT

Students enrolled in non-IT degrees or majors who, are eligible (upon application) for a Minor in Information Technology if they complete at least 18 credit points of intermediate or above units of study offered by the School of IT, within a completed degree. For further information see sydney.edu.au/engineering/it/future_students/undergrad/

Computer Science

The requirements for a major in Computer Science are defined in Table 1. Computer Science is a scientific discipline which has grown out of the use of computers to manage and transform information. It is concerned with the design of computers, their applications in science, government and business, and the formal and theoretical properties which can be shown to characterise these applications. The current research interests in the School include algorithms, bioinformatics, data management, data mining and machine learning, internet working, wireless networks, network computing, biomedical image processing, parallel and distributed computing, user-adaptive systems and information visualisation. The School has a range of computers and specialised laboratories for its teaching and research.

Information Systems

The requirements for a major in Information Systems are defined in Table 1. Information Systems is the study of people and organisations in order to determine, and deliver solutions to meet, their technological needs. Hence Information Systems deals with the following type of issues: strategic planning, system development, system implementation, operational management, end-user needs and education. Information Systems study is related to Computer Science but the crucial distinction is that the Information Systems is about the architecture of computer systems and making them work for people, whereas much of Computer Science is about developing and improving the performance of computers. The School's research in Information Systems encompasses natural language processing, IT economics, social networking analysis, ontologies design, data mining and knowledge management and open source software.

Summer School: January-February

This School sometimes offers some units of study in The Sydney Summer School. Consult The Sydney Summer School web site for more information: sydney.edu.au/summer.

Computer Science and Information Systems junior units of study

See the School web site sydney.edu.au/engineering/it for advice on choosing appropriate units of study from this list.

INFO1003

Foundations of Information Technology

Credit points: 6
Session: Semester 1, Semester 2 Classes: (Lec 2 hrs & Prac 2hrs) per week
Prohibitions: INFO1000 or INF1000
Assessment: Assignments (50%) and written exam (50%)

Information technologies (IT) and systems have emerged as the primary platform to support communication, collaboration, research, decision making, and problem solving in contemporary organisations. The essential necessity for all university students to acquire the fundamental knowledge and skills for applying IT effectively for a wide range of tasks is widely recognised. Foundations of Information Technology (INFO1003) is an introductory unit of study which prepares students from any academic discipline to develop the necessary knowledge, skills and abilities to be competent in the use of information technology for solving a variety of problems. The main focus of this unit is on modelling and problem solving through the effective use of using IT. Students will learn how to navigate independently to solve their problems on their own, and to be capable of fully applying the power of IT tools in the service of their goals in their own domains while not losing sight of the fundamental concepts of computing. Students are taught core skills related to general purpose computing involving a range of software tools such as spreadsheets, database management systems, internet search engine, HTML, and JavaScript. Students will undertake practical tasks including authoring an interactive website using HTML, JavaScript and AJAX and building a small scale application for managing information. In addition, the course will address the many social, ethical, and intellectual property issues arising from the wide-spread use of information technology in our society.

INFO1103

Introduction to Programming

Credit points: 6
Session: Semester 1, Semester 2 Classes: (Lec 1hr & Lab 2hrs) per week
Prohibitions: SOFT (1001 or 1901) or COMP (1001 or 1901) or DECO2011
Assumed knowledge: HSC Mathematics
Assessment: Assignment (20%), Quiz (15%), Lab Skills (5%), Final Exam (60%)

Programming in a legible, maintainable, reusable way is essential to solve complex problems in the pervasive computing environments. This unit will equip students with foundation of programming concepts that are common to widely used programming languages. The "fundamentals-first & objects-later" strategy is used to progressively guide this introductory unit from necessary and important building blocks of programming to the object-oriented approach. Java, one of the most popular programming languages, is used in this unit. It provides interdisciplinary approaches, applications and examples to support students from broad backgrounds such as science, engineering, and mathematics.
INFO1903  Informatics (Advanced)
Credit points: 6  Session: Semester 1  Classes: (Lec 3hrs & Prac 3hrs) per week
Prohibitions: Prohibitions: MATH1000, MATH1900, COMP1000, COMP2000, COMP2100, COMP2900, COMP2120, COMP2920, SOFT1000, SOFT1900
Assumed knowledge: HSC Mathematics or equivalent
Assessment: Assignments (30%), mid-semester exam (5%), report (15%) and written exam (50%)
Note: Department permission required for enrolment.

This unit covers advanced data processing and management, integrating the use of existing productivity software, e.g. spreadsheets and databases, with the development of custom software using the powerful general-purpose Python scripting language. It will focus on skills directly applicable to research in any quantitative domain. The unit will also cover presentation of data through written publications and dynamically generated web pages, visual representations and oral presentation skills. The assessment, a long project, involves the demonstration of these skills and techniques for processing and presenting data in a choice of domains.

INFO1105  Data Structures
Credit points: 6  Session: Semester 2  Classes: (Lec 2hrs & Prac 2hrs) per week
Prohibitions: INFO1905 or SOFT (1002 or 1902) or COMP (1002 or 1902 or 2160 or 2860 or 2111 or 2811 or 2002 or 2902)
Assumed knowledge: Programming, as for INFO1103
Assessment: Quiz (5%), Assignment (35%), Final Exam (60%)
The unit will teach some powerful ideas that are central to quality software: data abstraction and recursion. It will also show how one can analyse the scalability of algorithms using mathematical tools of asymptotic notation. Contents include: both external "interface" view, and internal "implementation" details, for commonly used data structures, including lists, stacks, queues, priority queues, search trees, hash tables, and graphs; asymptotic analysis of algorithm scalability, including use of recurrence relations to analyse recursive code. This unit covers the way information is represented in each structure, algorithms for manipulating the structure, and analysis of asymptotic complexity of the operations. Outcomes include: ability to write code that recursively performs an operation on a data structure; experience designing an algorithmic solution to a problem using appropriate data structures, coding the solution, and analysing its complexity.

INFO1905  Data Structures (Advanced)
Credit points: 6  Session: Semester 2  Classes: (Lec 2hrs & Prac 2hrs) per week
Prerequisites: 75% or greater in INFO1103 or INFO1903
Prohibitions: INFO1105 or SOFT (1002 or 1902) or COMP (1002 or 1902)
Assessment: Assignments (40%), Final Exam (60%)
An advanced alternative to INFO1105; covers material at an advanced and challenging level. See the description of INFO1105 for more information.

INFO1911  IT Special Project 1A
Credit points: 6  Session: Semester 1  Classes: Meeting 1 hour per week, project work 8 hours per week
Assessment: Project (100%)
Note: Department permission required for enrolment. Note: Enrolment in this unit of study is by invitation only.

This unit of study is specially designed for students in their first year of study who are an academic high achiever, as well as talented in IT areas of study. In this unit, students will be involved in advanced projects, which may be research-oriented, in which students apply problem solving and IT skills.

INFO1912  IT Special Project 1B
Credit points: 6  Session: Semester 2  Classes: Meeting 1 hour per week, project work 8 hours per week
Assumed knowledge: ATAR at least 98 and High Distinction average in first year IT units of study and Distinction average in first year non-IT units of study
Assessment: Project (100%)
Note: Department permission required for enrolment. Note: Departmental permission is required.

This unit of study is specially designed for students in their first year of study who is an academic high achiever, as well as talented in IT areas of study. In this unit, students will be involved in advanced projects, which may be research-oriented, in which students apply problem solving and IT skills.

Computer Science and Information Systems intermediate units of study
It is important to choose second year subjects appropriately to keep options open for further study. See sydney.edu.au/engineering/it for advice.

COMP2007  Algorithms and Complexity
Credit points: 6  Session: Semester 2  Classes: (Lec 2hrs & Prac 2hrs) per week
Prerequisites: COMP2007, COMP3309, COMP3609, COMP3111, COMP3811  Assumed knowledge: INFO1105, MATH1004 or MATH1904
Assessment: Assignments (20%), quizzes (20%) and final exam (60%)
This unit provides an introduction to the design and analysis of algorithms. The main aims are (i) to learn how to develop algorithmic solutions to computational problem and (ii) to develop understanding of algorithm efficiency and the notion of computational hardness.

COMP2907  Algorithms and Complexity (Advanced)
Credit points: 6  Session: Semester 2  Classes: (Lec 2hrs & Prac 2hrs) per week
Prerequisites: Distinction level result in INFO1105 or INFO1905 or SOFT1002 or SOFT1902  Assumed knowledge: INFO1905, MATH1904
Assessment: In-course involvement, assignments(20%), quizzes(20%) and final exam (60%)
An advanced alternative to COMP2007; covers material at an advanced and challenging level. This unit provides an introduction to the design and analysis of algorithms. The main aims are (i) to learn how to develop algorithmic solutions to computational problem and (ii) to develop understanding of algorithm efficiency and the notion of computational hardness.

COMP2121  Distributed Systems & Network Principles
Credit points: 6  Session: Semester 2  Classes: Lecture 2 hrs per week, Tutorial 2 hrs per week
Prerequisites: (INFO1103 or INFO1903) AND (INFO1105 or INFO1905)
Corequisites: (COMP2007 OR COMP2907)
Assessment: Assignment (30%), Mid-Sem Exam (20%), Final Exam (50%)
The unit will provide a broad introduction to the principles of distributed systems and their design; provide students the fundamental knowledge required to analyse and construct various types of distributed systems; explain the common architectural principles and approaches used in the design of networks at different scales (e.g. shared medium access and routing); introduce the programming skills required for developing distributed applications, and will cover the use of Java class libraries and APIs; cover common approaches and techniques in distributed resource management (e.g. task scheduling).

COMP2129  Operating Systems and Machine Principles
Credit points: 6  Session: Semester 1  Classes: Lecture 3 hrs per week, Laboratory 2 hrs per week
Prohibitions: SOFT2130, SOFT2830, SOFT2004, SOFT2904, COMP2004, COMP2904
Assumed knowledge: Programming, as from INFO1103
Assessment: Quizzes (15%), laboratory skills and reports (15%) and final written exam (70%)
In this unit of study elementary methods for developing robust, efficient and re-usable software will be covered. The unit is taught in C, in a Unix environment. Specific coding topics include memory management, the pragmatic aspects of implementing data structures such as lists and hash tables and managing concurrent threads. Debugging tools and techniques are discussed and common programming errors are considered along with defensive programming techniques to avoid such errors. Emphasis is placed on using common Unix tools to manage aspects of the software construction process, such as version control and regression testing. The subject is taught from a practical viewpoint and it includes a considerable amount of
programming practice, using existing tools as building blocks to complete a large-scale task.

INFO2110 Systems Analysis and Modelling
Credit points: 6 Session: Semester 2 Classes: (Lec 2hrs & Prac 2hrs) per week
Prohibitions: INFO2810, INFO2000, INFO2900
Assumed knowledge: Experience with a data model as in INFO1003 or INFO1103 or INFS1000
Assessment: Assignment (30%), Quiz (10%), Final Exam (60%)

This unit provides a comprehensive introduction to the analysis of complex systems. Key topics are the determination and expression of system requirements (both functional and non-functional), and the representation of structural and behavioural models of the system in UML notations. Students will be expected to evaluate requirements documents and models as well as producing them. This unit covers essential topics from the ACM/IEEE SE2004 curriculum, especially from MAA Software Modelling and Analysis.

INFO2110 Database Systems 1
Credit points: 6 Session: Semester 1 Classes: (Lec 3hrs & Prac 2hrs) per week
Prohibitions: INFO2820, INFO2005, INFO2905
Assumed knowledge: Some exposure to programming and some familiarity with data model concepts such as taught in INFO1103 or INFO1003 or INFS1000 or INF01903
Assessment: Assignment (30%), Quiz (10%), Final Exam (60%)

The proper management of data is essential for all data-centric applications and for effective decision making within organizations. This unit of study will introduce the basic concepts of database designs at the conceptual, logical and physical levels. Particular emphasis will be placed on introducing integrity constraints and the concept of data normalization which prevents data from being corrupted or duplicated in different parts of the database. This in turn helps in the data remaining consistent during its lifetime. Once a database design is in place, the emphasis shifts towards querying the data in order to extract useful information. The unit will introduce different query languages with a particular emphasis on SQL, which is industry standard. Other topics covered will include the important concept of transaction management, application development with a backend database, an overview of data warehousing and online analytic processing, and the use of XML as a data integration language.

INFO2820 Database Systems 1 (Advanced)
Credit points: 6 Session: Semester 1 Classes: (Lec 4hrs & Prac 2hrs) per week
Prerequisites: Distinction-level result in INFO1003 or INFO1103 or INFO1903 or INFO1105 or INFO1905
Prohibitions: INFO2120, INFO2005, INFO2905
Assessment: Assignment (30%), Quiz (10%), Final Exam (60%)

The proper management of data is essential for all data-centric applications and for effective decision making within organizations. This unit of study is an advanced alternative to INFO2120 that will introduce the basic concepts of database designs at the conceptual, logical and physical levels. Particular emphasis will be placed on introducing integrity constraints and the concept of data normalization which prevents data from being corrupted or duplicated in different parts of the database. This in turn helps in the data remaining consistent during its lifetime. Once a database design is in place, the emphasis shifts towards querying the data in order to extract useful information. The unit will introduce different query languages with a particular emphasis on SQL and, in INFO2820, deductive databases and DATALOG, which are all industry standard. Other topics covered will include the important concept of transaction management, application development with a backend database, an overview of data warehousing and OLAP, and the use of XML as a data integration language.

INFO2315 Introduction to IT Security
Credit points: 6 Session: Semester 2 Classes: (Lec 2hrs & Prac 1hr) per week
Prohibitions: NETS3305, NETS3605, NETS3016, NETS3916, ELEC5610, ELEC5616
Assumed knowledge: Computer literacy
Assessment: In-course involvement (5%), assignments(35%) and written exam (60%)

This unit provides a broad introduction to the field of IT security. We examine secure and insecure programs, secure and insecure information, secure and insecure computers, and secure and insecure network infrastructure. Key content includes the main threats to security; how to analyse risks; the role in reducing risk that can be played by technical tools (such as encryption, signatures, access control, firewalls, etc); the limitations of technical defences; and the simple process and behavioural changes that can reduce risk.

INFO2911 IT Special Project 2A
Credit points: 6 Session: Semester 1 Classes: Meeting 1 hour per week, project work 8 hours per week
Prerequisites: Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.
Assessment: Project (100%)
Note: Department permission required for enrolment. Note: Departmental permission required.

This unit of study enables talented students to apply their IT knowledge from their first year study to more advanced and exciting projects. In this unit, students will be provided with the opportunity to be involved in projects that will a greater research focus.

INFO2912 IT Special Project 2B
Credit points: 6 Session: Semester 2 Classes: Meeting 1 hour per week, project work 8 hours per week
Prerequisites: Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.
Assessment: Project (100%)
Note: Department permission required for enrolment. Note: Departmental permission required.

This unit of study enables talented students to apply their IT knowledge from their first year study to more advanced and exciting projects. In this unit, students will be provided with the opportunity to be involved in projects that will a greater research focus.

ISYS2140 Information Systems
Credit points: 6 Session: Semester 1 Classes: (Lec 2hrs & Prac 3hrs) per week
Assumed knowledge: INFO1003 or INFS1000
Assessment: Quiz (10%), Project (20%), Assignment (20%), Final Exam (50%)

This unit of study will provide a comprehensive conceptual and practical introduction to information systems (IS) in contemporary organisations. Content: General Systems Theory; Basic concepts of organisations, systems and information; The role of information systems in operating and managing organisations; How IS and the Internet enables organisations to adopt more competitive business models, including e-Commerce; The technologies that underpin IS; Distributed systems, including security, networking principles, the client server model and how distributed components locate and communicate with each other; The integration of disparate systems both within the organisation and between organisations, including the role of XML; Behavioural, managerial and ethical issues in implementing and managing IS.

Computer Science and Information Systems senior units of study in the BSc

Students are advised that doing less than 24 Senior credit points is not regarded as adequate preparation for a professional career in computing or for further study. Students are advised to balance their workload between semesters. It is important to choose second year subjects appropriately to keep options open for further study. See sydney.edu.au/engineering/it for advice.

COMP3109 Programming Languages and Paradigms
Credit points: 6 Session: Semester 2 Classes: (Lec 2hrs & Tutorial 1hrs) per week
Assumed knowledge: COMP2007
Assessment: In-course involvement, assignments(20%), quizzes(20%) and written exam(60%)

This unit provides an introduction to the foundations of programming languages and their implementation. The main aims are to teach what
Software Development Project
Credit points: 6 Session: Semester 2 Classes: (Meeting with academic supervisor 1hr & Class meeting 1hr) per week Prerequisites: INFO3402 Prohibitions: INFO3600, SOFT3300, SOFT3600, SOFT3200, SOFT3700 Assessment: Presentation/Seminar (20%), Report (70%), Progress Report (10%)
This unit will provide students an opportunity to apply the knowledge and practise the skills acquired in the prerequisite and qualifying units, in the context of designing and building a substantial software development system in diverse application domains including life sciences. Working in groups for an external client combined with academic supervision, students will need to carry out the full range of activities including requirements capture, analysis and design, coding, testing and documentation. Students will use the XP methodology and make use of professional tools for the management of their project.

Object Oriented Design
Credit points: 6 Session: Semester 1 Classes: (Lec 2hrs & Prac 2 hrs) per week Prohibitions: SOFT3001, SOFT3601, SOFT3101, SOFT3801, COMPP3008, COMPP3009 Assumed knowledge: INF02110 Assessment: Final Exam (70%), Assignment (26%), Quiz (4%) This unit covers essential design methods and language mechanisms for successful object-oriented design and programming. C++ is used as the implementation language and a special emphasis is placed on those features of C++ that are important for solving real-world problems. Advanced software engineering features, including exceptions and name spaces are thoroughly covered.

Human-Computer Interaction
Credit points: 6 Session: Semester 2 Classes: (Lec 2hrs & Prac 1hr) per week Prohibitions: MULT3307, MULT3607, MULT3018, MULT3918, SOFT3102, SOFT3802, COMPP3102, COMPP3802 Assumed knowledge: INF02110 Assessment: Lab skills (10%), assignment (20%), quiz (15%) and written exam (60%). This unit will introduce techniques to evaluate software user interfaces using heuristic evaluation and user observation techniques. Students will (i) learn how to design formal experiments to evaluate usability hypothesis and (ii) apply user centered design and usability engineering principles to design software user interfaces. A brief introduction to the psychological aspects of human-computer interaction will be provided.

Management of IT Projects and Systems
Credit points: 6 Session: Semester 1 Classes: (Lec 2hrs & Prac 1hr) per week Prohibitions: ISYS3500, ISYS3012, ELEC3606 Assumed knowledge: INF02000, INF02110, INF02810, INF02900 Assessment: Project (10%), Quiz (20%), Participation (20%), Final Exam (50%)
This course introduces the basic processes and techniques for managing IT projects, systems and services, throughout the IT lifecycle. It addresses both the technical and behavioural aspects of IT management at the enterprise level. Major topics include: organisational strategy and IT alignment, IT planning, project planning, tracking, resource estimation, team management, software testing,
delivery and support of IT services, service level agreements, change and problem management, cost effectiveness and quality assurance.

INFO3404
Database Systems 2
Credit points: 6
Session: Semester 2
Classes: (Lec 2hrs & Prac 2hrs) per week
Prohibitions: INFO3004, INFO3005, INFO3905, COMP3005, COMP3905
Assumed knowledge: Introductory database study such as INFO2120 or INFO2820 or INFO2905 or INFO2295.

This unit of study builds upon INFO2120 Database Systems 1 and provides a comprehensive overview of the internal mechanisms of Database Management Systems (DBMS) and other systems that manage large data collections. These skills are needed for successful performance tuning and to understand the scalability challenges faced by the information age. The first part of this subject focuses on mechanisms for large-scale data management. It provides a deep understanding of the internal components of a database engine. Topics include: physical data organization and disk-based index structures, query processing and optimisation, locking and logging, and database tuning. The second part focuses on the large-scale management of textual data such as by an information retrieval system or with web search engines. Topics include: distributed and replicated databases, information retrieval, document management, text index structures, web retrieval and page rank algorithms. This unit will be of interest to students studying an introduction to database tuning, disk-based data structures and algorithms, and information retrieval. It will be valuable to those pursuing such careers as Software Engineers, Database Experts, Database Administrators, and e-Business Consultants.

INFO3504
Database Systems 2 (Adv)
Credit points: 6
Teacher/Coordinator: - Session: Semester 2
Classes: (Lec 2hrs & Prac 2hrs) per week
Prohibitions: Distinction-level result in INFO2120 or INFO2820 or COMP2007 or COMP2907
Prohibitions: INFO3404, INFO3005, INFO3905, COMP3005, COMP3905
Assessment: Quiz (30%), Assignment (20%), Final Exam (50%)

This unit of study builds upon INFO2820 Database Systems 1 (Adv) and provides a comprehensive overview of the internal mechanisms of Database Management Systems (DBMS) and other systems that manage large data collections. These skills are needed for successful performance tuning and to understand the scalability challenges faced by the information age. The first part of this subject focuses on mechanisms for large-scale data management. It provides a deep understanding of the internal components of a database engine. Topics include: physical data organization and disk-based index structures, query processing and optimisation, locking and logging, and database tuning. The second part focuses on the large-scale management of textual data such as by an information retrieval system or with web search engines. Topics include: distributed and replicated databases, information retrieval, document management, text index structures, web retrieval and page rank algorithms. This unit will be of interest to students studying an introduction to database tuning, disk-based data structures and algorithms, and information retrieval. It will be valuable to those pursuing such careers as Software Engineers, Database Experts, Database Administrators, and e-Business Consultants.

INFO3600
Major Development Project (Advanced)
Credit points: 12
Session: Semester 2
Classes: Project Work - in class 2 hours per week, Site Visit 1 hour per week, Meeting 1 hour per week.
Prohibitions: INFO3402, COMP3615, ISYS3400, SOFT3300, SOFT3600, SOFT3200, SOFT3700
Assessment: Individual presentation/report (30%), oral examination(20%) and group reports (50%).
Note: Only available to students in BIT, BCST(Adv) or BS(Adv)

This unit will provide students an opportunity to carry out substantial aspects of a significant software development project. The project will be directed towards assisting a client group (from industry or with strong industry links). The student's contribution could cover one or more aspects such as requirements capture, system design, implementation, change management, upgrades, operation, and/or tuning. Assessment will be based on the quality of the delivered outputs, the effectiveness of the process followed, and the understanding of the way the work fits into the client’s goals, as shown in a written report.

INFO3911
IT Special Project 3A
Credit points: 6
Session: Semester 2
Classes: Meeting 1 hour per week, project work 8 hours per week.
Prohibitions: Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.
Assessment: Project (100%)
Note: Department permission required for enrolment.

This unit of study enables talented students with maturing IT knowledge to integrate various IT skills and techniques to carry out projects which are predominantly research-intensive.

INFO3912
IT Special Project 3B
Credit points: 6
Session: Semester 2
Classes: Meeting 1 hour per week, project work 8 hours per week.
Prohibitions: Distinction average in non-IT units completed in previous year of study, high distinction average in IT units completed in previous year.
Assessment: Project (100%)
Note: Department permission required for enrolment.

This unit of study enables talented students with maturing IT knowledge to integrate various IT skills and techniques to carry out projects which are predominantly research-intensive.

ISYS3400
Information Systems Project
Credit points: 6
Session: Semester 2
Classes: (Meeting with academic supervisor 1hr & Class meeting 1hr) per week
Prohibitions: INFO3402 or ISYS3012 and (ISYS3401 or ISYS3015)
Prohibitions: INFO3600, ISYS3207
Assumed knowledge: INFO2120
Assessment: Proposal (20%), Presentation/Seminar (10%), Report (30%), Participation (10%), Progress Report (10%), Final Exam (20%)

This unit will provide students an opportunity to apply the knowledge and practice the skills acquired in the prerequisite and qualifying units, in the context of a substantial information systems research or development project and to experience in a realistic way many aspects of analysing and solving information systems problems. Since information systems projects are often undertaken by small teams, the experience of working in a team is seen as an important feature of the unit. Students often find it difficult to work effectively with others and will benefit from the opportunity provided by this unit to further develop this skill.

ISYS3401
Analytical Methods & Information Systems
Credit points: 6
Session: Semester 1
Classes: (Lec 2hrs & Prac 1hr) per week
Prohibitions: ISYS3015
Assumed knowledge: INFO2110, ISYS2140
Assessment: In-course quizzes(50%) and written exam (50%)

This course will provide an introduction to the scientific approach and basic research methods that are relevant for conceptualizing and solving complex problems encountered Information Systems practice. A collection of different methods for collecting and analyzing information will be studied in the context of a few typical information system projects. These methods include surveys, controlled experiments, questionnaire design and sampling.

Law units of study
The following units of study are only available to students in the Bachelor of Science/Bachelor of Laws degree.

LAWS1006
Foundations of Law
Credit points: 6
Session: Semester 1
Classes: 1 x 1hr lec and 1 x 2hr seminar/wk
Prohibitions: LAWS1000
Assessment: class participation (20%), 1 x case analysis (30%), 1 x essay (50%)
This unit of study provides a foundation core for the study of law. We aim to provide a practical overview of the Australian legal system, an introduction to the skills of legal reasoning and analysis which are necessary to complete your law degree, and an opportunity for critical engagement in debate about the role of law in our lives. The course will introduce students to issues such as: (i) the development of judge made and statute law, with a particular focus on English and Australian legal history; (ii) the relationship between courts and parliament; (iii) the role and function of courts, tribunals and other forms of dispute resolution; (iv) understanding and interrogating principles of judicial reasoning and statutory interpretation; (v) the relationship between law, government and politics; (vi) what are rights in Australian law, where do they come from and where are they going; (vii) the development and relevance of international law. The course focus may be subject to change.

**LAW1012 Torts**

**Credit points:** 6  
**Teacher/Coordinator:** Prof Barbara McDonald, Mr Ross Anderson  
**Session:** S1 Intensive, Semester 2  
**Classes:** 3 x 2hr seminars for 6 weeks. Semester 2 (combined law): 1x2hr lectures and 1x1hr seminars/wk  
**Prerequisites:** LAWS1006, LAWS1010, LAWS3001  
**Assessment:** Combined Law: 1 x class test (30%); 1 x tutorial participation (10%) and 1 x 2hr exam (60%); Graduate Law: 1 x class test (30%), 1 x 2hr exam (70%).

This is a general introductory unit of study concerned with liability for civil wrongs. The unit seeks to examine and evaluate, through a critical and analytical study of primary and secondary materials, the function and scope of modern tort law and the rationale and utility of its governing principles. Particular topics on which the unit will focus include:

(a) The relationship between torts and other branches of the common law including contract and criminal law;  
(b) The role of fault as the principal basis of liability in the modern law;  
(c) Historical development of trespass and the action on the case and the contemporary relevance of this development;  
(d) Trespass to the person (battery, assault, and false imprisonment);  
(e) Trespass to land and private nuisance;  
(f) The action on the case for intentional injury;  
(g) Defences to intentional torts;  
(h) Development and scope of the modern tort of negligence, including detailed consideration of duty of care and breach of duty and causation and remoteness of damage with particular reference to personal and psychiatric injury;  
(i) Compensation for personal injuries, including special and alternative compensation schemes;  
(j) Injuries to relational interests, including compensation to relatives of victims of fatal accidents;  
(k) Defences to negligence.

**LAW1013 Legal Research I**

**Teacher/Coordinator:** Mr Graeme Coss  
**Session:** Semester 1, Semester 2  
**Classes:** 6x1hr seminars  
**Corequisites:** LAWS1006, LAWS1008  
**Assessment:** Satisfactory attendance, WebCT-based quizzes and 1x in-class exam

This is a compulsory unit taught on a pass/fail basis. The aim of the unit is to introduce you to finding and citing primary and secondary legal materials and introduce you to legal research techniques. These are skills which are essential for a law student and which you will be required to apply in other units.

**LAW1014 Civil and Criminal Procedure**

**Credit points:** 6  
**Teacher/Coordinator:** Assoc Prof David Hamer  
**Session:** Semester 1  
**Classes:** 2x2hr seminars/wk for 10 weeks  
**Prerequisites:** LAWS1006, LAWS1012, LAWS1003, LAWS3001, LAWS3002, LAWS3004, LAWS2006  
**Assessment:** 1x optional non-redeemable take home exam (30%) and 1x 2hr final exam (70% or 100%).

This unit of study aims to introduce students to civil and criminal procedure. It is concerned with the procedures relating to civil dispute resolution and criminal justice which are separate to the substantive hearing. The unit will consider the features of an adversarial system of justice and its impact on process. Recent reforms to the adversarial system of litigation will be explored. The civil dispute resolution part of the unit will cover alternative dispute resolution, the procedures for commencing a civil action, case management, gathering evidence and the rules of privilege. Criminal process will be explored by reference to police powers, bail and sentencing. The course focuses on practical examples with consideration of the applicable legislation, ethics, and contextual and theoretical perspectives.

**LAW1015 Contracts**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Greg Tolhurst  
**Session:** Semester 1, Summer Early  
**Classes:** 2x2hr lectures or tutorials/wk  
**Prerequisites:** LAWS1006, LAWS1008  
**Corequisites:** LAWS1006, LAWS1012, LAWS2008  
**Assessment:** class participation (10%), 1 x take-home assignment due week 7 (30%), 1 x 2hr final exam (60%).

Contract law provides the legal background for transactions involving the supply of goods and services and is, arguably the most significant means by which the ownership of property is transferred from one person to another. It vitally affects all members of the community and a thorough knowledge of contract law is essential to all practising lawyers. In the context of the law curriculum as a whole, Contracts provides background which is assumed knowledge in many other units. The aims of the course are composite in nature. The course examines the rules that regulate the creation, terms, performance, breach and discharge of a contract. Remedies and factors that may vitiate a contract such as misrepresentation are dealt with in Torts and Contracts II. The central aim of the course is to provide an understanding of the basic principles of contract law and how those principles are applied in practice to solve problems. Students will develop the skills of rules based reasoning and case law analysis. A second aim is to provide students an opportunity to critically evaluate and make normative judgments about the operation of the law. Successful completion of this unit of study is a prerequisite to the elective unit Advanced Contracts.

**LAW1016 Criminal Law**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Arlie Loughnan, Mr Graeme Coss  
**Session:** Semester 2  
**Classes:** 2x2hr seminar/wk for 10 weeks  
**Prerequisites:** LAWS1006, LAWS1014  
**Corequisites:** LAWS1003, LAWS3001, LAWS2009  
**Assessment:** class participation (10%), 1x research problem (30%) and 1x 2hr open book exam (60%).

This unit of study is designed to introduce the general principles of criminal law in NSW, and to critically analyse these in their contemporary social and political context. In order to achieve this, the unit will consider a range of theoretical literature as well as critical commentary, and will focus on particular substantive legal topics in problem-centred contexts. Although the topic structure is necessarily selective, it is intended that students will gain a broad understanding of crime and justice issues, as well as of the applications of the criminal law. Students will encounter problem-based learning and will be encouraged to challenge a range of conventional wisdom concerning the operation of criminal justice. This unit of study is designed to assist students in developing: (1) A critical appreciation of certain key concepts which recur throughout the substantive criminal law; (2) knowledge of the legal rules in certain specified areas of criminal law and their application; (3) preliminary knowledge of how the criminal law operates in its broader societal context. (4) Through following the process of proof in a criminal prosecution and its defense, to...
understand the determination of criminal liability. The course has a critical focus and will draw on procedural, substantive, theoretical and empirical sources. The contradictions presented by the application of legal principle to complex social problems will be investigated.

**LAW1017**

**Torts and Contracts I**

Credit points: 6  
Teacher/Coordinator: Assoc Prof Barbara McDonald, Mr Ross Anderson  
Session: Semester 2  
Main Classes: 1x2hr lecture and 1x1hr tutorial/week  
Prerequisites: LAWS1010 or LAWS1012 and LAWS1015  
Assessment: 1 x 2000w assignment or class test (30%); tutorial participation (10%); 1x 2 hour exam (60%).

The laws of tort and contract frequently overlap in practice and are increasingly regulated by statute. This unit aims to develop the integrated study of the law of obligations and remedies. It builds on the introduction to tort and contract law which students have acquired in Torts and Contracts. It will include the study of more advanced topics in both areas and the impact of related statutory liability and remedies. Topics:

(a) Concurrent, proportionate and vicarious liability;  
(b) Trespass to goods;  
(c) Liability for misrepresentation in tort, contract and under statute (eg statutory duties, s 52 Trade Practices Act 1974 (Cth));  
(d) Liability for economic loss in tort, including some comparative study;  
(e) Detailed consideration of causation and remoteness of damage in tort and contract;  
(f) Damages for breach of contract;  
(g) Unfair dealing in contracts and vitiating factors: mistake, misrepresentation, duress, undue influence, unconscionable conduct. This topic includes a study of equitable principles and statutory rights.

**LAW1019**

**Legal Research II**

Teacher/Coordinator: Mr Graeme Coss  
Session: Semester 1, Semester 2  
Classes: 4 x 2hr seminars  
Prerequisites: LAWS1013  
Prohibitions: LAWS1008, LAWS1022  
Assessment: Satisfactory attendance and 1x class exam  
Note: Semester 1 classes are for Combined Law candidates in the faculties of Arts, Engineering and Science. Semester 2 classes are for Combined Law candidates in the Faculty of Economics & Business.

This is a compulsory unit taught on a pass/fail basis. It is a continuation of Legal Research I and covers advanced searching techniques and the use of Lexis, Westlaw and other complex commercial databases. The purpose of this unit is to further develop the skills you will need as a law student and to introduce you to the legal research skills you will need after graduation.

**Marine Science**

The University of Sydney Institute of Marine Science (USIMS) provides for undergraduate units of study of a transdisciplinary nature in the marine sciences at the Intermediate, Senior and Honours levels. Staff from the School of Biological Sciences and the School of Geosciences teach these units. For further information on all units of study, please refer to the Marine Science website [http://sydney.edu.au/usims/study/majors.shtml](http://sydney.edu.au/usims/study/majors.shtml)

**Marine Science Intermediate units of study**

**GEOS2115**

Oceans, Coasts and Climate Change

Credit points: 6  
Teacher/Coordinator: Dr Maria Seton; A/Prof Peter Cowell, Dr Ana Vila Concejo  
Session: Semester 1  
Classes: 2x1hr lectures/week. Practical classes will comprise of 6x1hr tutorials, 1x8 hr field excursion on a Sunday, 3x4 hr excursions, 1x3 hr practical. Excursions may be timetabled for weekends. Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBGL/EDUH). 12 credit points of Junior Chemistry. Prohibitions: BIOL2918  
Assumed knowledge: 12 credit points of Junior Biology.  
Assessment: 1x2 hr theory exam (40%), 4 written reports (60%).

This unit will describe some of the ways in which the properties of the oceans affect marine organisms. It also introduces coral reefs and other marine ecosystems, together with their productivity, biological oceanography, the reproductive biology of marine organisms, and marine biological resources. The practical elements will provide the core skills and techniques that will equip students to perform laboratory and field studies in marine biology. The unit will introduce appropriate methodologies for the collection, handling and analysis of data, the scientific principles underlying experimental design, and the effective communication of scientific information.

**Textbooks**

**BIO1208**

Introduction to Marine Biology

Credit points: 6  
Teacher/Coordinator: Dr A Pile  
Session: Semester 2  
Classes: 2x1 hr lectures/week. Practical classes will comprise of 6x1hr tutorials, 1x8 hr field excursion on a Saturday, 3x4 hr excursions, 1x3 hr practical. Excursions may be timetabled for weekends. Prerequisites: BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBGL/EDUH). 12 credit points of Junior Chemistry. Prohibitions: BIOL2918  
Assumed knowledge: 12 credit points of Junior Biology.  
Assessment: 1x2 hr theory exam (40%), 4 written reports (60%).

This unit will describe some of the ways in which the properties of the oceans affect marine organisms. It also introduces coral reefs and other marine ecosystems, together with their productivity, biological oceanography, the reproductive biology of marine organisms, and marine biological resources. The practical elements will provide the core skills and techniques that will equip students to perform laboratory and field studies in marine biology. The unit will introduce appropriate methodologies for the collection, handling and analysis of data, the scientific principles underlying experimental design, and the effective communication of scientific information.

**Textbooks**

BIO2918
Introduction to Marine Biology (Adv)
Credit points: 6 Teacher/Coordinator: A/Professor R Coleman Session: Semester 2 Classes: 2x1hr lectures per week, 6x1hr tutorials, 1x3hr field trip, 3x4hr field trips and 1x3hr practical. Prerequisites: Distinction average in BIOL (1001 or 1911) and 6 additional credit points of Junior Biology (BIOL/MBLG/EDUH). 12 credit points of Junior Chemistry (or for BSc (Marine Science) students 6 credit points of Junior Chemistry and either an additional 6 credit points of Junior Chemistry or 6 credit points of Junior Physics. These requirements may be varied and students with lower averages should consult the Unit Executive Officer. Prohibitions: BIO2018, MARS2006, MARS2906, MARS2007, MARS2907 Assumed knowledge: 12 credit points of Junior Biology. Assessment: Two hour theory exam, four written reports (100%) Note: Entry is restricted and selection is made from applicants on the basis of previous performance.

This unit has the same objectives as BIO2018, Introduction to Marine Biology, and is suitable for students wishing to pursue aspects from the unit in greater depth. Students taking this unit will participate in alternatives to some elements of the ordinary level course and will be required to pursue the unit objectives by more independent means. Specific details of the unit will be announced in meetings, during the first week of teaching.

Textbooks
As for BIO2018

Marine Science senior units of study
Students can major in Marine Science, Marine Geoscience and Marine Biology by completing Senior units of study to a total worth of 24 credit points from the units listed in Table 1 for the respective majors. The marine science major is interdisciplinary so it must include at least one BIOL and one GEOS unit. Students in the specialist BSc (Marine Science) degree must enrol in a minimum of 36 credit points of Senior Marine Science units of study, which may include up to 3 Tropical Marine Science (NTMP) units, and which must include at least one BIOL and one GEOS unit. Students are encouraged to select those electives in which they have a particular interest, subject to certain conditions (see Table 1). Because of limited facilities available for some units of study, particularly in marine biology, it may be necessary to restrict number of students taking these electives. If this need arises selection will be based on academic merit and/or other courses completed. All students intending to enrol in any of the biology options must consult the booklet information for Students Considering Senior Biology Units of Study available from the School of Biological Sciences Office during the last few weeks of the academic year prior to this enrolment. Such students should also complete a preliminary enrolment form in the School of Biological Sciences before first semester commences.

Descriptions of senior Marine Science options
Students should consult electives as listed in this chapter under Biological Sciences and Geosciences in this handbook. BIO3006 Ecological Methods; BIO3007 Ecology; BIO3008 Marine Field Ecology; BIO3011 Ecophyiology; BIO3013 Marine Biology; BIO3016 Coral Reef Biology; GEOS3009 Coastal Environments and Processes; GEOS3014 GIS in Coastal Management; GEOS3018 Rivers: Science, Policy and Management; GEOS3103 Environmental & Sedimentary Geology; GEOS3104 Geophysical Methods; GEOS3102 Global Energy and Resources (and equivalent versions of these units).

Tropical Marine Network Program
Students enrolled in the BSc (Marine Science) are eligible to enrol in units of study offered as part of the Tropical Marine Network Program. This is a joint program of the University of Sydney, the University of Queensland and James Cook University, which offers four units of study in tropical marine science, all taught at marine island research stations off the Queensland coast. Students majoring in Marine Science or Marine Geoscience but who are not enrolled in the BSc (Marine Science) may be eligible for enrolment in some TMNP units subject to places available.

Stations used
The following stations will be used: Lizard Island (Australian Museum field station, north of Cairns); Orpheus Island (James Cook University field station, off Townsville); Heron Island (University of Queensland field station, off Gladstone); One Tree Island (University of Sydney field station, off Gladstone); North Stradbroke Island (University of Queensland field station, off Brisbane).

Teaching and assessment
The four units of study, each worth 6 credit points, are conducted as field schools offered only during the Easter (Semester 1 mid-semester) and the July mid-semester break. Each field school will run for approximately 10 days. Assessment will be based on participation and reports completed during the field school, and an assignment to be completed following the field school. The Coral Reef Ecosystems unit and the Coastal Management unit will be offered each year, together with one of the other two units. Students may enrol in these units in academic year 2 and year 3 as part of the BSc (Marine Science). Students enrolling in these units of study will be selected from the three participating Universities, as well as some overseas Study Abroad students. Preference will however be given to students enrolled in the program at the three participating universities.

Quotas on numbers of students enrolling in NTMP units
Owing to the size of facilities and accommodation at the island research stations all units will have a quota with entry based on merit. There are no Advanced versions of these units. For further information on the availability and timing of these units please refer to the website: sydney.edu.au/usims.

NTMP3004
Aquaculture
Credit points: 6 Teacher/Coordinator: Professor Maria Byrne Session: S2 Intensive Classes: Fieldwork, 72 hours block mode. Prerequisites: 12 credit points from Intermediate Science units of study which must include at least 6 credit points of Biology. Assumed knowledge: General concepts in Biology. Assessment: Assignments and report (100%) Note: Department permission required for enrolment.

Aquaculture is an intensive unit that will be held on campus at James Cook University with field work at Orpheus Island and other locations in the Great Barrier Reef Marine Park. The unit focuses on approaches to aquaculture in tropical marine environments with a focus on sustainable aquaculture. Some exercises use the aquarium system on campus at James Cook University. Emphasis is given to aquaculture of tropical invertebrates (especially bivalves and clams) and fishes. Aspects covered include: the design of aquaculture facilities; water quality; rearing of algae; rearing of planktonic food; stocking densities; and, growth and genetics of the target species.

NTMP3005
Coastal Management
Credit points: 6 Teacher/Coordinator: Dr Ana Vila-Concejo Session: S2 Intensive Classes: 80 hours block mode includes fieldwork. Prerequisites: 12 credit points from Intermediate Science units of study Assumed knowledge: General concepts in coastal environments Assessment: Assignment and report (100%) Note: Department permission required for enrolment.

This unit examines the impacts of human activities on coastal and marine environments. It explores the complex relationships among the ecological and social values of these environments and outlines strategies and tools for their management. This is an intensive unit that includes lectures on campus and at the Sydney Institute of Marine Science (SIMS) located in Chowder Bay as well as field trips to sites of interest.

Mathematics and Statistics
The School of Mathematics and Statistics offers units of study in Applied Mathematics, Mathematical Statistics and Pure Mathematics. The Junior units of study cover a range of topics in mathematics and statistics and are offered at three levels, viz. Introductory, Fundamental, Normal and Advanced, to suit various levels of previous
knowledge. Intermediate, Senior and Honours units of study are mostly provided within one of the subject areas of Applied Mathematics, Mathematical Statistics and Pure Mathematics.

Applied Mathematics
Applied Mathematics is concerned with the development of mathematical and computing methods and their application in particular contexts which may arise in the natural sciences, engineering, economics or the social sciences. Units of study are designed to give training to students who will specialise in other subjects, and also for training applied mathematicians. While mathematical rigour is not neglected, particular emphasis is given to questions such as the treatment of observational models which are relevant to particular contexts.

Mathematical Statistics
Mathematical Statistics is concerned with the theory of probability and the mathematical methods of statistics applied to such problems as statistical inference, the design of experiments and sample surveys, and all problems of data analysis. The major units of study are designed to train those who wish to become professional statisticians, tertiary teachers and research workers, but there are units of study which provide a knowledge of statistical methods and techniques for students specialising in other fields.

Pure Mathematics
Pure Mathematics units of study have two main aims. One of these is to equip students with the background of mathematical knowledge, understanding and skill necessary for units of study in many branches of science. The other is the provision of training in pure mathematics necessary for those who wish to make a career in mathematics. This might be either in teaching or research or in one of the many areas where highly developed mathematical ability and a thorough knowledge of modern mathematical techniques are required, such as computing, operations research, management, finance and economics. Website: Further information about all units of study is available at www.maths.usyd.edu.au/Teaching.html

Summer School
This School offers some units of study in The Sydney Summer School (January-February), Consult The Sydney Summer School website for more information: sydney.edu.au/summer.

Mathematics Junior units of study
Various combinations of Junior units of study may be taken, subject to the prerequisites listed. Often specific Junior units of study are prerequisites for Mathematics and Statistics units in the Intermediate and Senior years. Before deciding on a particular combination of Junior units of study, students are advised to check carefully the prerequisites relating to Mathematics for all units of study.

Junior introductory unit of study
Students who have not studied a calculus course in high school may enrol in the Introduction to Calculus, 6-credit point unit.

MATH1111
Introduction to Calculus
Credit points: 6 Session: Semester 1 Classes: Three 1-hour lectures and two 1-hour tutorials per week. Prohibitions: MATH1001, MATH1901, MATH1011, MATH1906 Assumed knowledge: HSC General Mathematics Assessment: One 2-hour exam, assignments, quizzes (100%)

Note: Department permission required for enrolment. Note: Students who have previously studied calculus at any level are prohibited from enrolling in this unit. In particular, students with HSC Mathematics/Extension 1/Extension 2 (or equivalent) are prohibited.

This unit is an introduction to the calculus of one variable. Topics covered include elementary functions, differentiation, basic integration techniques and coordinate geometry in three dimensions. Applications in science and engineering are emphasised.

Textbooks
As set out in the Junior Mathematics Handbook

Junior fundamental units of study
Fundamental units of study are designed to provide students with an overview of the necessary mathematical and statistical background for studies in other scientific disciplines. They are provided for students in the Faculty of Science whose major interests lies outside mathematics, but who require mathematics and statistics to support the study of other scientific disciplines. There are more details in the Junior Mathematics Handbook, available from the school at the time of enrolment.

Assumed knowledge
Knowledge equivalent to the HSC 2-unit Mathematics course is assumed. Students who do not have this knowledge are strongly advised to attend a bridging course conducted jointly by the School and the Mathematics Learning Centre in February.

Relationship of fundamental units to other units of study and recommendations
The four fundamental units of study together give 12 credit points of mathematics, which is the minimum required by the BSc degree regulations. Students obtaining a Distinction in MATH1011 are encouraged to enrol in normal units of study in subsequent semesters. Students obtaining a Distinction or better in MATH1011, 1013 or 1014 may proceed to Intermediate units of study in the Mathematics Discipline Area. Students with a Credit or better in MATH1011 and a Pass or better in MATH1015 may proceed to Intermediate units of study in the Statistics discipline area. Students with a Pass in only MATH1015 are limited to the Intermediate Statistics units of study STAT2011 and STAT2012.

MATH1011
Applications of Calculus
Credit points: 3 Session: Semester 1, Summer Main Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prohibitions: MATH1111, MATH1001, MATH1901, MATH1906, BIOM1003 Assumed knowledge: HSC Mathematics Assessment: One 1.5 hour examination, assignments and quizzes (100%)

This unit is designed for science students who do not intend to undertake higher year mathematics and statistics. It includes the fitting of data to various functions and demonstrates the use of calculus in optimisation problems. It extends differential calculus to functions of two variables and develops integral calculus, including the definite integral and multiple integrals.

Textbooks
As set out in the Junior Mathematics Handbook

MATH1013
Mathematical Modelling
Credit points: 3 Session: Semester 2, Summer Main Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prohibitions: MATH1003, MATH1903, MATH1907 Assumed knowledge: HSC Mathematics or MATH1111 Assessment: One 1.5 hour examination, assignments and quizzes (100%)

MATH1013 is designed for science students who do not intend to undertake higher year mathematics and statistics. In this unit of study students learn how to construct, interpret and solve simple differential equations and recurrence relations. Specific techniques include separation of variables, partial fractions and first and second order linear equations with constant coefficients. Students are also shown how to iteratively improve approximate numerical solutions to equations.

Textbooks
As set out in the Junior Mathematics Handbook

MATH1014
Introduction to Linear Algebra
Credit points: 3 Session: Semester 2 Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prohibitions: MATH1012, MATH1002, MATH1902 Assumed knowledge: HSC Mathematics or MATH1111 Assessment: One 1.5 hour exam, assignments, quizzes (100%)

This unit is an introduction to Linear Algebra. Topics covered include vectors, systems of linear equations, matrices, eigenvalues and
MATH1002 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study introduces vectors and vector algebra, linear algebra including solutions of linear systems, matrices, determinants, eigenvalues and eigenvectors.

Textbooks
As set out in the Junior Mathematics Handbook

MATH1003
Integral Calculus and Modelling
Credit points: 3
Session: Semester 2, Summer Main
Classes: Two 1 hour lectures and one 1 hour tutorial per week.
Prohibitions: MATH1005, MATH1903, MATH1907
Assumed knowledge: HSC Mathematics Extension 2 or MATH1001 or MATH1011
Assessment: One 1.5 hour examination, assignments and quizzes (100%)

MATH1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various techniques of integration are considered, such as integration by parts. The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

Textbooks
As set out in the Junior Mathematics Handbook

MATH1004
Discrete Mathematics
Credit points: 3
Session: Semester 2, Summer Main
Classes: Two 1 hour lectures and one 1 hour tutorial per week.
Prohibitions: MATH1004, MATH2011
Assumed knowledge: HSC Mathematics Extension 1
Assessment: One 1.5 hour examination, assignments and quizzes (100%)

MATH1004 is designed to provide a thorough preparation for further study in mathematics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science. This unit provides an introduction to fundamental aspects of discrete mathematics, which deals with 'things that come in chunks that can be counted'. It focuses on the enumeration of a set of numbers, viz. Catalan numbers. Topics include sets and functions, counting principles, Boolean expressions, mathematical induction, generating functions and linear recurrence relations, graphs and trees.

Textbooks
As set out in the Junior Mathematics Handbook

MATH1005
Statistics
Credit points: 3
Session: Semester 2, Summer Main
Classes: Two 1 hour lectures and one 1 hour tutorial per week.
Prohibitions: MATH1015, MATH1905, MATH1907
Assumed knowledge: HSC Mathematics Extension 1
Assessment: One 1.5 hour examination, assignments and quizzes (100%)

MATH1005 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit offers a comprehensive introduction to data analysis, probability, sampling, and inference including t-tests, confidence intervals and chi-squared goodness of fit tests.

Textbooks
As set out in the Junior Mathematics Handbook

Mathematics and Statistics Junior Advanced units of study
Advanced units of study are designed for students who have a strong background and a keen interest in mathematics and who need to study mathematics at a higher level to satisfy their own aspirations or degree requirements. All students aiming for high achievement, such...
as an Honours degree or postgraduate study, are advised to enrol in Advanced units of study.

Content

The unit of study content is similar in outline to that of the Normal units of study above but proceeds more deeply and at a faster rate, covers more difficult material and requires more mathematical sophistication. There are more details of these units of study in the Junior Mathematics Unit of Study Handbook, available from the School at the time of enrolment.

Assumed knowledge

Knowledge equivalent to the HSC Mathematics Extension 2 course is assumed. Students who have a very good result in the equivalent of the HSC Mathematics Extension 1 course may be permitted to enrol in these units of study after discussion with a Mathematics adviser.

Relation to other units of study and recommendations

Students should take two units of study in each semester in order to meet the minimum requirement of 12 credit points of Mathematics in the BSc award course. The usual enrolment for Advanced level students is in the units MATH1901, MATH1902, MATH1903 and MATH1905. Passes in Junior units of study at this level qualify students to proceed to Intermediate units of study in Mathematics and Statistics at the Advanced level. It should be noted that some Intermediate and Senior units of study in both Mathematics and Statistics require specific Junior units of study as prerequisites. Students who are awarded at least a Credit grade in this level are encouraged to proceed to Intermediate units of study in Mathematics and Statistics at the Advanced level. Enrolment in MATH1906 or MATH1907 is by invitation only.

MATH1901

Differential Calculus (Advanced)

Credit points: 3 Session: Semester 1 Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prerequisites: HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.

Prohibitions: MATH1111, MATH1011, MATH1001, MATH1905

Assessment: One 1.5 hour examination, assignments and quizzes (100%)

This unit is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. It parallels the normal unit MATH1101 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH1902

Linear Algebra (Advanced)

Credit points: 3 Session: Semester 1 Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prerequisites: HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.

Prohibitions: MATH1102, MATH1012, MATH1014

Assessment: One 1.5 hour examination, assignments and quizzes (100%)

This unit is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. It parallels the normal unit MATH1102 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH1903

Integral Calculus and Modelling Advanced

Credit points: 3 Session: Semester 2 Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prerequisites: HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.

Prohibitions: MATH1003, MATH1013, MATH1907

Assumed knowledge: HSC Mathematics Extension 2 or Credit or better in MATH1001 or MATH1901

Assessment: One 1.5 hour examination, assignments and quizzes (100%)

MATH1903 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study parallels the normal unit MATH1103 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH1905

Statistics (Advanced)

Credit points: 3 Session: Semester 2 Classes: Two 1 hour lectures and one 1 hour tutorial per week. Prerequisites: HSC Mathematics Extension 2. This requirement may be varied. Students with an interest in mathematics, but without HSC mathematics Extension 2, should consult the unit of study coordinator.

Prohibitions: MATH1015, MATH1105, STAT1A01, STAT1002, ECMT1010

Assessment: One 1.5 hour examination, assignments and quizzes (100%)

This unit is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This Advanced level unit of study parallels the normal unit MATH1105 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH1906

Mathematics (Special Studies Program) A

Credit points: 3 Session: Semester 1 Classes: Two 1 hour lectures, one 1 hour tutorial per week. Prerequisites: UAI (or ATAR equivalent) of at least 98.5 and result in Band E4 HSC Mathematics Extension 2; by invitation Prohibitions: MATH1111, MATH1001, MATH1011, MATH1901

Assessment: One 1.5 hour exam, assignments, coursework (100%)

Note: Department permission required for enrolment.

This is an Advanced unit of study. Entry to Mathematics (Special Studies Program) A is restricted to students with a UAI of 98.5 and an excellent school record in Mathematics. Students will cover the material in MATH1901 Differential Calculus (Advanced). In addition there will be a selection of special topics, which are not available elsewhere in the Mathematics and Statistics program.

MATH1907

Mathematics (Special Studies Program) B

Credit points: 3 Session: Semester 2 Classes: Two 1 hour lectures, one 1 hour seminar and one 1 hour tutorial per week. Prerequisites: UAI (or ATAR equivalent) of at least 98.5 and result in Band E4 HSC Mathematics Extension 2; by invitation Prohibitions: MATH1003, MATH1013, MATH1903

Assessment: One 1.5 hour exam, assignments, coursework (100%)

Note: Department permission required for enrolment.

This is an Advanced unit of study. Entry to Mathematics (Special Studies Program) B is normally restricted to students with a Distinction in MATH1906. Students will cover the material in MATH1901 Differential Calculus (Advanced). In addition there will be a selection of special topics, which are not available elsewhere in the Mathematics and Statistics program.

Mathematics Intermediate units of study

The School of Mathematics provides a range of Intermediate units of study, each worth 6 credit points covering a variety of topics in Pure and Applied Mathematics. A normal Intermediate load in a discipline is 12 credit points and this is the minimum that should be undertaken by anyone intending to specialise in Senior Mathematics. The units of study are taught at either the Normal or the Advanced level. Entry to an Advanced unit of study usually requires a Credit or better in a Normal level prerequisite or a Pass in an Advanced level prerequisite. For ease of overview the units of study are arranged under Pure, for students wishing to specialise in Pure Mathematics, and Applied, for
those wishing to specialise in Applied Mathematics. Several units of study are suitable for either. Details of each unit of study appear below whilst full details of unit of study structure, content and examination procedures are provided in the Second Year Mathematics Handbook available from the School at the time of enrolment.

Pure units of study (each 6 credit points)
Algebra (Adv) MATH2968; Discrete Maths & Graph Theory MATH2969; Discrete Math’s & Graph Theory (Adv) MATH2969; Linear Mathematics & Vector Calculus MATH2961; Linear Mathematics & Vector Calculus (Adv) MATH2961; Number Theory and Cryptography MATH2968; Real and Complex Analysis (Adv) MATH2962

Applied units of study (each 6 credit points)

Relation to other units of study and recommendations
In general, 2 units of study (12 credit points) of Intermediate mathematics are needed to progress to a Senior Mathematics unit of study. If your major interest is in mathematics, then you are strongly encouraged to enrol in at least 3 units of study in Intermediate Mathematics. If you are considering doing Honours in mathematics, they should include some Advanced units of study. Students intending to specialise in Applied Mathematics are encouraged to include MATH2061 or 2961, and MATH2065 or 2965. Students intending to specialise in Pure Mathematics should include MATH2061 or 2961. Students considering Honours in Pure Mathematics should also take MATH2962 and MATH2968. Computer Science students may like to include MATH2069 or 2969 among their choices. Physics students would be well-advised to choose MATH2061 or 2961, and MATH2065 or 2965. Prospective teachers of mathematics should consider MATH2061 and 2968.

MATH2916
Working Seminar A (SSP)
Credit points: 3 Session: Semester 1 Classes: One 1 hour seminar per week. Prerequisites: By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics Assessment: One 1 hour presentation, 15-20 page essay (100%)
Note: Department permission required for enrolment.

The main aim of this unit is to develop the students' written and oral presentation skills. The material will consist of a series of connected topics relevant to modern mathematics and statistics. The topics are chosen to suit the students' background and interests, and are not covered by other mathematics or statistics units. The first session will be an introduction on the principles of written and oral presentation of mathematics. Under the supervision and advice of the lecturer(s) in charge, the students present the topics to the other students and the lecturer in a seminar series and a written essay in a manner that reflects the practice of research in mathematics and statistics.

MATH2917
Working Seminar B (SSP)
Credit points: 3 Session: Semester 2 Classes: One 1 hour seminar per week. Prerequisites: By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics Assessment: One 1 hour presentation, 15-20 page essay (100%)
Note: Department permission required for enrolment.

The aim of this unit is to develop the students' written and oral presentation skills. The material will consist of a series of connected topics relevant to modern mathematics and statistics. The topics are chosen to suit the students' background and interests, and are not covered by other mathematics or statistics units. The first session will be an introduction on the principles of written and oral presentation of mathematics. Under the supervision and advice of the lecturer(s) in charge, the students present the topics to the other students and the lecturer in a seminar series and a written essay in a manner that reflects the practice of research in mathematics and statistics.

MATH2061
Linear Mathematics and Vector Calculus
Credit points: 6 Session: Semester 1, Summer Main Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. Prerequisites: MATH(1011 or 1001 or 1901 or 1906) and MATH(1014 or 1002 or 1902) and MATH(1903 or 1903 or 1907). Prohibitions: MATH2001, MATH2901, MATH2902, MATH2902, MATH2961, MATH2067 Assessment: Two 1 hour exam, assignments, quizzes (100%)

This unit starts with an investigation of linearity: linear functions, general principles relating to the solution sets of homogeneous and inhomogeneous linear equations (including differential equations), linear independence and the dimension of a linear space. The study of eigenvalues and eigenvectors, begun in junior level linear algebra, is extended and developed. The unit then moves on to topics from vector calculus, including vector-valued functions (parametrised curves and surfaces; vector fields; div, grad and curl; gradient fields and potential functions), line integrals (arc length; work; path-independent integrals and conservative fields; flux across a curve), iterated integrals (double and triple integrals; polar, cylindrical and spherical coordinates; areas, volumes and mass; Green's Theorem), flux integrals (flow through a surface; flux integrals through a surface defined by a function of two variables, though cylinders, spheres and parametrised surfaces), Gauss' Divergence Theorem and Stokes' Theorem.

MATH2961
Linear Mathematics & Vector Calculus Adv
Credit points: 6 Session: Semester 1 Classes: Four 1 hour lectures and one 1 hour tutorial per week. Prerequisites: MATH(1901 or 1906 or Credit in 1001) and MATH(1902 or Credit in 1002) and MATH(1903 or 1907 or Credit in 1003). Prohibitions: MATH2001, MATH2901, MATH2902, MATH2902, MATH2061, MATH2067 Assessment: Two 1 hour exam, assignments, quizzes (100%)

This unit is an advanced version of MATH2061, with more emphasis on the underlying concepts and on mathematical rigour. Topics from linear algebra focus on the theory of vector spaces and linear transformations.

The connection between matrices and linear transformations is studied in detail. Determinants, introduced in first year, are revised and investigated further, as are eigenvalues and eigenvectors. The calculus component of the unit includes local maxima and minima, Lagrange multipliers, the inverse function theorem and Jacobians. There is an informal treatment of multiple integrals: double integrals, change of variables, triple integrals, line and surface integrals, Green's theorem and Stokes' theorem.

MATH2962
Real and Complex Analysis (Advanced)
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. Prerequisites: MATH(1901 or 1906 or Credit in 1001) and MATH(1902 or Credit in 1002) and MATH(1903 or 1907 or Credit in 1003). Prohibitions: MATH2007, MATH2907 Assessment: Two 1 hour exam, assignments, quizzes (100%)

Analysis is one of the fundamental topics underlying much of mathematics including differential equations, dynamical systems, differential geometry, topology and Fourier analysis. Starting off with an axiomatic description of the real number system, this first course in analysis concentrates on the limiting behaviour of infinite sequences and series on the real line and the complex plane. These concepts are then applied to sequences and series of functions, looking at point-wise and uniform convergence. Particular attention is given to power series leading into the theory of analytic functions and complex analysis. Topics in complex analysis include elementary functions on the complex plane, the Cauchy integral theorem, Cauchy integral formula, residues and related topics with applications to real integrals.

MATH2963
Math Computing and Nonlinear Systems
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week (lectures in common with MATH2963). Prerequisites: MATH(1011 or 1001 or 1901 or 1906) and
This unit will introduce students to techniques of mathematical computation as applied to nonlinear systems, using the numerical programming language MATLAB and, where appropriate, computer algebra. This knowledge will be applied to a number of modelling problems, particularly those involving nonlinear mappings and nonlinear ordinary differential equations (ODEs). Throughout the unit of study the essential nonlinear theory will be developed, and the resulting ideas will be explored computationally. This will allow us to explore the modern concepts of chaos using a variety of examples, including the logistic map, the Henon map and the Lorenz equations. No prior knowledge of programming or of the MATLAB language or computer algebra is required.

MATH2963
Math Computing & Nonlinear Systems (Adv)
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week (lectures in common with MATH2063). Prerequisites: MATH (1901 or 1906 or Credit in 1001) and MATH (1902 or Credit in 1002) and MATH (1903 or 1907 or Credit in 1003) Prohibitions: MATH2003, MATH2903, MATH2006, MATH2906, MATH2063 Assessment: 2 hour exam, assignments, quizzes (100%)

The content of this unit of study parallels that of MATH2063, but both computational and theory components will place more emphasis on applications to technology including Lyapunov exponents, stability, 2- and 3-cycles for mappings and concepts such as strange attractors. No prior knowledge of programming or of the MATLAB language or computer algebra is required.

MATH2065
Partial Differential Equations (Intro)
Credit points: 6 Session: Semester 2, Summer Main Classes: Three 1 hour lectures, one 1 hour tutorial, one 1 hour example class per week. Prerequisites: MATH(1011 or 1001 or 1901 or 1906) and MATH(1012 or 1002 or 1902) and MATH1003 or 1903 or 1907) Prohibitions: MATH2005, MATH2905, MATH2065, MATH2965 Assessment: 2 hour exam, mid-semester test, assignments (100%)

This is an introductory course in the analytical solutions of PDEs (partial differential equations) and boundary value problems. The techniques covered include separation of variables, Fourier series, Fourier transforms and Laplace transforms.

MATH2965
Partial Differential Equations Intro Adv
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week (lectures in common with MATH2065). Prerequisites: MATH(2901 or Credit in 2061) or MATH(2901 or Credit in 2061) or MATH(2902 or Credit in 2002) Prohibitions: MATH2005, MATH2905, MATH2065, MATH2965 Assessment: 2 hour exam, assignments (100%)

This unit of study is essentially an Advanced version of MATH2065, the emphasis being on solutions of differential equations in applied mathematics. The theory of ordinary differential equations is developed for second order linear equations, including series solutions, special functions and Laplace transforms, and boundary-value problems including separation of variables, Fourier series and Fourier transforms.

MATH2068
Number Theory and Cryptography
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. Prerequisites: 6 credit points of Junior level Mathematics. Prohibitions: MATH3024, MATH3009, MATH2968 Assumed knowledge: MATH (1014 or 1002 or 1902) Assessment: 2 hour exam, assignments, quizzes (100%)

Cryptography is the branch of mathematics that provides the techniques for confidential exchange of information sent via possibly insecure channels. This unit introduces the tools from elementary number theory that are needed to understand the mathematics underlying the most commonly used modern public key cryptosystems. Topics include the Euclidean Algorithm, Fermat's Little Theorem, the Chinese Remainder Theorem, Möbius Inversion, the RSA Cryptosystem, the ElGamal Cryptosystem and the Diffie-Hellman Protocol. Issues of computational complexity are also discussed.

MATH2988
Number Theory and Cryptography Advanced
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. Prerequisites: 9 credit points of Junior Mathematics (advanced level or Credit at normal level) including (MATH1902 or Credit in MATH1002) Prohibitions: MATH2958, MATH2918, MATH2068 Assessment: 2 hour exam, assignments (100%)

This unit provides an introduction to modern abstract algebra, via linear algebra and group theory. It extends the linear algebra covered in Junior Mathematics and in MATH2961, and proceeds to a classification of linear operators on finite dimensional spaces. Permutation groups are used to introduce and motivate the study of abstract group theory. Topics covered include actions of groups on sets, subgroups, homomorphisms, quotient groups and the classification of finite abelian groups.

MATH2069
Discrete Mathematics and Graph Theory
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. Prerequisites: 6 credit points of Junior level Mathematics. Prohibitions: MATH2011, MATH2009, MATH2969 Assessment: One 2 hour exam, assignments, quizzes (100%)

This unit introduces students to several related areas of discrete mathematics, which serve their interests for further study in pure and applied mathematics, computer science and engineering. Topics to be covered in the first part of the unit include recursion and induction, generating functions and recurrences, combinatorics, asymptotics and analysis of algorithms. Topics covered in the second part of the unit include Eulerian and Hamiltonian graphs, the theory of trees (used in the study of data structures), planar graphs, the study of chromatic polynomials (important in scheduling problems), maximal flows in networks, matching theory.

MATH2969
Discrete Mathematics & Graph Theory Adv
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. Prerequisites: 9 credit points of Junior Mathematics (advanced level or Credit at the normal level) Prohibitions: MATH2011, MATH2009, MATH2969 Assessment: One 2-hour exam, assignments, quizzes (100%)

This unit will cover the same material as MATH2069 with some extensions and additional topics.

MATH2070
Optimisation and Financial Mathematics
Credit points: 6 Session: Semester 2, Summer Main Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. Prerequisites: MATH(1011 or 1001 or 1901 or 1906) and MATH(1014 or 1902 or 1902) Prohibitions: MATH2010, MATH2033, MATH2933, MATH2970, ECM23510 Assumed knowledge: MATH (1003 or 1903 or 1907) Assessment: One 2-hour exam, assignments, quiz, project (100%)

Note: Students may enrol in both MATH2070 and MATH3075 in the same semester.
limitations. The first part of this unit looks at programming problems and their solution using the simplex algorithm; nonlinear optimisation & the Kuhn Tucker conditions.

The second part of the unit deals with utility theory and modern portfolio theory. Topics covered include: pricing under the principles of expected return and expected utility; mean-variance Markowitz portfolio theory, the Capital Asset Pricing Model, log-optimal portfolios and the Kelly criterion; dynamical programming. Some understanding of probability theory including distributions and expectations is required in this part.

Theory developed in lectures will be complemented by computer laboratory sessions using MATLAB. Minimal computing experience will be required.

MATH2970
Optimisation & Financial Mathematics Adv
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week (lectures given in common with MATH2070). Prerequisites: MATH (1901 or 1906 or Credit in 1002) or MATH (1903 or 1904 or Credit in 1002) Prohibitions: MATH2010, MATH2033, MATH2933, MATH2070 Assumed knowledge: MATH (1903 or 1907) or Credit in MATH1103 Assessment: One 2 hour exam, assignments, quizzes (100%)

Note: Students may enrol in both MATH2970 and MATH3975 in the same semester.

The content of this unit of study parallels that of MATH2070, but students enrolled at Advanced level will undertake more advanced problem solving and assessment tasks, and some additional topics may be included.

Mathematics Senior units of study
The School of Mathematics and Statistics provides a range of senior units of study in the Science Subject Area MATH. (The separate Science Subject Area STAT is dealt with in the next section.) Each unit of study is worth 6 credit points; students wishing to obtain a major in mathematics must therefore take at least 4 units of senior mathematics, while those wishing to obtain a double major must take 8. To proceed to honours in either Applied Mathematics or Pure Mathematics, students must have a major in mathematics. Honours entry is further restricted to students attaining a sufficiently high average mark in their senior year. Students interested in doing honours should consult the School to find out the precise details, and obtain advice on an appropriate senior year program. As well as majors in Mathematics and Statistics, the School offers a major in Financial Mathematics and Statistics. The precise requirements for this major can be found in Table 1. Alternatively, consult the School directly.

Normal and Advanced
Each unit of study is designated either as “Normal” or “Advanced”. Advanced units have more stringent prerequisites than normal units, and are significantly more demanding. Although the precise requirements vary from unit to unit, it is generally inadvisable for a student who has not achieved a Credit average in intermediate level mathematics to attempt an advanced senior mathematics unit.

Semester 1
MATH3063 Differential Equations and Biomaths; MATH3065 Logic and Foundations; MATH3076 Mathematical Computing; MATH3961 Metric Spaces (Advanced); MATH3962 Rings, Fields and Galois Theory (Adv); MATH3963 Differential Equations and Biomaths (Adv); MATH3974 Fluid Dynamics (Advanced); MATH3976 Mathematical Computing (Advanced)

Semester 2
MATH3061 Geometry and Topology; MATH3062 Algebra and Number Theory; MATH3067 Information and Coding Theory; MATH3075 Financial Mathematics; MATH3078 PDEs and Waves; MATH3964 Complex Analysis with Applications (Advanced); MATH3966 Modules and Group Representations (Adv); MATH3968 Differential Geometry (Adv); MATH3969 Measure Theory & Fourier Analysis (Adv); MATH3975 Financial Mathematics (Advanced); MATH3977 Lagrangian & Hamiltonian Dynamics (Adv); MATH3978 PDEs and Waves (Advanced)

Relation to other units of study and recommendations
In general, 4 units of study (24 credit points) are required in order to major in Mathematics and a credit average is required to progress to an Honours year. Potential Honours students are strongly encouraged to include one or more Advanced level unit(s) of study and seek advice from a Senior year coordinator. Particular combinations would be suitable for students with special interests.

Computer Science students
MATH3065, MATH3962, MATH3076/3976, MATH3062, MATH3067, MATH3966, MATH3061, MATH3075/3975.

Engineering (BSc/BE) students
MATH3961, MATH3068, MATH3063/3963, MATH3065, MATH3974, MATH3076/3976, MATH3969, MATH3078/3978, MATH3968, MATH3067, MATH3977, MATH3964, MATH3075/3975.

Physics or Chemistry students
MATH3061/3961, MATH3068, MATH3962, MATH3063/3963, MATH3065, MATH3969, MATH3076/3976, MATH3969, MATH3966, MATH3968, MATH3078/3978, MATH3964, MATH3977, 3075/3975, MATH3067.

Prospective teachers of Mathematics
MATH3065, MATH3068, MATH3063/3963, MATH3962, MATH3961, MATH3076/3976, MATH3067, MATH3062, MATH3061, MATH3078/3978.

MATH3061
Geometry and Topology
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics Prohibitions: MATH3001, MATH3006 Assessment: One 2 hour exam, tutorial tests, assignments (100%)

The aim of the unit is to expand visual/geometric ways of thinking. The geometry section is concerned mainly with transformations of the Euclidean plane (that is, bijections from the plane to itself), with a focus on the study of isometries (proving the classification theorem for transformations which preserve distances between points), symmetries (including the classification of frieze groups) and affine transformations (transformations which map lines to lines). The basic approach is via vectors and matrices, emphasising the interplay between geometry and linear algebra. The study of affine transformations is then extended to the study of collineations in the real projective plane, including collineations which map conics to conics. The topology section considers graphs, surfaces and knots from a combinatorial point of view. Key ideas such as homeomorphism, subdivision, cutting and pasting and the Euler invariant are introduced first for graphs (1-dimensional objects) and then for triangulated surfaces (2-dimensional objects). Topics include the classification of surfaces, map colouring, decomposition of knots and knot invariants.

MATH3062
Metric Spaces (Advanced)
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics units Prohibitions: MATH3001, MATH3001 Assumed knowledge: MATH2961 or MATH2962 Assessment: 2 hour exam, assignments, quizzes (100%)

Topology, developed at the end of the 19th Century to investigate the subtle interaction of analysis and geometry, is now one of the basic disciplines of mathematics. A working knowledge of the language and concepts of topology is essential in fields as diverse as algebraic number theory and non-linear analysis. This unit develops the basic ideas of topology using the example of metric spaces to illustrate and motivate the general theory. Topics covered include: Metric spaces, convergence, completeness and the contraction mapping theorem; Metric topology, open and closed subsets; Topological spaces, subspaces, product spaces; Continuous mappings and
homeomorphisms; Compact spaces; Connected spaces; Hausdorff spaces and normal spaces, Applications include the implicit function theorem, chaotic dynamical systems and an introduction to Hilbert spaces and abstract Fourier series.

MATH3062
Algebra and Number Theory
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics Prohibitions: MATH3962, MATH3902, MATH3002. MATH3009
Assessment: One 2 hour exam, quizzes and assignments (100%) Note: Students are advised to take MATH2068 or 2968 before attempting this unit.

The first half of the unit continues the study of elementary number theory, with an emphasis on the solution of Diophantine equations (for example, representing integers as sums of squares). Topics include the Law of Quadratic Reciprocity, representing an integer as the sum of two squares, and continued fractions. The second half of the unit introduces the abstract algebraic concepts which arise naturally in this context: rings, fields, irreducibles and unique factorisation. Polynomial rings, algebraic numbers and constructible numbers are also discussed.

MATH3962
Rings, Fields and Galois Theory (Adv)
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics. Prohibitions: MATH3062, MATH3902, MATH3002. Assumed knowledge: MATH2961
Assessment: One 2 hour exam, homework assignments (100%)
Note: Students are advised to take MATH2968 before attempting this unit.

This unit of study investigates the modern mathematical theory that was originally developed for the purpose of studying polynomial equations. The philosophy is that it should be possible to factorize any polynomial into a product of linear factors by working over a "large enough" field (such as the field of all complex numbers). Viewed like this, the problem of solving polynomial equations leads naturally to the problem of understanding extensions of fields. This in turn leads into the area of mathematics known as Galois theory.

The basic theoretical tool needed for this program is the concept of a ring, which generalizes the concept of a field. The course begins with examples of rings, and associated concepts such as subrings, ring homomorphisms, ideals and quotient rings. These tools are then applied to study quotient rings of polynomial rings. The final part of the course deals with the basics of Galois theory, which gives a way of understanding field extensions.

MATH3063
Differential Equations and Biomaths
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics. Prohibitions: MATH3020, MATH3902, MATH3003, MATH3923.
MATH3963 Assumed knowledge: MATH2061
Assessment: One 2 hour exam, assignments, quizzes (100%)

This unit of study is an introduction to the theory of systems of ordinary differential equations. Such systems model many types of phenomena in engineering, biology and the physical sciences. The emphasis will not be on finding explicit solutions, but instead on the qualitative features of these systems, such as stability, instability and oscillatory behaviour. The aim is to develop a good geometrical intuition into the behaviour of solutions to such systems. Some background in linear algebra, and familiarity with concepts such as limits and continuity, will be assumed. The applications in this unit will be drawn from predator-prey systems, transmission of diseases, chemical reactions, beating of the heart and other equations and systems from mathematical biology.

MATH3963
Differential Equations & Biomaths (Adv)
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics. Prohibitions: MATH3020, MATH3902, MATH3003, MATH3923.
MATH3063 Assumed knowledge: MATH2961
Assessment: One 2 hour exam, assignments, quizzes (100%)

The theory of ordinary differential equations is a classical topic going back to Newton and Leibniz. It comprises a vast number of ideas and methods of different nature. The theory has many applications and stimulates new developments in almost all areas of mathematics. The applications in this unit will be drawn from predator-prey systems, transmission of diseases, chemical reactions, beating of the heart and other equations and systems from mathematical biology. The emphasis is on qualitative analysis including phase-plane methods, bifurcation theory and the study of limit cycles. The more theoretical part includes existence and uniqueness theorems, stability analysis, linearisation, and hyperbolic critical points, and omega limit sets.

MATH3964
Complex Analysis with Applications (Adv)
This unit of study is not available in 2011
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics. Prohibitions: MATH3904, MATH3915. Assumed knowledge: MATH2962
Assessment: One 2 hour exam, assignments and quizzes (100%)

This unit continues the study of functions of a complex variable and their applications introduced in the second year unit Real and Complex Analysis (MATH2962). It is aimed at highlighting certain topics from analytic function theory and the analytic theory of differential equations that have intrinsic beauty and wide applications. This part of the analysis of functions of a complex variable will form a very important background for students in applied and pure mathematics, physics, chemistry and engineering.

The course will begin with a revision of properties of holomorphic functions and Cauchy theorem with added topics not covered in the second year course. This will be followed by meromorphic functions, entire functions, harmonic functions, elliptic functions, elliptic integrals, analytic differential equations, hypergeometric functions. The rest of the course will consist of selected topics from Greens functions, complex differential forms and Riemann surfaces.

MATH3065
Logic and Foundations
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 6 credit points of Intermediate Mathematics. Prohibitions: MATH3005.
Assessment: One 2 hour exam, tutorial tests, assignments (100%)

This unit is in two halves. The first half provides a working knowledge of the propositional and predicate calculi, discussing techniques of proof, consistency, models and completeness. The second half discusses notions of computability by means of Turing machines (simple abstract computers). (No knowledge of computer programming is assumed.) It is shown that there are some mathematical tasks (such as the halting problem) that cannot be carried out by any Turing machine. Results are applied to first-order Peano arithmetic, culminating in Gödel's Incompleteness Theorem: any statement that includes first-order Peano arithmetic contains true statements that cannot be proved in the system. A brief discussion is given of Zermelo-Fraenkel set theory (a candidate for the foundations of mathematics), which still succumbs to Gödel's Theorem.

MATH3966
Modules and Group Representations (Adv)
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics. Prohibitions: MATH3906, MATH3907. Assumed knowledge: MATH3962
Assessment: One 2 hour exam, assignments and quizzes (100%)

This unit deals first with generalized linear algebra, in which the field of scalars is replaced by an integral domain. In particular we investigate the structure of modules, which are the analogues of vector spaces in this setting, and which are of fundamental importance in modern pure mathematics. Applications of the theory include the solution over the integers of simultaneous equations with integer coefficients and analysis of the structure of finite abelian groups.
In the second half of this unit we focus on linear representations of groups. A group occurs naturally in many contexts as a symmetry group of a set or space. Representation theory provides techniques for analysing these symmetries. The component will deal with the decomposition of representation into simple constituents, the remarkable theory of characters, and orthogonality relations which these characters satisfy.

**MATH3067**

**Information and Coding Theory**

*This unit of study is not available in 2011*

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics  
**Prohibitions:** MATH3007, MATH3010  
**Assessment:** One 2 hour exam, tutorial tests, assignments (100%)  

The related theories of information and coding provide the basis for reliable and efficient storage and transmission of digital data, including techniques for data compression, digital broadcasting and broadband internet connectivity. The first part of this unit is a general introduction to the ideas and applications of information theory, where the basic concept is that of entropy. This gives a theoretical measure of how much data can be compressed for storage or transmission. Information theory also addresses the important practical problem of making data immune to partial loss caused by transmission noise or physical damage to storage media. This leads to the second part of the unit, which deals with the theory of error-correcting codes. We develop the algebra behind the theory of linear and cyclic codes used in modern digital communication systems such as compact disk players and digital television.

**MATH3068**

**Analysis**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics  
**Prohibitions:** MATH3008, MATH2007, MATH2907  
**Assessment:** One 2 hour exam, tutorial tests, assignments (100%)  

Note: This unit of study is offered only in odd numbered years.

Analysis grew out of calculus, which leads to the study of limits of functions, sequences and series. The aim of the unit is to present enduring beautiful and practical results that continue to justify and inspire the study of analysis. The unit starts with the foundations of calculus and the real number system. It goes on to study the limiting behaviour of sequences and series of real and complex numbers. This leads naturally to the study of functions defined as limits and to the notion of uniform convergence. Returning to the beginnings of calculus, and power series expansions leads to complex variable theory; analytic functions, Taylor expansions and the Cauchy Integral Theorem.

Power series are not adequate to solve the problem of representing periodic phenomena such as wave motion. This requires Fourier theory, the expansion of functions as sums of sines and cosines. This unit deals with this theory, Parseval's identity, pointwise convergence theorems and applications.

The unit goes on to introduce Bernoulli numbers, Bernoulli polynomials, the Euler MacLaurin formula and applications, the gamma function and the Riemann zeta function. Lastly we return to the foundations of analysis, and study limits from the point of view of topology.

**MATH3968**

**Differential Geometry (Advanced)**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics, including MATH2961  
**Prohibitions:** MATH3903  
**Assumed knowledge:** At least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level.  
**Assessment:** One 2 hour exam and 2 assignments (100%)  

Note: This unit of study is offered only in odd numbered years.

This unit is an introduction to Differential Geometry, using ideas from calculus of several variables to develop the mathematical theory of geometrical objects such as curves, surfaces and their higher-dimensional analogues. Differential geometry also plays an important part in both classical and modern theoretical physics. The initial aim is to develop geometrical ideas such as curvature in the context of curves and surfaces in space, leading to the famous Gauss-Bonnet formula relating the curvature and topology of a surface. A second aim is to present the calculus of differential forms as the natural setting for the key ideas of vector calculus, along with some applications.

**MATH3969**

**Measure Theory & Fourier Analysis (Adv)**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics  
**Prohibitions:** MATH3909  
**Assumed knowledge:** At least 6 credit points of Advanced Mathematics units of study at Intermediate or Senior level  
**Assessment:** One 2 hour exam, assignments, quizzes (100%)  

Measure theory is the study of such fundamental ideas as length, area, volume, arc length and surface area. It is the basis for the integration theory used in advanced mathematics since it was developed by Henri Lebesgue in about 1900. Moreover, it is the basis for modern probability theory. The course starts by setting up measure theory and integration, establishing important results such as Fubini's Theorem and the Dominated Convergence Theorem which allow us to manipulate integrals. This is then applied to Fourier Analysis, and results such as the Inversion Formula and Plancherel's Theorem are derived. Probability Theory is then discussed, with topics including independence, conditional probabilities, and the Law of Large Numbers.

**MATH3974**

**Fluid Dynamics (Advanced)**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics with average grade of at least Credit  
**Prohibitions:** MATH3914  
**Assumed knowledge:** MATH2961, MATH2965  
**Assessment:** One 2 hour exam (100%)  

This unit of study provides an introduction to fluid dynamics, starting with a description of the governing equations and the simplifications gained by using stream functions or potentials. It develops elementary theorems and tools, including Bernoulli's equation, the role of vorticity, the vorticity equation, Kelvin's circulation theorem, Helmholtz's theorem, and an introduction to the use of tensors. Topics covered include viscous flows, lubrication theory, boundary layers, potential theory, and complex variable methods for 2-D airfoils. The unit concludes with an introduction to hydrodynamic stability theory and the transition to turbulent flow.

**MATH3975**

**Financial Mathematics**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics  
**Prohibitions:** MATH3975, MATH3015, MATH3933  
**Assessment:** Two class quizzes and one 2 hour exam (100%)  

This unit is an introduction to the mathematical theory of modern finance. Topics include: notion of arbitrage, pricing riskless securities, risky securities, utility theory, fundamental theorems of asset pricing, complete markets, introduction to options, binomial option pricing model, discrete random walks, Brownian motion, derivation of the Black-Scholes option pricing model, extensions and introduction to pricing exotic options, credit derivatives. A strong background in mathematical statistics and partial differential equations is an advantage, but is not essential. Students completing this unit have been highly sought by the finance industry, which continues to need graduates with quantitative skills. The lectures in the Normal unit are held concurrently with those of the corresponding Advanced unit.

**MATH3975**

**Financial Mathematics (Advanced)**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week.  
**Prerequisites:** 12 credit points of Intermediate Mathematics with at least Credit average  
**Prohibitions:** MATH3933, MATH3015, MATH3075  
**Assessment:** Two class quizzes and one 2 hour exam (100%)
This unit is an introduction to the mathematical theory of modern finance. Topics include: notion of arbitrage, pricing riskless securities, risky securities, utility theory, fundamental theorems of asset pricing, complete markets, introduction to options, binomial option pricing model, discrete random walks, Brownian motion, derivation of the Black-Scholes option pricing model, extensions and introduction to pricing exotic options, credit derivatives. A strong background in mathematical statistics and partial differential equations is an advantage, but is not essential. Students completing this unit have been highly sought by the finance industry, which continues to need graduates with quantitative skills. Students enrolled in this unit at the Advanced level will be expected to undertake more challenging assessment tasks. The lectures in the Advanced unit are held concurrently with those of the corresponding Normal unit.

MATH3076
Mathematical Computing
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour laboratory per week. Prerequisites: 12 credit points of Intermediate Mathematics and one of MATH(1001 or 1003 or 1901 or 1903 or 1906 or 1907) Prohibitions: MATH3976, MATH3016, MATH3916 Assessment: One 2 hour exam, assignments, quizzes (100%) This unit of study provides an introduction to Fortran 95 programming and numerical methods. Topics covered include computer arithmetic and computational errors, systems of linear equations, interpolation and approximation, solution of nonlinear equations, quadrature, initial value problems for ordinary differential equations and boundary value problems.

MATH3976
Mathematical Computing (Advanced)
Credit points: 6 Teacher/Coordinator: Dr D J Ivers Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics and one of MATH(1903 or 1907) or Credit in MATH1003 Prohibitions: MATH3076, MATH3016, MATH3916 Assessment: One 2 hour exam, assignments, quizzes (100%) See entry for MATH3076 Mathematical Computing.

MATH3977
Lagrangian & Hamiltonian Dynamics (Adv)
Credit points: 6 Teacher/Coordinator: Dr Leon Poladian Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics with at least Credit average Prohibitions: MATH2904, MATH2004, MATH3917 Assessment: One 2 hour exam and assignments and/or quizzes (100%) This unit provides a comprehensive treatment of dynamical systems using the mathematically sophisticated framework of Lagrange and Hamilton. This formulation of classical mechanics generalizes elegantly to modern theories of relativity and quantum mechanics. The unit develops dynamical theory from the Principle of Least Action using the calculus of variations. Emphasis is placed on the relation between the symmetry and invariance properties of the Lagrangian and Hamiltonian functions and conservation laws. Coordinate and canonical transformations are introduced to make apparently complicated dynamical problems appear very simple. The unit will also explore connections between geometry and different physical theories beyond classical mechanics.

Students will be expected to solve fully dynamical systems of some complexity including planar motion and to investigate stability using perturbation analysis, Hamilton-Jacobi theory will be used to elegantly solve problems ranging from geodesics (shortest path between two points) on curved surfaces to relativistic motion in the vicinity of black holes.

This unit is a useful preparation for units in dynamical systems and chaos, and complements units in differential equations, quantum theory and general relativity.

MATH3078
PDEs and Waves
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics Prohibitions: MATH3978, MATH3018, MATH3921 Assumed knowledge: MATH2061/2961 and MATH2065/2965 Assessment: One 2 hour exam, one lecture quiz (100%) This unit of study introduces Sturm-Liouville eigenvalue problems and their role in finding solutions to boundary value problems. Analytical solutions of linear PDEs are found using separation of variables and integral transform methods. Three of the most important equations of mathematical physics - the wave equation, the diffusion (heat) equation and Laplace's equation - are treated, together with a range of applications. There is particular emphasis on wave phenomena, with an introduction to the theory of sound waves and water waves.

Textbooks

MATH3978
PDEs and Waves (Advanced)
Credit points: 6 Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week. Prerequisites: 12 credit points of Intermediate Mathematics with at least Credit average Prohibitions: MATH3078, MATH3018, MATH3921 Assumed knowledge: MATH2061/2961 and MATH2065/2965 Assessment: One 2 hour exam, one lecture quiz (100%) As for MATH3078 PDEs & Waves but with more advanced problem solving and assessment tasks. Some additional topics may be included.

Textbooks

Statistics Intermediate units of study
The School of Mathematics and Statistics provides Intermediate units of study, each worth 6 credit points, in Statistics. A normal Intermediate load in a discipline is 12 credit points and students intending to specialise in Senior Statistics should take 2 units of study (12 credit points) of Intermediate Statistics. Topics are offered at Normal and Advanced levels and may not be counted together. Further information follows, whilst details of units of study structure, content and assessment procedures are provided in the Intermediate Year Unit of Study Handbook available from the School at the time of enrolment. The units of study (each 6 credit points) are listed below:

First semester
Statistical Models STAT2011; Probability and Statistical Models (Adv) STAT2911

Second semester
Statistical Tests STAT2012; Statistical Tests (Advanced) STAT2912

Relation to other units of study and recommendations
Students should note that all Senior Statistics units of study have statistics prerequisites and some require MATH1003 or 1903 or MATH1002 or 1902. MATH2061 or MATH2961 is also desirable. If your major interest is statistics, you are encouraged to enrol in 2 units of study (12 credit points) in Intermediate Statistics. If you are considering doing Honours in Statistics, these units of study should be the Advanced units of study, and choices from Intermediate Mathematics should include at least MATH2061 or 2961. If you do not intend to major in Statistics but want a solid introduction to Applied Statistics, you should take STAT2012 in your second semester.

STAT2011
Statistical Models
Credit points: 6 Session: Semester 1 Classes: Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory week. Prerequisites: MATH (1001 or 1901 or 1906 or 1011) and MATH (1005 or 1905 or 1015) or STAT1021 Prohibitions: STAT2001, STAT2001, STAT3911 Assessment: One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%) This unit provides an introduction to univariate techniques in data analysis and the most common statistical distributions that are used to model patterns of variability. Common discrete random models like the binomial, Poisson and geometric and continuous models including the normal and exponential will be studied. The method of moments and maximum likelihood techniques for fitting statistical distributions
to data will be explored. The unit will have weekly computer classes where candidates will learn to use a statistical computing package to perform simulations and carry out computer intensive estimation techniques like the bootstrap method.

**STAT2911 Probability and Statistical Models (Adv)**

**Credit points:** 6  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prerequisites:** MATH (1903 or 1907 or Credit in 1003) and MATH (1905 or 1904 or Credit in 1005)  
**Prohibitions:** STAT2001, STAT2011, STAT2901  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This unit is essentially an advanced version of STAT2011, with an emphasis being on the mathematical techniques used to manipulate random variables and probability models. Common random variables including the Poisson, normal, beta and gamma families are introduced. Probability generating functions and convolution methods are used to understand the behaviour of sums of random variables. The method of moments and maximum likelihood techniques for fitting statistical distributions to data will be explored. The unit will have weekly computer classes where candidates will learn to use a statistical computing package to perform simulations and carry out computer intensive estimation techniques like the bootstrap method.

**STAT2012 Statistical Tests**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prerequisites:** MATH (1005 or 1905 or 1015) 
**Prohibitions:** STAT2004, STAT2912  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This unit provides an introduction to the standard methods of statistical analysis of data: Tests of hypotheses and confidence intervals, including t-tests, analysis of variance, regression - least squares and robust methods, power of tests, non-parametric tests, non-parametric smoothing, tests for count data, goodness of fit, contingency tables. Graphical methods and diagnostic methods are used throughout with all analyses discussed in the context of computation with real data using an interactive statistical package.

**STAT2912 Statistical Tests (Advanced)**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prerequisites:** MATH1905 or Credit in MATH1005  
**Prohibitions:** STAT2004, STAT2012  
**Assessment:** One 2 hour exam, assignments and/or quizzes, computer practical reports and one computer practical exam (100%)

This unit is essentially an advanced version of STAT2012 with an emphasis on both methods and the mathematical derivation of these methods: Tests of hypotheses and confidence intervals, including t-tests, analysis of variance, regression - least squares and robust methods, power of tests, non-parametric methods, non-parametric smoothing, tests for count data, goodness of fit, contingency tables. Graphical methods and diagnostic methods are used throughout with all analyses discussed in the context of computation with real data using an interactive statistical package.

**Statistics senior units of study**

The School of Mathematics and Statistics provides several Senior units of study, each worth 6 credit points, in Statistics. Students wishing to major in Statistics should take 4 units of study (24 credit points) of Senior Statistics. Some topics are offered at Normal and Advanced levels and may not be counted together. Entry to some Advanced units of study requires a Credit or better in a Normal level prerequisite or a Pass or better in an Advanced level prerequisite. Further information follows, whilst details of unit of study structure, content, and assessment procedures are provided in the Senior Units of Study Handbook available from the School at the time of enrolment. The units of study (each 6 credit points) are listed below:

**First semester**


**Second semester**

- STAT3013 Statistical Inference; STAT3913 Statistical Inference Advanced; STAT3014 Applied Statistics; STAT3914 Applied Statistics Advanced

**Relation to other units of study and recommendations**

In general 4 units of study (24 credit points) are required in order to major in Statistics, and a Credit average is required to progress to an Honours year. Potential Honours students are expected to include at least two Advanced level units of study. Students intending to major in Statistics should choose 2 units of study of Senior Statistics each semester, making 24 credit points in total.

**STAT3011 Stochastic Processes and Time Series**

**Credit points:** 6  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week; ten 1 hour computer laboratories per semester.  
**Prerequisites:** STAT (2011 or 2011 or 2901 or 2901) and MATH (1003 or 1903 or 1907).  
**Prohibitions:** STAT3911, STAT3003, STAT3903, STAT3005, STAT3905  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

Section I of this course will introduce the fundamental concepts of applied stochastic processes and Markov chains used in financial mathematics, mathematical statistics, applied mathematics and physics. Section II of the course establishes some methods of modeling and analysing situations which depend on time. Fitting ARMA models for certain time series are considered from both theoretical and practical points of view. Throughout the course we will use the S-PLUS (or R) statistical packages to give analyses and graphical displays.

**STAT3911 Stochastic Processes and Time Series Adv**

**Credit points:** 6  
**Session:** Semester 1  
**Classes:** Three 1 hour lecture, one 1 hour tutorial per week, plus an extra 1 hour lecture per week on advanced material in the first half of the semester. Seven 1 hour computer laboratories (on time series) in the second half of the semester (one 1 hour class per week).  
**Prohibitions:** STAT2911 or credit in STAT2011 and MATH (1003 or 1903 or 1907).  
**Prohibitions:** STAT3911, STAT3003, STAT3903, STAT3005, STAT3905  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This is an Advanced version of STAT3011. There will be 3 lectures in common with STAT3011. In addition to STAT3011 material, theory on branching processes and birth and death processes will be covered. There will be more advanced tutorial and assessment work associated with this unit.

**STAT3012 Applied Linear Models**

**Credit points:** 6  
**Session:** Semester 1  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratories per week.  
**Prerequisites:** STAT2012 or 2912 or 2004 and MATH (1002 or 1014 or 1902).  
**Prohibitions:** STAT3912, STAT3002, STAT3902, STAT3004, STAT3904  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This course will introduce the fundamental concepts of analysis of data from both observational studies and experimental designs using classical linear methods, together with concepts of collection of data and design of experiments. First we will consider linear models and regression methods with diagnostics for checking appropriateness of models. We will look briefly at robust regression methods here. Then we will consider the design and analysis of experiments considering notions of replication, randomization and ideas of factorial designs. Throughout the course we will use the R statistical package to give analyses and graphical displays.
This unit is essentially an Advanced version of STAT3012, with emphasis on the mathematical techniques underlying applied linear models together with proofs of distribution theory based on vector space methods. There will be 3 lectures per week in common with STAT3012 and some advanced material given in a separate advanced tutorial together with more advanced assessment work.

### STAT3013 Statistical Inference

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prerequisites:** STAT(2012 or 2912 or 2003 or 2903) and STAT (2011 or 2911).  
**Prohibitions:** STAT3913, STAT3001, STAT3901  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

In this course we will study basic topics in modern statistical inference. This will include traditional concepts of mathematical statistics: likelihood estimation, method of moments, properties of estimators, exponential families, decision-theory approach to hypothesis testing, likelihood ratio test as well as more recent approaches such as Bayes estimation, Empirical Bayes and nonparametric estimation. During the computer classes (using R software package) we will illustrate the various estimation techniques and give an introduction to computationally intensive methods like Monte Carlo, Gibbs sampling and EM-algorithm.

### STAT3913 Statistical Inference Advanced

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prohibitions:** STAT(2911 or 2903).  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This unit is essentially an Advanced version of STAT3013, with emphasis on the mathematical techniques underlying statistical inference together with proofs based on distribution theory. There will be 3 lectures per week in common with some material required only in this advanced course and some advanced material given in a separate advanced tutorial together with more advanced assessment work.

### STAT3014 Applied Statistics

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week.  
**Prohibitions:** STAT(2012 or 2912 or 2004).  
**Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%)

This unit has three distinct but related components: Multivariate analysis; sampling and surveys; and generalised linear models. The first component deals with multivariate data covering simple data reduction techniques like principal components analysis and core multivariate tests including Hotelling’s T^2, Mahalanobis’ distance and Multivariate Analysis of Variance (MANOVA). The sampling section includes sampling without replacement, stratified sampling, ratio estimation, and cluster sampling. The final section looks at the analysis of categorical data via generalised linear models. Logistic regression and log-linear models will be looked at in some detail along with special techniques for analyzing discrete data with special structure.
recombinant technology, cloning and gene products, transgenics and the linkage and mapping of genes including reference to DNA fingerprinting and the human genome project and gene therapy. The technical skills taught in the practical classes include the use of restriction enzymes, the separation of DNA molecules using electrophoresis, the preparation of chromosomes, linkage mapping, gene transfer and the measurement of gene expression. In addition to nurturing the skills involved in the design and execution of experiments, the practical sessions will formally teach students report writing skills and will give students practice at articulating feedback to their peers.

Textbooks
Genes IX (9th edition, Jones & Bartlett, 2008)

BMED2803 Cardiac, Respiratory and Renal Function
Credit points: 6
Teacher/Coordinator: Dr Suzanne Ollerenshaw
Session: Semester 1
Classes: Two 1 hour lectures per week; five hours of tutorials or practicals every fortnight.
Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study
Prohibitions: All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL (2006/2906) and BIOL (2016/2916)
Assessment: One 2hr theory exam; three in-semester assessments (100%)

This unit of study examines the cardiovascular and renal systems in human disease, with reference to major apparatus such as the heart, blood vessels, respiratory system and the kidney. The structure and function of the cardiovascular system is discussed and cardiac output, blood pressure and blood flow are studied. Discussion of the respiratory system embraces the structure of the respiratory organs and description of the mechanism of the transport of gases to and from cells. Similar treatment of the renal system involves anatomical and histological investigation of kidney structure and a physiological description of kidney function. Practical classes are designed to nurture the same generic attributes taught in BMED2801 and BMED2802 but, in addition, students are introduced to a wide range of anatomical and physiological technical skills. Specifically, students will investigate the structure and function of the heart and blood vessels, the components of the respiratory system and the kidney - all at the cellular and organ level. Students will also conduct experiments (often on themselves) which show how heart rate and blood pressure are controlled, how breathing is regulated and how urine output is modulated in response to both physiological and pharmacological stimuli.

BMED2804 Digestion, Absorption and Metabolism
Credit points: 6
Teacher/Coordinator: Dr Kim Bell-Anderson
Session: Semester 2
Classes: Two 1 hour lectures per week; five hours of tutorials or practicals every fortnight.
Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study
Prohibitions: All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL (2006/2906) and BIOL (2016/2016)
Assessment: One 2 hour theory exam; three in-semester assignments (100%)

This unit of study gives an introduction to the structures used to digest and absorb fuels, at both the anatomical and histological level. This is then followed by discussion of the utilisation and fate of absorbed fuels, at both the anatomical and histological level. This unit of study gives students extensive experience with inspection of the digestive system at both the cellular and gross anatomical level. The peristaltic reflex and pharmacological influences are explored. These sessions are designed to nurture observation, data analysis, record keeping and report writing skills.

BMED2805 Hormones, Reproduction and Development
Credit points: 6
Teacher/Coordinator: Dr Michael Morris
Session: Semester 2
Classes: Two 1 hour lectures per week; five hours of tutorials or practicals every fortnight.
Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study
Prohibitions: All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL (2006/2906) and BIOL (2016/2016)
Assessment: One 2 hr theory exam; three in-semester assessments (100%)

This unit of study examines hormonal control of human body processes. Specifically, students will investigate the structure and function of endocrine glands, such as the pituitary, thyroid and pancreas, at the cellular and organ level. Examples of the influence of hormones on metabolic processes are provided by considering fuel selection during exercise and starvation, and in diabetes and obesity. The fate of the macronutrients (carbohydrate, fat and protein) is then considered in terms of their uptake, disposal and reassembly into storage fuels and cellular substrates. Biochemical pathways involved in the extraction of energy from the macronutrient fuels are then covered, with emphasis on the whole-body integration and regulation of these metabolic processes. This leads to discussion of performance enhancing drugs and also provides a solid background for understanding pharmacological intervention in these conditions. The hormones involved in reproduction, contraception, fertilisation and pregnancy are also discussed, leading on to foetal-new-born transition and the development of the human embryo and cell differentiation. In the practical classes, students are introduced to a wide range of technical skills. Specifically, students will investigate the structure and function of the important endocrine glands, design a biochemical kit for the evaluation of blood glucose, perform a glucose tolerance test to investigate how glucose levels are regulated and modulated in response to a glucose load, and build models of embryos to help understand general mechanisms associated with development and differentiation. In addition, sessions are designed to nurture oral presentation skills, hypothesis testing, data analysis, troubleshooting, instruction writing and feedback skills.

BMED2806 Sensory and Motor Functions
Credit points: 6
Teacher/Coordinator: Dr Richard Ward
Session: Semester 1
Classes: Two 1 hour lectures per week; five hours of tutorials or practicals every fortnight.
Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study
Prohibitions: All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL (2006/2906) and BIOL (2016/2016)
Assessment: One 2 hr theory exam; three in-semester assessments (100%)

This unit of study examines how neural and motor systems are adapted to sense and respond to changes in the external environment. After consideration of the basic anatomical organisation of the nervous and sensory systems, the way in which nerve signals are integrated and coordinated in response to external stimuli are covered in more detail. Various senses such as vision, touch and hearing are studied, together with a discussion on motor reflexes. The receptors involved in normal modes of communications are discussed before specific examples such as the fright and flight and stress responses are considered. This is complemented by discussion of the effects of drugs on the nervous system, with special reference to pain and analgesics. An appreciation is gained of how toxins and infections can perturb the function of endocrine glands, such as the pituitary, thyroid and pancreas, at the cellular and organ level. Examples of the influence of hormones on metabolic processes are provided by considering fuel selection during exercise and starvation, and in diabetes and obesity. The fate of the macronutrients (carbohydrate, fat and protein) is then considered in terms of their uptake, disposal and reassembly into storage fuels and cellular substrates. Biochemical pathways involved in the extraction of energy from the macronutrient fuels are then covered, with emphasis on the whole-body integration and regulation of these metabolic processes. This leads to discussion of performance enhancing drugs and also provides a solid background for understanding pharmacological intervention in these conditions. The hormones involved in reproduction, contraception, fertilisation and pregnancy are also discussed, leading on to foetal-new-born transition and the development of the human embryo and cell differentiation. In the practical classes, students are introduced to a wide range of technical skills. Specifically, students will investigate the structure and function of the important endocrine glands, design a biochemical kit for the evaluation of blood glucose, perform a glucose tolerance test to investigate how glucose levels are regulated and modulated in response to a glucose load, and build models of embryos to help understand general mechanisms associated with development and differentiation. In addition, sessions are designed to nurture oral presentation skills, hypothesis testing, data analysis, troubleshooting, instruction writing and feedback skills.
and function of the nervous system and the skeleton (especially the vertebral column, the thorax and the limbs). Practical sessions also include the effects of analgesics on experimental pain and case studies of tetanus and botulism. The practical sessions draw widely on, and nurture, the generic skills taught in preceding units of study but particularly in BMED2804 and BMED2805.

BMED2807
Microbes and Body Defences
Credit points: 6  Teacher/Coordinator: Helen Agus  Session: Semester 2  Classes: Two 1 hour lectures per week; five hours of tutorials or practicals every fortnight. Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study  Prohibitions: All Intermediate level units offered by the Schools of Molecular Bioscience, Medical Sciences and BIOL(2006/2906) and BIOL(2016/2916)  Assessment: One 2-hour theory exam; three in-semester assessments (100%)

This unit of study begins by introducing the concepts of disease transmission, pathogenicity and virulence mechanisms of microbes. How the body deals with injury and infection is discussed by exploring host defences. Sections on wound healing, clotting and inflammation cover the response to physical damage and this is complemented by discussion of the pharmacological basis of anti-inflammatory agents and anti-coagulants.

For a full understanding of the process of infection, it is necessary to have an appreciation of the range of pathogens and injuries with which the body must cope. Therefore this unit of study examines the structure and function of pathogenic microorganisms (including bacteria, fungi, protists, and viruses, etc). The response of the body to pathogen invasion is studied by discussion of both molecular and cellular immune responses. In particular, this gives students an appreciation of the structure, production and diversity of antibodies, the processing of antigens, operation of the complement system and recognition and destruction of invading cells. This allows students to appreciate the basis of derangements of the immune system and the mechanism of action of immuno-modulatory drugs.

Practical classes allow students to obtain experience in, and an understanding of, a range of techniques in classical and molecular virology, bacteriology and immunology. In addition, the practical sessions draw widely on, and nurture, the generic skills taught in preceding units of study.

BMED2808
Disease in Society
Credit points: 6  Teacher/Coordinator: A/Prof Brett Hambly  Session: Semester 2  Classes: Two 1-hour lectures per week; five hours of tutorials or practicals every fortnight. Prerequisites: 42 credit points of Junior Bachelor of Medical Science units of study  Prohibitions: All Intermediate level units offered by the Schools of Pathology, Molecular and Microbial Bioscience, Medical Sciences and BIOL(2006/2006) and BIOL(2016/2016)  Assessment: One 2-hour theory exam; three in-semester assessments (100%)

Disease in Society seeks to integrate basic knowledge of important diseases, ranging from metabolic diseases through airways and heart disease and cancer to infections. About half the unit considers infectious diseases: viral, bacterial, fungal and parasitic. The other half looks at inherited disorders, cardio-respiratory disorders such as angina, heart failure and asthma. Society's approaches to dealing with these diseases - whether by pharmacological intervention, counselling or lifestyle change are discussed. Putting the disease in the relevant social context is emphasized in all aspects of the unit.

The impact of bacteria and viruses on individuals and society is taught with reference to specific infectious diseases (eg influenza, polio, herpes, STDs, etc) and this leads into an introduction of epidemiology. Included in the discussion of the way in which these organisms cause and transmit disease is a consideration of how antibiotics and anti-viral drugs work and how microbes can become drug resistant.

Practical classes are designed to complement the lectures and provide a 'hands-on' experience in investigating disease. Also included are tutorial sessions in which hospital microbiologists guide students though clinical case studies and in an integrated session, students examine the infection, immunity and pathology of tuberculosis. These sessions are designed to nurture an appreciation of the importance of an integrative approach to the study of disease in today's society. The generic skills taught in preceding units of study are further reinforced.

Bachelor of Medical Science Senior Core units of study
Students are required to complete at least 36 credit points of Senior units of study chosen from the core subject areas of Anatomy and Histology, Biology (Genetics), Biochemistry, Cell Pathology, Immunology, Infectious diseases, Microbiology, Pharmacology and Physiology, as listed in Table IV. Descriptions are listed here and under the relevant department headings in this chapter where the units are offered by other Schools/Departments in the faculty.

INF3012
Infectious Diseases
Credit points: 6  Teacher/Coordinator: A/Prof Colin Harbour  Session: Semester 2  Classes: One 1 hour lecture and one 1 hour tutorial and one 2 hour practical and one 2 hour case study or theme session a week. Prerequisites: 42 credit points of intermediate BMED units including BMED2807  Assumed knowledge: Intermediate microbiology, immunology, molecular biology and genetics.  Assessment: Formal examination (60%); one 2 hour exam worth 40%.  Progressive assessment (40%): includes 2000-word essay, tutorial case presentation, poster presentation.

Note: The completion of MICR3011 is strongly recommended prior to undertaking this course.

Infectious diseases occur as a result of interactions between a host and a microbial parasite. This unit of study will explain how infectious agents interact with human hosts at the molecular, cellular, individual patient and community levels to cause diseases and how the hosts attempt to combat these infections. The unit will be taught by the discipline of Infectious Diseases and Immunology of the Department of Medicine within the Central Clinical School, Faculty of Medicine with involvement of associated clinical and research experts who will contribute lectures and theme sessions on their own special interests.

The primary learning vehicle in this unit will be the case study involving three or four cases per week on the diseases theme of the week, eg Pneumonia in week 1, wound infections in week 2 etc. Students are strongly recommended to complete MICR3011 before enrolling in this unit.

Textbooks

Medicinal Chemistry
Medicinal Chemistry is an interdisciplinary major offered within the BSc. It is concerned with the chemistry underpinning the design, development and development of new pharmaceuticals, and is jointly administered by the School of Chemistry and the Department of Pharmacology. Medicinal Chemistry examines why some types of chemical compounds are toxic, why some have therapeutic value, and the mode of drug action at the molecular level. A major in Medicinal Chemistry includes the study of natural and synthetic compounds of biological and medicinal importance, how molecules interact with each other and how specific molecules can influence metabolic pathways in living organisms. A student seeking to complete this major will study Junior and Intermediate Chemistry, and also Intermediate Pharmacology, as prerequisites for the Senior units of study. Refer to Table 1 for an enrolment guide and to entries under the contributing schools and departments for unit descriptions.

Microbiology
The discipline of Microbiology in the School of Molecular and Microbial Biosciences offers units of study that equip students for a career in Microbiology in fields of health, industry and basic research. In addition, it provides introductory units of study to students of agriculture, pharmacy and science. These units of study will help students who wish to specialise in related fields where microorganisms are often used in studying life processes, e.g. biochemistry, genetics and botany.
Microbiology Intermediate units of study

MICR2021 Microbial Life
Credit points: 6 Teacher/Coordinator: Dr Deborah Blanckenberg Session: Semester 1 Classes: Two 1-hour lectures per week, plus an additional six 1-hour tutorials per semester. Eleven 3-hour practicals per semester. Prerequisites: 6cp of Junior Biology and (6cp of MBLG (1001 or 1901) or MBLG2901 or PLNT2001 or PLNT2901) and 6cp of Junior Chemistry Prohibitions: MICR2921, MICR2024, MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2909 Assessment: One 2-hour theory exam, continuous assessment in practicals, two assignments, two quizzes, practical assessment exercises (100%)
Note: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG (1001 or 1901) or PLNT (2001 or 2901).

MICR2022 Microbial Life (Advanced)
Credit points: 6 Teacher/Coordinator: Dr Deborah Blanckenberg Session: Semester 1 Classes: Two 1-hour lectures per week, plus an additional four 1-hour tutorials and three 1-hour seminars per semester. Eleven 3-hour practicals per semester. Prerequisites: (6 credit points of Junior Biology) and (6 credit points of MBLG1001 or MBLG1901 or MBLG2901 or PLNT2001 or PLNT2901) and 6 credit points of Junior Chemistry. Distinction grade required in at least one of Junior Biology or MBLG1001 or MBLG1901 or MBLG2901 or PLNT2001 or PLNT2911. Prohibitions: MICR2201, MICR2024, MICR2001, MICR2901, MICR2003, MICR2007, MICR2111, MICR2909 Assessment: One 2-hour theory exam, continuous assessment in practicals, two assignments, two quizzes, practical assessment exercises, essay (100%)
Note: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG (1001 or 1901) or PLNT (2001 or 2901).

This unit of study is based on MICR2021 with three additional seminars on advanced aspects of the material covered in MICR2021. The content and nature of this component may vary from year to year. Textbooks As for MICR2021

MICR2022 Microbes in Society
Credit points: 6 Teacher/Coordinator: Dr Deborah Blanckenberg Session: Semester 2 Classes: Two 1-hour lectures per week, plus an additional four 1-hour tutorials per semester. Eleven 3-hour practicals per semester. Prerequisites: 6 of Junior Biology and (6 of MBLG (1001 or 1901) or PLNT2001 or PLNT2911) and 6 of Junior Chemistry Prohibitions: MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 Assumed knowledge: MICR2021 or MICR2921 or MICR2024. MICR2022/2922 may be offered the opportunity to undertake work experience for approx one month in a local microbiology laboratory (hospital, industrial, university etc) subject to availability of places. Assessment: One 2-hour theory exam, continuous assessment in practicals and assignments, two quizzes, practical assessment exercises, essay (100%)
Note: Students are very strongly advised to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG (1001 or 1901) or PLNT (2001 or 2901).

MICR2024 Microbes in the Environment
Credit points: 6 Teacher/Coordinator: A/Prof Michael Kertesz Session: Semester 2 Classes: 2 (lec, 3h prac)/wk Prerequisites: 12 credit points of first year Biology Prohibitions: MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2021, MICR2921, MICR2909 Assessment: 1 x 2hr exam (60%), 4 x quizzes (total 15%), lab skills assessment (5%) and 1 x lab project report (20%)
This unit introduces the diversity of microbes found in soil, water, air, plants and Thalamic environments. Through an examination of their physiology and genetics it explores their interactions with plants, animals and each other, and their roles as decomposers and recyclers in the environment. The soil is a rich microbial environment, and the concept of soil health and its relationship to plant growth is discussed. Practical classes include techniques and skills in isolating, quantifying and culturing microbes, designing and interpreting experiments to study microbial growth, and in preparing and presenting data. Textbooks Willey et al. 2007. Prescott/Harley/Klein's Microbiology 8th ed. McGraw-Hill

Microbiology units, students must also complete MBLG (1001 or 1901) or PLNT (2001 or 2901). Pathogenic microbes cause infectious diseases of humans, animals and plants, and inflict enormous suffering and economic losses. Beneficial microbes are important contributors to food production, agriculture, biotechnology, and environmental processes. The aims of MICR2022/2922 are to explore the impacts and applications of microbes in human society and in the environment at large, and to teach skills and specialist knowledge in several key areas of microbiology. Medical Microbiology lectures will cover bacterial, viral, and fungal pathogens, and will introduce the concepts of epidemiology, transmission, pathogenicity, virulence factors, host/parasite relationships, host defences, prevention of disease, and antibiotic types, functions, and resistance. Lecture topics in other areas include food (preservation, spoilage, poisoning, industrial context), Industrial (fermentation, traditional and recombinant products, bioprospecting), Environmental (nutrient cycles, atmosphere, wastewater, pollution, biodegradation) and Agricultural (nitrogen fixation, plant pathogens, biocontrols). The laboratory sessions are integrated with the lecture series and are designed to give students practical experience in isolating, identifying and manipulating microorganisms. BSc or BSc (Advanced) students who have completed MICR2021/2921 and MICR2022/2922 may be offered the opportunity to undertake work experience for approx one month in a local microbiology laboratory.
Microbiology Senior units of study

MICR3011

Microbes in Infection

Credit points: 6  
Teacher/Coordinator: Helen Agus  
Session: Semester 1  
Classes: Two 1-hour lectures per week, eight 3-hour practical sessions and three 2-hour clinical tutorials per semester  
Prerequisites: At least 6 credit points of MBLG units and (MICR2022 or MICR2922 or MICR2002 or MICR2902)  
For BMedSc students: 42 credit points of Intermediate BMED units including BMED2807 and BMED2808, For BScAgr students: (PLNT2001 or PLNT2901) and MICR2002 or MICR2922  
Prohibitions: MICR3911, MICR3001, MICR3921  
Assessment: One 2-hour exam, practical assessment (100%)  

This unit is designed to further develop an interest in, and understanding of, medical microbiology from the introduction in Intermediate Microbiology. Through an examination of microbial structure, virulence, body defences and pathogenesis, the process of acquisition and establishment of disease is covered. The unit is divided into three themes: 1. Clinical Microbiology: host defences, infections, virulence mechanisms; 2. Public health microbiology: epidemiology, international public health, transmission, water and food borne outbreaks; 3. Emerging and re-emerging diseases: the impact of societal change with respect to triggering new diseases and causing the emergence of past problems, or new studies. The practical component is designed to enhance students’ practical skills and to complement the lecture series. Clinical tutorial sessions underpin and investigate the application of the material covered in the practical classes.

Textbooks  

MICR3911

Microbes in Infection (Advanced)

Credit points: 6  
Teacher/Coordinator: Helen Agus  
Session: Semester 1  
Classes: Two 1-hour lectures per week, plus an additional six 1-hour tutorials, eight 3-hour practical sessions and three 2-hour clinical tutorials per semester  
Prerequisites: At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2922 or 2002 or 2902). For BMedSc students: 42 credit points of Intermediate BMED units including in BMED (2807 or 2808) with a Distinction in one of these two. For BScAgr students: PLNT (2001 or 2901) and MICR (2022 or 2922) including one Distinction.  
Prohibitions: MICR3911, MICR3001, MICR3991  
Assessment: One 2-hour exam, practical assessment, one in-semester 1 hour essay exam on topic of choice (100%)  

This unit is available to students who have performed well in Intermediate Microbiology. MICR3911 is based on MICR3011 with a series of additional tutorials and self-directed learning to extend students beyond the core material. Consequently, the unit of study content may vary from year to year.

Textbooks  

MICR3032

Molecular Microbiology Concepts

Credit points: 6  
Teacher/Coordinator: Andrew Holmes  
Session: Semester 2  
Classes: Three lectures per week and one 2-hour practicum per week  
Prerequisites: At least 6 credit points of MBLG units and MICR (2022 or 2922 or 2002 or 2902). For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802, 2807 and 2808). For BScAgr students: PLNT (2001 or 2901) and MICR2024.  
Prohibitions: MICR3932  
Assumed knowledge: MICR2021 or equivalent introductory microbiology  
Assessment: One 1-hour exam (mid semester); One 2-hour exam (end of semester); One written assignment (report/essay); One presentation; One computer-based assessment exercise (100%)  

Note: Students undertaking a major in microbiology must take MICR3042 or MICR3942. One of these two units is a required corequisite for students completing a major in Microbiology.

Textbooks  
None

MICR3932

Molecular Microbiology Concepts (Adv)

Credit points: 6  
Teacher/Coordinator: A/Professor Dee Carter  
Session: Semester 2  
Classes: Three lectures per week and One 2-hour practicum per week  
Prerequisites: At least 6 credit points of MBLG units and MICR (2022 or 2922 or 2002 or 2902). For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 or 2807 or 2808) with a Distinction in one of these three. For BScAgr students: PLNT (2001 or 2901) and MICR2024 including one Distinction.  
Corequisites: Students undertaking a major in microbiology must take MICR3042 or MICR3942.  
Prohibitions: MICR3032  
Assumed knowledge: MICR2021 or equivalent introductory microbiology  
Assessment: One 1-hour exam (mid semester); One 2-hour exam (end of semester); Three written assessments (100%)  

This unit of study introduces students to key areas of research in molecular microbiology. Building on knowledge gained in MICR2012 and MICR2022, as well as MBG1001, it brings in areas of microbial evolution, pathogenesis, physiology, ecology, biotechnology and genetics, with each key theme explored with a series of 6 lectures led by an expert in the field. Lectures will be complemented with practical/tutorial sessions that teach students how to research, write, review and evaluate scientific literature for publication. It is strongly recommended that students also take the complementary unit of study, MICR3042 or MICR3942. One of these two units is a required corequisite for students completing a major in Microbiology.

Textbooks  
None

MICR3042

Molecular Microbiology Research Skills

Credit points: 6  
Teacher/Coordinator: Dr Nicholas Coleman  
Session: Semester 2  
Classes: One lecture per week. One 4.5 hours prac per week.  
Prerequisites: At least 6 credit points of MBLG units and MICR (2022 or 2922 or 2002 or 2902). For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802, 2807 and 2808). For BScAgr students: PLNT (2001 or 2901) and MICR2024.  
Corequisites: MICR3032 or MICR3932  
Prohibitions: MICR3942, MICR3022, MICR3922  
Assumed knowledge: MICR2021 or equivalent introductory microbiology  
Assessment: One 1-hour theory exam, One 1-hour problem-based exam. In-lab practical assessment (continuous participation: attendance and participation). One report. Planning and protocol development (100%)  

This Unit of Study focuses on practical skills that are essential for laboratory research into molecular microbiology. We will focus on three key areas of modern microbiology: Environmental microbiology and the techniques required for the study of complex microbial communities; Microbial biotechnology, which explores how microbes can be used as cellular factories to produce useful products; and Medical microbiology, where we will introduce some important molecular techniques such as producing gene deletions and knockout strains to study phenotypes important in microbial pathogenesis. The Unit will be assessed by in-lab continuous assessment, one written report, planning and protocol development, one 1-hour exam on the theory lectures and one 1-hour problem-based exam based on practical work. Students enrolling in MICR3042 must also take the complementary Unit of Study MICR3032/3932.

Textbooks  
None

MICR3942

Microbial Micro Research Skills (Adv)

Credit points: 6  
Teacher/Coordinator: A/Professor Andrew Holmes  
Session: Semester 2  
Classes: One 1-hour lecture per week. One 5-hour prac per week.  
Prerequisites: At least 6 credit points of MBLG units and Distinction in MICR (2022 or 2922 or 2002 or 2902). For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 or 2807 or 2808) with a Distinction in one of these three. For BScAgr students: PLNT (2001 or 2901) and MICR2024 including one Distinction.  
Corequisites: MICR3X32  
Prohibitions: MICR3042, MICR3022, MICR3922  
Assumed knowledge: MICR2021 or equivalent introductory microbiology  
Assessment: One 1-hour theory exam. One 1-hour problem-based exam. Laboratory book. One poster presentation. Assessment of laboratory performance (100%)
This Unit of Study allows students to undertake a research project in molecular microbiology under the direction of a research group leader in Microbiology. It will be complemented by a series of lectures that focus on three key areas of modern microbiology: Environmental microbiology and the techniques required for the study of complex microbial communities; Microbial biotechnology, which explores how microbes can be used as cellular factories to produce useful products; and Medical microbiology, where we will introduce some important molecular techniques such as producing gene deletions and knock out strains to study phenotypes important in microbial pathogenesis. The Unit will be assessed by performance in the research laboratory, the laboratory notebook, a poster presentation based on the research project, one 1-hour exam based on the theory lectures and one 1-hour problem-based exam on practical work. Students enrolling in MICR3942 must also take the complementary Unit of Study MICR0302/3932.

**VIRO3001 Virology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Tim Newsome  
**Session:** Semester 1  
**Classes:** Two 1-hour lectures per week, five 2-hour tutorials and six 4-hour practicals per semester.  
**Prerequisites:** At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MCR or BCHM or BIOL or IMMU or PCOL or PHSI or PLNT units. For BMEdSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: PLNT (201 or 291 or 2022 or 2922) and MCR2024.  
**Prohibitions:** VIRO3001  
**Assumed knowledge:** Intermediate microbiology, immunology, molecular biology and genetics.  
**Assessment:**  
- Two 1-hour exam, practical work, group presentations (100%)  

**Note:** Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.

Viruses are some of the simplest biological machinery known, being completely dependent on hosts for their replication, yet they are also the etiological agents for some of the most important human diseases. New technologies that have revolutionised the discovery of new viruses are also revealing a hitherto unappreciated abundance and diversity in the ecosphere, and a wider role in human health and disease. Developing new gene technologies have enabled the use of viruses as therapeutic agents, in novel vaccine approaches, gene delivery and in the treatment of cancer. This unit of study is designed to introduce students who have a basic understanding of molecular biology to the rapidly evolving field of virology. Viral infection in plant and animal cells and bacteria is covered by an examination of virus structure, genomes, gene expression and replication. Building upon these foundations, this unit progresses to examine host-virus interactions, pathogenesis, cell injury, the immune response and the prevention and control of infection. The structure and replication of sub-viral agents: viroids and prions, and their role in disease are also covered. The practical component provides hands-on experience in current diagnostic and research techniques such as molecular biology, cell culture, serological techniques, immunofluorescence and immuno blot and is designed to enhance the students' practical skills and complement the lecture series. Tutorials cover a range of topical issues and provide a forum for students to develop their communication skills.

**Textbooks**


**VIRO3002 Medical and Applied Virology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Belinda Herring  
**Session:** Semester 2  
**Classes:** One 2-hour lecture per week, and one 4-hour practical per week.  
**Prerequisites:** 6 CP MBLE units and at least 6 CP from Intermediate MICR or BCHM or BIOL or MCR2024.  
**Prohibitions:** VIRO3001  
**Assumed knowledge:** Intermediate microbiology, immunology, molecular biology and genetics.  
**Assessment:**  
- Formal examination, prose and essay, practical assignment (100%)  

**Note:** Students are very strongly recommended to complete VIRO(3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Semester 2.

This unit of study explores the way viruses invade cells, infect individual patients and spread in the community. Host/Virus interactions will also be described with a focus on the viral mechanisms that have evolved to combat and/or evade host defence systems. These features will be used to explain the symptoms, spread and control of particular human diseases ranging from the common cold to HIV. The unit will be taught by the Infectious Diseases and Immunology Unit of the Department of Medicine with the involvement of associated clinical and research experts who will contribute lectures on their own special interests and with contributions from the discipline of Microbiology. In the practical classes students will have the opportunity to develop their skills in performing methods currently used in diagnostic and research laboratories such as molecular analysis of viral genomes, immunofluorescent staining of viral antigens, cell culture and the culture of viruses.

**Textbooks**


**VIRO3002 Medical and Applied Virology (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Belinda Herring  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures & 1 x 4h practical/week (as per VIRO3002), mentored research project  
**Prohibitions:** VIRO3001 (Distinction) or VIRO3901 (Credit)  
**Assessment:** Practical report in addition to the assessment outlined for VIRO3002 (100%)  

This unit is available to students who have performed well in VIRO3001 and is based on the VIRO3002 course with a mentored practical component and report, enabling students to gain practical and relevant laboratory experience. The content of this unit may change from year to year based on research interests within the department.

**Textbooks**


**Molecular Biology and Genetics**

Molecular Biology and Genetics units of study at the Junior and Intermediate level will be taught by staff from the School of Molecular and Microbial Biosciences and the School of Biological Sciences. The Junior unit, MBLLG1001, and the Intermediate unit, MBLLG2071/2971, are coordinated by the School of Molecular and Microbial Biosciences, while MBLLG 2072/2972 is coordinated by the School of Biological Sciences.

**MBLG1001 Molecular Biology and Genetics (Intro)**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Dale Hancock  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight  
**Prohibitions:** AGCH2001, BCHM2001, BCHM2101, BCHM2901, MBLG2101, MBLG2901, MBLLG2001, MBLG2111, MBLG2771, 158
The lectures in this unit of study introduce the "Central Dogma" of molecular biology and genetics - i.e., the molecular basis of life. The course begins with the information macromolecules in living cells: DNA, RNA and protein, and explores how their structures allow them to fulfill their various biological roles. This is followed by a review of how DNA is organised into genes leading to discussion of replication and gene expression (transcription and translation). The unit concludes with an introduction to the techniques of molecular biology and, in particular, how these techniques have led to an explosion of interest and research in Molecular Biology. The practical component complements the lectures by exposing students to experiments which explore the measurement of enzyme activity, the isolation of DNA and the 'cutting' of DNA using restriction enzymes. However, a key aim of the practicals is to give students higher level generic skills in computing, communication, criticism, data analysis/evaluation and experimental design.

MBLG1999
Molecular Biology & Genetics Seminar A
Session: Semester 2
Classes: Four 1-hour seminars offering different perspectives of molecular biology and genetics
Assessment: There will be no assessment for this unit
Note: Only available in the BSc(MBG) and MBLG1901

This unit consists of four introductory molecular biology and genetics research based seminars.

MBLG2071
Molecular Biology and Genetics A
Credit points: 6
Teacher/Coordinator: Ms Vanessa Gysbers
Session: Semester 1
Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight
Requisites: MBLG1901 or MBLG1001 and 12 CP of Junior Chemistry
Assessment: One 2.5-hour exam, practical work, laboratory reports (100%)
Note: Students enrolled in the combined BAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course prior to enrolling in this unit.

This unit of study extends the basic concepts introduced in MBLG1001/1901 and provides a firm foundation for students wishing to continue in the molecular biosciences as well as for those students who intend to apply molecular techniques to other biological or medical questions. The unit explores the regulation of the flow of genetic information in both eukaryotes and prokaryotes. The central focus is on the control of replication, transcription and translation and how these processes can be studied and manipulated in the laboratory. The processes of DNA mutation and repair are also discussed. Experiments in laboratory organisms are presented to illustrate current advancements in the field, together with discussion of work carried out in human systems and the relevance to human genetic diseases.

Tools of molecular biology are taught within the context of recombinant DNA cloning - with an emphasis on essential knowledge required to use plasmid vectors. The methods of gene introduction (examples of transgenic plants and animals) are also discussed along with recent developments in stem cell biology. Other techniques include the separation and analysis of macromolecules, like DNA, RNA and proteins, by gel electrophoresis and Southern, Northern & Western blotting. Analysis of gene expression by microarrays is also discussed.

In the genomics section, topics include structure, packaging and complexity of the genome: assigning genes to specific chromosomes, physical mapping of genomes as well as DNA and genome sequencing methods and international projects in genome mapping.

The practical course complements the theory and builds on the skills learnt in MBLG1001. Specifically students will: use spectrophotometry for the identification and quantification of nucleic acids, explore the lac operon system for the investigation of gene expression control, perform plasmid isolation, and complete a PCR analysis for detection of polymorphisms. As with MBLG1001, strong emphasis is placed on the acquisition of generic and fundamental technical skills.

Textbooks

MBLG2971
Molecular Biology and Genetics A (Adv)
Credit points: 6
Teacher/Coordinator: Vanessa Gysbers
Session: Semester 1
Classes: Two 1-hour lectures per week; one 1-hour tutorial and one 4-hour practical per fortnight
Requisites: 12 credit points of Junior Chemistry and Distinction in MBLG (1001 or 1901)
Assessment: One 2.5-hour exam, practical work, laboratory reports (100%)
Note: Students enrolled in the combined BAppSc (Exercise and Sport Science)/BSc(Nutrition) must have completed all Junior units for this course prior to enrolling in this unit.

Extension of concepts presented in MBLG2071 which will be taught in the context of practical laboratory experiments.

Textbooks

MBLG2072
Molecular Biology and Genetics B
Credit points: 6
Session: Semester 2
Classes: Two 1-hour lectures per week; one 2-3-hour practical per week. One tutorial every second week.
Requisites: BIOL (1001 or 1003 or 1911 or 1903) and MBLG (1001 or 1901) and 12 credit points of Junior Chemistry
Prohibitions: MBLG2972 Assumed knowledge: One of MBLG2071, MBLG2971
Assessment: One 2 hour exam (50%), laboratory reports and quizzes (50%).

This unit of study builds on the concepts introduced in MBLG2071 and shows how modern molecular biology is being applied to the study of the genetics of all life forms from bacteria through to complex multicellular organisms including plants, animals and humans. Lecture topics include classical Mendelian genetics with an emphasis on its molecular basis, cytogenetics, bacterial genetics and evolution, molecular evolution, bioinformatics and genomics, developmental genetics and the techniques and applications of molecular genetics.

Practical: In laboratory exercises you will use a variety of prokaryotic and eukaryotic organisms to illustrate aspects of the lecture material, while developing familiarity and competence with equipment used in molecular techniques, microscopes, computers and statistical tests. Generic skills are developed in report writing, oral presentation, problem solving and data analysis. This is a core Intermediate unit of study in the BSc (Molecular Biology and Genetics) degree program.

MBLG2972
Molecular Biology and Genetics B (Adv)
Credit points: 6
Session: Semester 2
Classes: Two 1-hour lectures per week; one 2-3-hour practical per week. One tutorial every second week.
Requisites: BIOL(1001 or 1911 or 1003 or 1903) and MBLG(1001 or 1901) and 12 credit points of Junior Chemistry and a Distinction in MBLG(2071 or 2971); or a Distinction in MBLG(1001 or 1901) and 12 credit points of Junior Chemistry, and a Distinction average in all Junior Science units of study undertaken.
Prohibitions: MBLG2072
Assumed knowledge: MBLG2071 or MBLG2971
Assessment: One 2-hour exam (50%), laboratory reports and quizzes (50%).

Qualified students will participate in alternative components of MBLG2072, Molecular Biology and Genetics B. The content and nature of these components may vary from year to year.

MBLG3999
Molecular Biology & Genetics Seminar B
Session: Semester 2
Classes: Four 1-hour seminars (available by invitation only from MBLG program chair)
Assessment: There will be no assessment for this unit.
Note: Only available to students enrolled in the BSc(MBG) degree or the BCHM3972 course

This unit consists of four advanced molecular biology and genetics research based seminars.
**School of Molecular and Microbial Biosciences**

The School brings together the disciplines of Biochemistry, Microbiology, Molecular Biotechnology and Nutrition. Significant contributions are also made to the Intermediate faculty units of study in Molecular Biology and Genetics with study code MBLG [see Table ID for details of the BSc (Molecular Biology and Genetics)] and to the units of study in Molecular Biotechnology [see Table IE for details of the BSc (Molecular Biotechnology)].

**Location of unit descriptions**

Unit descriptions are located under separate headings in this chapter: Biochemistry (BCHM); Microbiology (MICR); Molecular Biology and Genetics (MBLG);

**Location**

The School is located in the Biosciences Biochemistry and Microbiology Building (G08), across near City Road in the Darlington area behind the Wentworth Building.

**Nanoscience and Technology**

Nanoscience and Technology is an interdisciplinary major offered within the BSc. It is directed at students interested in understanding the emerging science of working and building at and near the molecular level. It incorporates study of the fundamental sciences in order to understand the structure of matter, as well as technological elements of the mechanical properties of materials. Students undertaking this major are strongly encouraged to take suitable units from the Faculty of Engineering in combination with Physics and Chemistry.

**Majoring in Nanoscience and Technology**

A student seeking to complete this major should study Physics and Chemistry in their Junior and Intermediate years together with some Engineering and Mathematics. In the Senior year it is possible to focus on two of the three discipline areas, or to continue to study elements of all three. This major may also be seen as a complement to a traditional major in Chemistry or Physics. Refer to Table 1 for an enrolment guide and to entries under the contributing schools and departments for unit descriptions. Engineering units are described in the Engineering Handbook.

**Neuroscience**

Neuroscience encompasses a diverse range of disciplines that cross traditional subject boundaries. The study of Neuroscience ranges from anatomy to neuronal function; the cellular and molecular biology of the neuron to the complex phenomena of perception; emotion and memory; from the regulation of breathing and blood pressure to movement; developing to ageing; normal cognition to neurodegeneration.

**Majoring in Neuroscience**

A major in Neuroscience is designed to provide a foundation in the basic biology of the brain as well as the fundamentals of cognition. Students are able to focus their cross-disciplinary studies with a molecular, cellular, anatomical and behavioural concentration. Refer to Table 1 for an enrolment guide and to entries in specific subject areas for Unit of Study descriptions. A cross-disciplinary major requires careful selection of subjects to fulfill the requirements of the major. Research in Neuroscience is vibrant and an international priority area.

**Neuroscience Coordinator**

Dr Karen Cullen (Anatomy) is the coordinator for the Neuroscience major. Email: karen.cullen@sydney.edu.au.

**Nutrition**

The Human Nutrition Unit in the School of Molecular and Microbial Biosciences offers units of study to students enrolled in the Bachelor of Science (Nutrition) degree. This degree is not offered to new students. Continuing students should use the 2010 handbook. Check the relevant Department/school entries in this chapter for descriptions of other units of study required for this degree.

**NUTR3911 Nutrition Assessment Methods**

**Credit points:** 6  
**Teacher/Coordinator:** Ms Katherine Jukic  
**Session:** Semester 1  
**Classes:** Lectures/tutorials/labs/workshops average 4 hours per week.  
**Prerequisites:** NUTR2911 and NUTR2912  
**Prohibitions:** NUTR3901  
**Assessment:** One 2-hour exam, 4 assignments

This unit of study covers Dietary Assessment Methods: purposes of dietary assessment; uses of dietary data; four key dietary assessment methods and their use, application, strengths, weaknesses, sources of measurement error; quantification of portion and serve sizes; evaluation of dietary data; use and application of dietary reference standards; food composition databases; and the appraisal and interpretation of dietary assessment methods in published literature. This unit of study also covers Anthropometry, Body Composition & Nutritional Biochemistry: anthropometric and body composition methods for the assessment of nutritional status; reference standards for assessing body composition; anthropometric measurements; biochemical and haematological indices for nutritional assessment.

**Textbooks**


**NUTR3912 Community and Public Health Nutrition**

**Credit points:** 6  
**Teacher/Coordinator:** Ms Katherine Jukic, Ms Sue Amanatidis  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures and averaging one 3-hour workshop/tutorial/presentation per week  
**Prerequisites:** NUTR2911 and NUTR2912  
**Prohibitions:** NUTR3902  
**Assessment:** One 2-hour exam and 2 assignments

This unit of study covers topics such as: nutrition through the life cycle from infancy to old age; nutrition in vulnerable groups; and theories of food habits. It helps students gain skills and knowledge in planning, implementing and evaluating nutrition health promotion programs for various population groups. Topics covered include: principles of health promotion, effective nutrition promotion strategies, program evaluation and program planning. This course also looks at current public health nutrition strategies and case studies for promoting health and preventing diet-related diseases.

**Textbooks**


**NUTR3921 Methods in Nutrition Practice**

**Credit points:** 6  
**Teacher/Coordinator:** Ms Soumela Amanatidis  
**Session:** Semester 1  
**Classes:** One 2-hour lecture and averaging one 3-hour tutorial/workshop per week.  
**Prerequisites:** NUTR2911 and NUTR2912  
**Prohibitions:** NUTR3901  
**Assessment:** One 2.5-hour exam and 2 assignments

This unit of study covers basic concepts in: Survey & Questionnaire Design (data collection methods, designing surveys and research protocols, designing and piloting short questionnaires, focus groups); Nutritional Epidemiology (hypothesis, study designs, epidemiological measures and methods, sources of bias, critical appraisal of published data/literature); and Statistics (statistical methods, statistical packages, statistics terminology).

**Textbooks**


**NUTR3922 Nutrition and Chronic Disease**

**Credit points:** 6  
**Teacher/Coordinator:** Ms Katherine Jukic, A/Prof Margaret Allman-Farinelli  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures and averaging one 3-hour workshop/tutorial per week.  
**Prerequisites:** NUTR2911 and NUTR2912  
**Prohibitions:** NUTR3902  
**Assessment:** One 2.5-hour exam, and two assignments.
This unit of study examines the relationship and evidence for the role of nutrition in the etiology of chronic diseases, such as cancer, coronary heart disease, hypertension, obesity, dental caries and osteoporosis. It also investigates the current nutrition policies and guidelines that are aimed at preventing these diseases at a population level. Students will also get an opportunity to examine the current popular fad diets on the market, and develop a foundation of knowledge in debating, media, communication and counselling skills.

Textbooks

Pharmacology
This Department offers a general training in Pharmacology to students in the Faculty of Science. It provides three intermediate 6-credit point units of study and eight senior 6-credit point units of study.

PCOL2011 Pharmacology Fundamentals
Credit points: 6
Teacher/Coordinator: Dr Brent McParland
Session: Semester 1
Classes: Two 1 hour lectures per week; workshops and laboratory sessions.
Prerequisites: (6 credit points of Junior Chemistry) and (6 credit points of Junior Biology or MBLG (1001 or 1901)).
Prohibitions: PCOL2001
Assessment: One 2 hour exam, in semester quizzes and reports (100%)

This unit of study examines four basic areas in Pharmacology: (1) principles of drug action (2) pharmacokinetics and drug metabolism (3) autonomic and endocrine pharmacology, and (4) drug design. The delivery of material involves lectures, practicals, computer-aided learning and problem-based workshops. Practical classes provide students with the opportunity of acquiring technical experience and teamwork skills. Problem-based workshops are based on real-life scenarios of drug use in the community. These workshops require students to integrate information obtained in lectures in order to provide solutions to the problems. Online quizzes accompany each module for self assessment.

Textbooks

PCOL2012 Pharmacology: Drugs and People
Credit points: 6
Teacher/Coordinator: Dr Jonathan Arnold
Session: Semester 2
Classes: Two 1 hour lectures per week; workshops and laboratory sessions.
Prerequisites: (6 credit points of Junior Chemistry) and (6 credit points of Junior Biology or MBLG (1001 or 1901)).
Prohibitions: PCOL2002, PCOL2013
Assumed knowledge: PCOL2011
Assessment: One 2 hour exam, in semester quizzes, reports (100%)

This unit of study examines four important areas of Pharmacology: (1) drug action in the nervous system (2) drug discovery and development (3) pharmacotherapy of inflammation, allergy and gut disorders, and (4) drugs of recreation, dependence and addiction. The delivery of material involves lectures, practicals, computer-aided learning and problem-based workshops. Practical classes provide students with the opportunity of acquiring technical experience and teamwork. Problem-based workshops are based on real-life scenarios of drug use in the community. These workshops require students to integrate information obtained in lectures in order to provide solutions to the problems. Online quizzes accompany each module.

Textbooks

PCOL2555 Essentials of Pharmacology
Credit points: 6
Session: Summer Main Classes: On-line lectures and face-to-face tutorial and laboratory classes.
Prohibitions: PCOL2011, PCOL2012
Assumed knowledge: 6cp of Junior Biology, 6 cp of Junior Chemistry
Assessment: on-line quizzes and a final examination (100%)

This unit of study introduces students to the principles of drug action and allows them to develop an understanding of the therapeutic applications of drugs based on their underlying pharmacodynamic properties. It covers cardiovascular and renal drugs, chemotherapy, analgesics and anti-inflammatory agents, respiratory and gastro-intestinal drugs, drugs affecting peripheral and central neurotransmission and the principles of chemotherapy.

PCOL3011 Toxicology
Credit points: 6
Session: Semester 1
Classes: Two 1 hour lectures and one 3 hour tutorial/practical per week.
Prerequisites: PCOL2011 or PCOL2012 and PCOL2012 or 42 credit points from Intermediate BMED units of study.
Prohibitions: PCOL3001, PCOL3901, PCOL3911
Assessment: One 2 hour exam, tutorial presentations, assignments (100%)

This unit of study is designed to introduce students with a basic understanding of pharmacology to the discipline of toxicology. It considers the toxicology associated with therapeutic drugs (adverse drug reactions) and the associated issue of drug interactions. The pharmacogenetic basis of adverse reactions is also considered. The unit also considers aspects of environmental toxicology, particularly toxic reactions to environmental agents such as asbestos and pesticides, and its effects on different target organs (lung, liver, CNS). As a final consequence of exposure to toxins, the biology and causes of cancer are discussed. As part of the unit students are introduced to basic ideas about the collection and analysis of data from human and animal populations, both in the structured situation of clinical trials, forensic problems and in analysis of retrospective data.

Textbooks

PCOL3911 Toxicology (Advanced)
Credit points: 6
Session: Semester 1
Classes: Two 1 hour lectures and one 3 hour tutorial/practical per week.
Prerequisites: Distinction average in PCOL2011 and PCOL2012 or Distinction average in 42 credit points from Intermediate BMED units of study.
Prohibitions: PCOL3001, PCOL3901, PCOL3911
Assessment: One 2 hour exam, tutorial presentations, assignments (100%)

This unit will consist of the lecture and practical components of PCOL3011. Students will be set special advanced assignments related to the material covered in core areas. These may also involve advanced practical work or detailed investigation of a theoretical problem.

Textbooks

PCOL3012 Drug Design and Development
Credit points: 6
Session: Semester 1
Classes: Two 1 hour lectures and one 3 hour tutorial/practical per week.
Prerequisites: PCOL2011 or PCOL2012 and PCOL2012 or 42 credit points from Intermediate BMED units of study.
Prohibitions: PCOL3001, PCOL3901, PCOL3912
Assessment: One 2 hour exam, in class quizzes, assignments (100%)

This unit of study is designed to introduce students with a basic understanding of pharmacology to the field of medicinal chemistry associated with drug design and development. The course covers the fundamental aspects of drug discovery and development with reference to the essentials of chemistry and illustrates drug development with examples that include neuraminidase inhibitors and statins. The role of computers in drug design is emphasised by classwork and assignments on molecular modelling and structure-activity relationships. The course also extends to a section on the design of diverse pharmacological agents which include compounds for imaging by positron emission tomography (PET), as well as chemical and biological warfare agents, and riot control agents.

Textbooks
PCOL3912
Drug Design and Development (Adv)
Credit points: 6
Session: Semester 2
Classes: Two 1 hour lectures per week, four 1 hour tutorials, two 2 hour practical/computer laboratories, elective project (equivalent to three 4 hour practicals).
Prerequisites: PCOL2011 or PCOL2012 or 36 credit points from intermediate BMED units of study. Prohibitions: PCOL3902, PCOL3902, PCOL3921
Assessment: One 2 hour exam, tutorial and practical assignments and elective project (100%) This unit will consist of the lecture and practical components of PCOL3912. Students will be set special advanced assignments related to the material covered in core areas. These may also involve advanced practical work or detailed investigation of a theoretical problem.
Textbooks

PCOL3021
Drug Therapy
Credit points: 6
Session: Semester 2
Classes: Two 1 hour lectures per week, four 1 hour tutorials, two 4 hour practical/computer laboratories, elective project (equivalent to three 4 hour practicals).
Prerequisites: PCOL3012, PCOL3002, PCOL3022
Assessment: One 2 hour exam, tutorial and practical assignments and elective project (100%) This unit of study builds on pharmacological knowledge acquired in the intermediate PCOL and BMED units of study with a major emphasis on gaining an understanding of the scientific basis of drug therapy. Lecture topics, tutorials and laboratory sessions cover drug treatment of arthritis and asthma, cardiovascular disorders, microbial infections and cancer. Elective projects relate to current research areas in Pharmacology.
Textbooks

PCOL3921
Drug Therapy (Advanced)
Credit points: 6
Session: Semester 2
Classes: Two 1 hour lectures per week, four 1 hour tutorials, two 4 hour practical/computer laboratories, elective project (equivalent to three 4 hour practicals).
Prerequisites: PCOL3002, PCOL3021
Assessment: One 2 hour exam, tutorial and practical assignments and elective project (100%) Advanced students complete the same core lecture material as students in PCOL3021 but carry out advanced level elective projects, practicals and tutorials.
Textbooks

PCOL3022
Neuropharmacology
Credit points: 6
Session: Semester 2
Classes: Two 1 hour lectures per week, four 1 hour tutorials, two 3 hour practicals, one 2 hour practical workshop, elective project (equivalent to three 4 hour practicals).
Prerequisites: PCOL2011 and PCOL2012 or 36 credit points from intermediate BMED units of study. Prohibitions: PCOL3902, PCOL3902, PCOL3922
Assessment: One 2 hour exam, tutorial and practical assignments and elective project (100%) This unit of study builds on pharmacological knowledge acquired in the intermediate PCOL and BMED units of study with a major emphasis on gaining an understanding of neuropharmacology. The neuropharmacology of the major neurotransmitters is explored together with the treatment of disorders such as Alzheimer’s disease, depression, epilepsy, insomnia, pain and schizophrenia. Elective projects relate to current research areas in Pharmacology.
Textbooks
Units of Study

There are seven different semester length units of study offered at the Junior level. Completion of one unit of study in each semester provides a solid foundation for further studies in Physics in higher years. PHYS1500 Astronomy cannot be counted towards the 12 credit points of Junior Physics needed as a prerequisite for Intermediate Physics. Each unit of study has a laboratory component. The first semester laboratory work provides an introduction to experimental techniques while reinforcing concepts of physics introduced in lectures. In second semester the laboratory work provides an introduction to electrical circuits and offers students the opportunity to design and undertake short experimental projects.

**First semester**

**PHYS1001 (Regular); PHYS1002 (Fundamentals); PHYS1901 (Advanced)**

**Second semester**

**PHYS1003 (Technological); PHYS1004 (Environmental and Life Sciences); PHYS1902 (Advanced); PHYS1500 (Astronomy)**

**Information Booklet**

Further information about Junior Physics units of study is contained in a booklet for intending commencing students available at enrolment or during O-Week or from Physics Student Services (Room 202, ground floor, Physics Building (A28)). It is also available on the School of Physics website at www.sydney.edu.au/science/physics

**Progression to Intermediate Physics**

Students intending to continue into Intermediate Physics are encouraged to take PHYS1003 or PHYS1902 in semester 2. Students taking PHYS1004 may continue into Intermediate Physics but are recommended to undertake supplementary reading as additional preparation.

**PHYS1001 Physics 1 (Regular)**

**Credit points:** 6

**Session:** Semester 1

**Classes:** Three 1-hour lectures, one 3-hour laboratory per week for 9 weeks and one 1-hour tutorial per week.

**Corequisites:** Recommended concurrent Units of Study: MATH (1001/1901, 1002/1902)

**Prohibitions:** PHYS1001, PHYS1901, EUDH1017

**Assumed knowledge:** HSC Physics

**Assessment:** 3-hour exam plus laboratories, assignments and mid-semester tests (100%)

This unit of study is for students who gained 65 marks or better in HSC Physics or equivalent. The lecture series contains three modules on the topics of mechanics, thermal physics, and oscillations and waves.

**Textbooks**


Course lab manual.

**PHYS1002 Physics 1 (Fundamentals)**

**Credit points:** 6

**Session:** Semester 1

**Classes:** Three 1-hour lectures, one 3-hour laboratory per week for 10 weeks and one 1-hour tutorial per week.

**Corequisites:** Recommended concurrent Units of Study: MATH (1001/1901, 1002/1902)

**Prohibitions:** PHYS1001, PHYS1901, EUDH1017

**Assumed knowledge:** No assumed knowledge of Physics

**Assessment:** 3-hour exam plus laboratories, assignments and mid-semester tests (100%)

This unit of study is designed for students who have not studied Physics previously or scored below 65 in HSC Physics. The lecture series contains modules on the language of physics, mechanics, and oscillations and waves.

**Textbooks**

College Physics: A Strategic Approach by Knight, Jones and Field, 1st edition with Mastering Physics. Addison-Wesley, 2008

Course lab manual.

**PHYS1003 Physics 1 (Technological)**

**Credit points:** 6

**Session:** Semester 2

**Classes:** Three 1-hour lectures, one 3-hour laboratory per week for 10 weeks, one 1-hour tutorial per week.

**Corequisites:** Recommended concurrent Units of Study: MATH (1003/1903).

MATH (1005/1905)

**Prohibitions:** PHYS1004, PHYS1902

**Assumed knowledge:** HSC Physics or PHYS (1001 or 1002 or 1901) or equivalent.

**Assessment:** 3-hour exam plus laboratories, tutorials, and assignments (100%)

Note: It is recommended that PHYS (1001 or 1002 or 1901) be completed before this unit

This unit of study is designed for students majoring in physical and engineering sciences and emphasis is placed on applications of physical principles to the technological world. The lecture series contains modules on the topics of fluids, electromagnetism, and quantum physics.

**Textbooks**


**PHYS1004 Physics 1 (Environmental & Life Science)**

**Credit points:** 6

**Session:** Semester 2

**Classes:** Three 1-hour lectures, one 3-hour laboratory per week for 10 weeks and one 1-hour tutorial per week.

**Corequisites:** Recommended concurrent Units of Study: MATH (1003/1903), MATH (1005/1905)

**Prohibitions:** PHYS1003, PHYS1902

**Assumed knowledge:** HSC Physics or PHYS (1001 or 1002 or 1901) or equivalent.

**Assessment:** 3-hour exam plus laboratories and assignments (100%)

Note: It is recommended that PHYS (1001 or 1902 or 1901) be completed before this unit

This unit of study has been designed specifically for students interested in further study in environmental and life sciences. The lecture series contains modules on the topics of properties of matter, electromagnetism, and radiation and its interactions with matter.

**Textbooks**


Course lab manual.

**PHYS1500 Astronomy**

**Credit points:** 6

**Session:** Semester 2

**Classes:** Three 1-hour lectures, one 2-hour laboratory and one 1-hour tutorial per week.

**Assumed knowledge:** No assumed knowledge of Physics

**Assessment:** 2-hour exam plus laboratories, assignments and night-viewing project (100%)

This unit of study provides a broad understanding of the structure, scale and diversity of the universe and an appreciation of the scientific methods used to achieve this understanding. Current areas of investigation, new ideas and concepts which often receive wide media attention will be used to demonstrate how science attempts to understand new and remote phenomena and how our ideas of our place in the universe are changing. The range of topics includes the planets, the solar system and its origin, spacecraft discoveries, stars, supernova, black holes, galaxies, quasars, cosmology and the Big Bang. It also includes day and night sky observing sessions. This unit of study cannot be counted as part of the 12 credit points of Junior Physics necessary for enrolment in Intermediate Physics.

**Textbooks**


Course lab manual.

**PHYS1901 Physics 1A (Advanced)**

**Credit points:** 6

**Session:** Semester 1

**Classes:** Three 1-hour lectures, one 3-hour laboratory per week for 9 weeks and one 1-hour tutorial per week.

**Prohibitions:** PHYS1001, PHYS1902

**Assumed knowledge:** HSC Physics or PHYS (1001 or 1002 or 1901) or equivalent.

**Assessment:** 3-hour exam plus laboratories, assignments and mid-semester tests (100%)

This unit of study is intended for students who have a strong background in Physics and an interest in studying more advanced topics. It proceeds faster than Physics 1 (Regular), covering further and more difficult material. The lecture series contains modules on the topics of mechanics, thermal physics, oscillations and waves and
9. Undergraduate units of study

chaos. The laboratory work also provides an introduction to computational physics using chaos theory as the topic of study.

Textbooks

Course lab manual.

PHYS1902
Physics 1B (Advanced)
Credit points: 6  Session: Semester 2  Classes: Three 1-hour lectures, one 3-hour laboratory per week for 10 weeks and one 1-hour tutorial per week.  Prerequisites: UAI (or ATAR equivalent) of at least 96, or HSC Physics result in Band 5, or PHYS1901, or Distinction or better in PHYS (1001 or 1002) or an equivalent unit.  Corequisites: Recommended concurrent unit of study: MATH (1003/1903), MATH (1005/1905).  Prohibitions: PHYS1003, PHYS1004  Assessment: 3-hour exam plus laboratories, and assignments (100%)  Note: It is recommended that PHYS (1001 or 1002 or 1901) be completed before this unit

This unit of study is a continuation of the more advanced treatment of Physics 1A (Advanced). Students who have completed PHYS1001 or PHYS1002 at Distinction level may enrol. It proceeds faster than Physics 1 (Technological), covering further and more difficult material. The lecture series contains modules on the topics of fluids, electricity and magnetism, and quantum physics.

Textbooks

Course lab manual.

Physics intermediate units of study
Coordinator
Associate Professor Mike Wheatland

Units of Study
There are three units at the Normal level and three at the Advanced level: PHYS2011/2911 Physics 2A (Normal/Advanced) - Semester 1; PHYS2012/2912 Physics 2B (Normal/Advanced) - Semester 2; PHYS2013/2913 Astrophysics and Relativity (Normal/Advanced) - Semester 2. The Advanced versions can be taken by students who have achieved a Credit or better in their previous Physics units.

Progression to senior Physics
The prerequisites for Senior Physics units are PHYS2011/2911 and PHYS2012/2912. Students intending to major in Physics are strongly encouraged to take PHYS2013/2913 as well. Full details of Intermediate Physics unit of study structures, content and assessment policies are provided in the unit of study handbooks available at the start of semester on the School of Physics website at sydney.edu.au/physics and also on unit of study eLearning sites.

PHYS2011
Physics 2A
Credit points: 6  Session: Semester 1  Classes: Two 1-hour lectures per week for 11 weeks; one 2-hour computational laboratory and one 3-hour experimental laboratory per week for 9 weeks.  Prerequisites: 15 credit points of Junior Physics (excluding PHYS1500).  Prohibitions: PHYS2001, PHYS2901, PHYS2911, PHYS2921, PHYS2923 Assumed knowledge: MATH (1001/1901 and 1002/1902 and 1003/1903). MATH (1005/1905) would also be useful  Assessment: One 2-hour exam, one 1-hour computational test, practical work, practical report and oral presentation (100%)

In combination with two semesters of Junior Physics, this unit of study continues a first pass through the major branches of classical and modern physics, providing students with a sound basis for later Physics units or for studies in other areas of science or technology. Hence, this unit suits students continuing with the study of Physics at the Intermediate level, and those wishing to round out their knowledge of physics before continuing in other fields.

The major topics in this unit of study are:

- Optics: The wave nature of light, and its interactions with matter. Applications including spectroscopy and fibre optics.
- Nuclear Physics: The fundamental structure of matter.
- Computational Physics: In a PC-based computing laboratory students use simulation software to conduct virtual experiments in optics, which illustrate and extend the relevant lectures. Students also gain experience in the use of computers to solve problems in physics. An introductory session is held at the beginning of semester for students who are not familiar with programming.

Practical: Experimental Physics is taught as a laboratory module and includes experiments in the areas of optics, nuclear decay and particles, properties of matter, and other topics. Assessment is based on mastery of each attempted experiment. At the end of the semester students prepare a short report on one experiment and make an oral presentation on it.

Textbooks

Course lab manual.

PHYS2012
Physics 2B
Credit points: 6  Session: Semester 2  Classes: Three 1-hour lectures per week; one 2-hour computational laboratory per week for 11 weeks.  Prerequisites: PHYS (1003 or 1004 or 1902) and PHYS (1001 or 1002 or 1901 or or 2011 or 2911) Prohibitions: PHYS2102, PHYS2104, PHYS2902, PHYS2902, PHYS2912, PHYS2923, PHYS2920 Assumed knowledge: MATH (1001/1901 and 1002/1902 and 1003/1903) or MATH (1005/1905) would also be useful  Assessment: One 3-hour exam, one 1-hour computational test (100%)

This unit of study is designed for students continuing with the study of Physics at the general Intermediate level, and represents the beginning of a more in-depth study of the main topics of classical and modern physics. The lecture topics are:

- Quantum physics: The behaviour of matter and radiation at the microscopic level, modelled by the Schroedinger equation. Application to 1-dimensional systems including solid state physics.
- Electromagnetic properties of matter: Electric and magnetic effects in materials; the combination of electric and magnetic fields to produce light and other electromagnetic waves; the effects of matter on electromagnetic waves.
- Computational Physics: The computational physics component is similar to that of PHYS2011, except that the material includes topics in the quantum physics module.

Textbooks

Course lab manual.

PHYS2013
Astrophysics and Relativity
Credit points: 6  Session: Semester 2  Classes: Two 1-hour lectures per week for 11 weeks and one 3-hour experimental laboratory per week for 12 weeks.  Prerequisites: PHYS (1003 or 1004 or 1902) and PHYS (1001 or 1002 or 1901 or or 2011 or 2911) Corequisites: PHYS (2012 or 2912) Prohibitions: PHYS2001, PHYS2901, PHYS2911, PHYS2921, PHYS2923 Assumed knowledge: MATH (1001/1901 and 1002/1902 and 1003/1903). MATH 1005/1905 would also be useful  Assessment: One 2-hour exam, practical work, practical report and oral presentation (100%)

This unit of study builds on the foundation provided by Junior Physics and first semester of Intermediate Physics, to provide an introduction to Astrophysics (Structure and evolution of stars), and Special Relativity (Space and time at high velocities).

Practical: Experimental Physics is taught as a laboratory module and includes experiments in the areas of analysis of stellar images, electromagnetic phenomena, electronic instrumentation, quantum physics, and other topics. Assessment is based on mastery of each attempted experiment. At the end of the semester students may work in teams on a project. Students prepare a written report and oral presentation on their project or one experiment.

Textbooks

Course lab manual.

PHYS2911
Physics 2A (Advanced)
Credit points: 6  Session: Semester 1  Classes: Two 1-hour lectures per week for 11 weeks; one 2-hour computational laboratory and one 3-hour experimental laboratory per week for 9 weeks.  Prerequisites: Credit or better in PHYS (1901 or 1001 or 1002) and Credit or better in PHYS (1902 or 1003 or 1904).  Prohibitions: PHYS2901, PHYS2001, PHYS2911, PHYS2921, PHYS2920, PHYS2923.

This unit of study provides an introduction to Advanced Physics, and includes topics such as quantum mechanics, special relativity, and advanced electromagnetic phenomena. Students learn to apply advanced physics concepts to solve complex problems.
This unit of study is designed for students with a strong interest in Physics. The lecture topics are as for PHYS2011. They are treated in greater depth and with more rigorous attention to derivations than in PHYS2011. The assessment reflects the more challenging nature of the material presented.

Computational Physics: As for PHYS2011, but at a more advanced level.

Practical: As for PHYS2011.

Textbooks

PHYS2912
Physics 2B (Advanced)
Credit points: 6 Session: Semester 2 Classes: Three 1-hour lectures per week, one 2-hour computational laboratory per week for 11 weeks.
Prerequisites: Credit or better in PHYS (1003 or 1004 or 1902) and Credit or better in PHYS (1001 or 1002 or 1901 or 2001 or 2901 or 2011 or 2911).
Assumed knowledge: MATH (1001/1901 and 1002/1902 and 1003/1903). MATH 1005/1905 would also be useful.
Assessment: One 3-hour exam, one 1-hour computational test (100%)

Refer to PHYS2911 for an overall description of the Advanced Intermediate Physics program. The lecture topics are as for PHYS2012 with some advanced content. Computational Physics: As for PHYS2012, but at a more advanced level.

Textbooks

PHYS2913
Astrophysics and Relativity (Advanced)
Credit points: 6 Session: Semester 2 Classes: Two 1-hour lectures per week for 11 weeks; one 3-hour experimental laboratory per week for 12 weeks.
Prerequisites: Credit or better in PHYS (1003 or 1004 or 1902) and Credit or better in PHYS (1001 or 1002 or 1901 or 2001 or 2911). Corequisites: PHYS (2912 or 2012). Prohibitions: PHYS2001, PHYS2801, PHYS2013, PHYS2101, PHYS2103. Assumed knowledge: MATH (1001/1901 and 1002/1902 and 1003/1903). MATH 1005/1905 would also be useful. Assessment: One 3-hour exam, practical work, practical report and oral presentation (100%)

The lecture topics are as PHYS2013 with some advanced content. Practical: as for PHYS2013.

Textbooks

Physics senior units of study
Coordinator
Professor Tim Bedding

Majoring in Physics
Students intending to major in Physics, or to proceed to Physics Honours, must take at least 24 credit points of Senior Physics, which must include a Semester 1 Core unit (PHYS3040, 3940 or 3941); a Semester 2 Core unit (PHYS3060, 3960 or 3961); two Options units (usually one in each semester). Further information concerning Senior Physics is available on the School of Physics website at sydney.edu.au/science/physics and also on unit of study eLearning sites.

Units intended for students not majoring in Physics
PHYS3015
Topics in Senior Physics A
Credit points: 6 Session: Semester 1 Classes: 40 hours per semester. Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912). Assumed knowledge: 6 credit points of Intermediate Mathematics. Assessment: Exams and/or practical reports.
Note: Department permission required for enrolment.

This unit covers the same topics as PHYS3015, but with some more challenging material.

PHYS3025
Topics in Senior Physics B
Credit points: 6 Session: Semester 2 Classes: 40 hours per semester. Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912). Assumed knowledge: 6 credit points of Intermediate Mathematics. Assessment: Exams, assignments and/or laboratory reports (100%)
Note: Department permission required for enrolment.

This unit covers the same topics as PHYS3025, with some more challenging material.

PHYS3040
Electromagnetism and Physics Lab
Credit points: 6 Session: Semester 1 Classes: Nineteen 1 hour lectures and twelve 4 hour practicals. Prerequisites: PHYS (2011 or 2911), PHYS (2012 or 2912). MATH (2061 or 2961 or 2067). Prohibitions: PHYS3940, PHYS3941. Assessment: One 1.5 hour exam, practical reports and oral presentation (100%)

The lectures cover the theory of electromagnetism, one of the cornerstone of classical physics. They introduce Maxwell's equations in their differential form, using the power of vector calculus. The main application will be to electromagnetic waves, including reflection and absorption, which have application in fields such as optics, plasma physics and astrophysics. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

Textbooks

PHYS3940
Electromagnetism and Physics Lab (Adv)
Credit points: 6 Session: Semester 1 Classes: Nineteen 1 hour lectures and twelve 4 hour practicals. Prerequisites: PHYS (2011 or 2911) with a grade of at least Credit; PHYS (2012 or 2912) with a grade of at least Credit; MATH (2061 or 2961 or 2067). Prohibitions: PHYS3940, PHYS3941. Assumption: One 1.5 hour exam, practical reports and oral presentation (100%)

This unit covers the same topics as PHYS3040, but with greater depth and some more challenging material.

Textbooks
9. Undergraduate units of study

PHYS3941
Electromagnetism & Special Project (Adv)
Credit points: 6 Session: Semester 1 Classes: Nineteen 1 hour lectures, 4 hours per week with a research group. Prerequisites: PHYS (2011 or 2911) with at least Credit; PHYS (2012 or 2912) with at least Credit; MATH (2061 or 2961 or 2067) Prohibitions: PHYS3040, PHYS3940, PHYS3961, PHYS3911, PHYS3918, PHYS3928 Assessment: One 1.5 hour exam, assignments, 1 project report and talk (100%)
Note: Department permission required for enrolment. Note: Approval for this unit must be obtained from the School of Physics Senior Coordinator.

The lectures cover the theory of electromagnetism, one of the cornerstones of classical physics. They introduce Maxwell's equations in their differential form, using the power of vector calculus. The main application will be to electromagnetic waves, including reflection and absorption, which have application in fields such as optics, plasma physics and astrophysics. The project is carried out in a research group within the School of Physics, working on a research experiment or theoretical project supervised by a researcher. The aim is for students to acquire an understanding of the nature of research, to apply their knowledge of physics and scientific practice, and to serve as preparation for a research project at Honours level and beyond.

Textbooks

Semester 1 optional units

PHYS3046
Credit points: 6 Session: Semester 1 Classes: Fifty-seven 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) with at least Credit; PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3046, PHYS3047, PHYS3048, PHYS3049, PHYS3940, PHYS3941, PHYS3051, PHYS3052, PHYS3053, PHYS3953, PHYS3954, PHYS3955, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3956, PHYS3957, PHYS3958, PHYS3959, PHYS3960, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3981, PHYS3982, PHYS3982 Assessment: One 3 hour exam (100%)

The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. The lectures on High Energy Physics cover the basic constituents of matter, such as quarks and leptons, examining their fundamental properties and interactions, and their origin at the creation of the universe.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley. 2000

PHYS3047
Credit points: 6 Session: Semester 1 Classes: Fifty-seven 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3046, PHYS3047, PHYS3048, PHYS3049, PHYS3940, PHYS3941, PHYS3948, PHYS3949, PHYS3953, PHYS3954, PHYS3955, PHYS3956, PHYS3957, PHYS3958, PHYS3959, PHYS3960, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3981, PHYS3982, PHYS3982 Assessment: One 3 hour exam (100%)

The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. Plasma Physics is the study of ionised gases, which are collections of charged and neutral particles and form the main constituent of the Universe. These lectures aim to provide an understanding of the physics of fundamental phenomena in plasmas and to introduce the basic methods of theoretical and experimental plasma physics. The lectures on High Energy Physics cover the basic constituents of matter, such as quarks and leptons, examining their fundamental properties and interactions, and their origin at the creation of the universe.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley. 2000

PHYS3048
Credit points: 6 Session: Semester 1 Classes: Thirty-eight 1 hour lectures and six 4 hour practicals Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3046, PHYS3047, PHYS3048, PHYS3049, PHYS3051, PHYS3052, PHYS3053, PHYS3054, PHYS3055, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3060, PHYS3069, PHYS3956, PHYS3957, PHYS3958, PHYS3959, PHYS3960, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3981, PHYS3982, PHYS3982 Assessment: One 3 hour exam (100%)

This unit covers the same topics as PHYS3046, but with greater depth and some more challenging material.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley. 2000

PHYS3049
Credit points: 6 Session: Semester 1 Classes: One 2 hour exam, practical reports (100%)

The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. Plasma Physics is the study of ionised gases, which are collections of charged and neutral particles and form the main constituent of the Universe. These lectures aim to provide an understanding of the physics of fundamental phenomena in plasmas and to introduce the basic methods of theoretical and experimental plasma physics. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley. 2000

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PHYS3948 Thermodynamics/Plasma Physics/Lab (Adv)

Credit points: 6  Session: Semester 1  Classes: Thirty-eight 1 hour lectures and six 4 hour practicals. Prerequisites: Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067). Corequisites:
PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3046, PHYS3946, PHYS3047, PHYS3947, PHYS3048, PHYS3948, PHYS3049, PHYS3949, PHYS3051, PHYS3951, PHYS3052, PHYS3952, PHYS3053, PHYS3953, PHYS3054, PHYS3954, PHYS3055, PHYS3955, PHYS3056, PHYS3956, PHYS3057, PHYS3957, PHYS3058, PHYS3958, PHYS3059, PHYS3959, PHYS3070, PHYS3970, PHYS3072, PHYS3972, PHYS3073, PHYS3973, PHYS3076, PHYS3976, PHYS3077, PHYS3977, PHYS3078, PHYS3978 Assessment: One 2 hour exam, practical reports (100%)

This unit covers the same topics as PHYS3048, but with greater depth and some more challenging material.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley, 2000

PHYS3049 Thermodynamics/High Energy Physics/Lab

Credit points: 6  Session: Semester 1  Classes: Thirty-eight 1 hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912). Prohibitions: PHYS3046, PHYS3946, PHYS3047, PHYS3947, PHYS3048, PHYS3948, PHYS3049, PHYS3949, PHYS3051, PHYS3951, PHYS3052, PHYS3952, PHYS3053, PHYS3953, PHYS3054, PHYS3954, PHYS3055, PHYS3955, PHYS3056, PHYS3956, PHYS3057, PHYS3957, PHYS3058, PHYS3958, PHYS3059, PHYS3959, PHYS3070, PHYS3970, PHYS3072, PHYS3972, PHYS3073, PHYS3973, PHYS3076, PHYS3976, PHYS3077, PHYS3977, PHYS3078, PHYS3978, PHYS3080, PHYS3980, PHYS3082, PHYS3982 Assessment: One 2 hour exam, practical reports (100%)

The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. The Biological Physics component will cover applications of physics to biological systems, including topics such as molecular biology, structure and properties of polymers and proteins, thermodynamics of cells, transport of biomolecules, excitation of nerve impulses, and computer simulations of biological systems. In the practical laboratories, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley, 2000

PHYS3949 Thermodynamics/High Energy Phys/Lab(Adv)

Credit points: 6  Session: Semester 1  Classes: Thirty-eight 1 hour lectures and six 4 hour practicals. Prerequisites: Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912) and Prohibitions: PHYS3046, PHYS3946, PHYS3047, PHYS3947, PHYS3048, PHYS3948, PHYS3049, PHYS3949, PHYS3051, PHYS3951, PHYS3052, PHYS3952, PHYS3053, PHYS3953, PHYS3054, PHYS3954, PHYS3055, PHYS3955, PHYS3056, PHYS3956, PHYS3057, PHYS3957, PHYS3058, PHYS3958, PHYS3059, PHYS3959, PHYS3070, PHYS3970, PHYS3072, PHYS3972, PHYS3073, PHYS3973, PHYS3076, PHYS3976, PHYS3077, PHYS3977, PHYS3078, PHYS3978, PHYS3080, PHYS3980, PHYS3082, PHYS3982 Assessment: One 2 hour exam, practical reports (100%)

This unit covers the same topics as PHYS3049, but with greater depth and some more challenging material.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley, 2000

PHYS3051 Thermodynamics/Biophysics & Lab

Credit points: 6  Session: Semester 1  Classes: Fifty-seven 1 hour lectures. Prerequisites: PHYS (2011 or 2911) or PHYS (2012 or 2912). Corequisites: PHYS3046 or PHYS3946 or PHYS3047 or PHYS3947, PHYS3048 or PHYS3948, PHYS3049 or PHYS3949, PHYS3051 or PHYS3951, PHYS3052 or PHYS3952, PHYS3053 or PHYS3953, PHYS3054 or PHYS3954, PHYS3055 or PHYS3955, PHYS3056 or PHYS3956, PHYS3057 or PHYS3957, PHYS3058 or PHYS3958, PHYS3059 or PHYS3959, PHYS3069 or PHYS3969, PHYS3071 or PHYS3971, PHYS3073 or PHYS3973, PHYS3074 or PHYS3974, PHYS3076 or PHYS3976, PHYS3078 or PHYS3978, PHYS3079 or PHYS3979, PHYS3080 or PHYS3980, PHYS3082 or PHYS3982 Assessment: One 2 hour exam, practical reports (100%)

This unit covers the same topics as PHYS3051, but with greater depth and some more challenging material.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley, 2000

PHYS3059 Plasma Physics/Thermodynamics/Biophysics

Credit points: 6  Session: Semester 1  Classes: Fifty-seven 1 hour lectures. Prerequisites: PHYS (2011 or 2911) or PHYS (2012 or 2912). Corequisites: PHYS3040 or PHYS3940 or PHYS3941 Prohibitions: PHYS3046, PHYS3946, PHYS3047, PHYS3947, PHYS3048, PHYS3948, PHYS3049, PHYS3949, PHYS3051, PHYS3951, PHYS3052, PHYS3952, PHYS3053, PHYS3953, PHYS3054, PHYS3954, PHYS3055, PHYS3955, PHYS3056, PHYS3956, PHYS3057, PHYS3957, PHYS3058, PHYS3958, PHYS3059, PHYS3959, PHYS3070, PHYS3970, PHYS3072, PHYS3972, PHYS3073, PHYS3973, PHYS3076, PHYS3976, PHYS3077, PHYS3977, PHYS3078, PHYS3978 Assumed knowledge: Electromagnetism at Senior Physics level; MATH (2061 or 2961 or 2067) Assessment: One 3 hour exam and assignments (100%)

Plasma Physics is the study of ionised gases, which are collections of charged and neutral particles and form the main constituent of the Universe. The lectures cover the properties of plasmas and their applications, including nuclear fusion energy, materials synthesis and modification, environmental remediation, aerospace, nanotechnology, and biomedical technologies. The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. The Biological Physics component will cover applications of physics to biological systems, including topics such as molecular biology, structure and properties of polymers and proteins, thermodynamics of cells, transport of biomolecules, excitation of nerve impulses, and computer simulations of biological systems.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley, 2000

PHYS3959 Plasma Phys./Thermodynamics/Biophys(Adv)

Credit points: 6  Session: Semester 1  Classes: Fifty-seven 1 hour lectures. Prerequisites: PHYS (2011 or 2911) or PHYS (2012 or 2912) with at least Credit. Prohibitions: PHYS3046, PHYS3946, PHYS3047, PHYS3947, PHYS3048, PHYS3948, PHYS3049, PHYS3949, PHYS3051, PHYS3951, PHYS3052, PHYS3952, PHYS3053, PHYS3953, PHYS3054, PHYS3954, PHYS3055, PHYS3955, PHYS3056, PHYS3956, PHYS3057, PHYS3957, PHYS3058, PHYS3958, PHYS3059, PHYS3959, PHYS3069, PHYS3969, PHYS3071, PHYS3971, PHYS3073, PHYS3973, PHYS3074, PHYS3974, PHYS3076, PHYS3976, PHYS3078, PHYS3978, PHYS3080, PHYS3980, PHYS3082, PHYS3982 Assessment: One 2 hour exam, practical reports (100%)

The lectures on Thermodynamics provide an introduction to the subject, emphasising the use of entropy, chemical potential, and free energy. They also introduce statistical mechanics, including the classical Boltzmann distribution and some quantum statistical mechanics. The Biological Physics component will cover applications of physics to biological systems, including topics such as molecular biology, structure and properties of polymers and proteins, thermodynamics of cells, transport of biomolecules, excitation of nerve impulses, and computer simulations of biological systems.
9. Undergraduate units of study

This unit covers the same topics as PHYS3059, but with greater depth and some more challenging material.

Textbooks
Schroeder, DV. An Introduction to Thermal Physics. Addison-Wesley. 2000

PHYS3073
Plasma/High Energy Physics & Lab
Credit points: 6 Session: Semester 1 Classes: Thirty-eight hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067)
Corequisites: PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3036, PHYS3046, PHYS3050, PHYS3946, PHYS3950, PHYS3954, PHYS3955, PHYS3059, PHYS3959, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3981, PHYS3982
Assumed knowledge: Electromagnetism at Senior Physics level. Assessment: One 2 hour exam, practical reports (100%)

Plasma Physics is the study of ionised gases, which are collections of charged and neutral particles and form the main constituent of the Universe. These lectures aim to provide an understanding of the physics of fundamental phenomena in plasmas and to introduce the basic methods of theoretical and experimental plasma physics. The lectures on High Energy Physics cover the basic constituents of matter, such as quarks and leptons, examining their fundamental properties and interactions, and their origin at the creation of the universe. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

PHYS3973
Plasma/High Energy Physics & Lab (Adv)
Credit points: 6 Session: Semester 1 Classes: Thirty-eight hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) with at least Credit and PHYS (2012 or 2912) with at least Credit, MATH (2061 or 2961 or 2067)
Corequisites: PHYS (3040 or 3940 or 3941) Prohibitions: PHYS3036, PHYS3046, PHYS3050, PHYS3946, PHYS3950, PHYS3954, PHYS3955, PHYS3059, PHYS3959, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3982, PHYS3985
Assumed knowledge: Electromagnetism at Senior Physics level. Assessment: One 2 hour exam, practical reports (100%)

This unit covers the same topics as PHYS3073, but with greater depth and some more challenging material.

Semester 2 core units

PHYS3050
Quantum Mechanics & Physics Lab
Credit points: 6 Session: Semester 2 Classes: Nineteen 1 hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) with at least Credit and PHYS (2012 or 2912) with at least Credit and MATH (2061 or 2961 or 2067) Prohibitions: PHYS3960, PHYS3961, PHYS3962, PHYS3986
Assessment: One 1.5 hour exam, assignments, practical reports and oral presentation (100%)

The lectures cover the fundamental concepts and formalism of quantum dynamics, and the application to angular momentum and symmetry in quantum mechanics. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

Textbooks

PHYS3060
Quantum Mechanics and Physics Lab (Adv)
Credit points: 6 Session: Semester 2 Classes: Nineteen 1 hour lectures and twelve 4 hour practicals Prerequisites: PHYS (2011 or 2911) with at least Credit and PHYS (2012 or 2912) with at least Credit and MATH (2061 or 2961 or 2067) Prohibitions: PHYS3060, PHYS3961, PHYS3962, PHYS3986
Assessment: One 1.5 hour exam, assignments, practical reports and oral presentation (100%)

This unit covers the same topics as PHYS3060, but with greater depth and some more challenging material.

Textbooks

PHYS3961
Quantum Mechanics & Special Project(Adv)
Credit points: 6 Session: Semester 2 Classes: Nineteen 1 hour lectures and 4 hours per week with a research group. Prerequisites: PHYS (2011 or 2911) with at least Credit and PHYS (2012 or 2912) with at least Credit, MATH (2061 or 2961 or 2067) Prohibitions: PHYS3060, PHYS3960, PHYS3962, PHYS3964
Assessment: One 1.5 hour exam, assignments, project report and oral presentation (100%)

Note: Department permission required for enrolment. Note: Approval for this unit must be obtained from the School of Physics Senior Coordinator.

The lectures cover the fundamental concepts and formalism of quantum dynamics, and the application to angular momentum and symmetry in quantum mechanics. The project is carried out in a research group within the School of Physics, working on a research experiment or theoretical project supervised by a researcher. The aim is for students to acquire an understanding of the nature of research, to apply their knowledge of physics and scientific practice, and to serve as preparation for a research project at Honours level and beyond.

Textbooks

Semester 2 optional units

PHYS3068
Condensed Matter Physics/Optics/Lab
Credit points: 6 Session: Semester 2 Classes: Thirty-eight hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912); MATH (2061 or 2961 or 2067) Prohibitions: PHYS3050, PHYS3950, PHYS3952, PHYS3953, PHYS3954, PHYS3955, PHYS3956, PHYS3957, PHYS3958, PHYS3959, PHYS3960, PHYS3961, PHYS3962, PHYS3963, PHYS3964, PHYS3965, PHYS3966, PHYS3967, PHYS3968, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980, PHYS3981, PHYS3982
Assessment: Electromagnetism and Quantum Mechanics at Senior Physics level Assessment: One 2 hour exam, practical reports, and assignments (100%)

The lectures on Optics introduce students to modern optics, using the laser to illustrate the applications in studying the properties of matter and many important optical phenomena. The lectures on Condensed Matter Physics cover the theoretical underpinning and properties of condensed matter, specifically the physics of solids. Semiconductors are investigated in detail, considering recent discoveries and new developments in nanotechnology and lattice dynamics. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

PHYS3968
Condensed Matter Physics/Optics/Lab(Adv)
Credit points: 6 Session: Semester 2 Classes: Thirty-eight hour lectures and six 4 hour practicals. Prerequisites: PHYS (2011 or 2911) with at least Credit, PHYS (2012 or 2912) with at least Credit; MATH (2061 or 2961 or 2067) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3950, PHYS3952, PHYS3953, PHYS3954, PHYS3955, PHYS3956, PHYS3957, PHYS3958, PHYS3959, PHYS3960, PHYS3961, PHYS3962, PHYS3963, PHYS3964, PHYS3965, PHYS3966, PHYS3967, PHYS3968, PHYS3969, PHYS3970, PHYS3971, PHYS3972, PHYS3973, PHYS3974, PHYS3975, PHYS3976, PHYS3977, PHYS3978, PHYS3979, PHYS3980
Assessment: Electromagnetism and Quantum Mechanics at Senior Physics level. Assessment: One 2 hour exam, assignments, practical reports and oral presentation (100%)

This unit covers the same topics as PHYS3068, but with greater depth and some more challenging material.

Note: Department permission required for enrolment. Note: Approval for this unit must be obtained from the School of Physics Senior Coordinator.
PHYS3063
Cond. Matter Physics/Nanoscience/Optics

Credit points: 6 Session: Semester 2 Classes: Fifty-seven 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3052, PHYS3054, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3065, PHYS3066, PHYS3067, PHYS3071, PHYS3076, PHYS3077, PHYS3079, PHYS3080, PHYS3081, PHYS3082, PHYS3982 Assessment: One 3 hour exam (100%)

This course draws on basic quantum theory and statistical mechanics and considers recent discoveries and new developments in semiconductors, nanostructures, magnetism, and superconductivity. Nanoscience is the study of the behaviour of light and matter as they interact with structures that have features on nanometre scales. The lectures cover the fundamental physics of nanoscience and the methods used for manipulating matter and creating structures on these scales. The lectures on Optics introduce students to modern optics, using the laser to illustrate the applications in studying the properties of matter and many important optical phenomena. These include the Lorentz model as a model for the optical properties of matter, spontaneous and stimulated emission of light, rate equation analysis of lasers, diffraction, Gaussian beam propagation, anisotropic media and nonlinear optics.

PHYS3963
Cond. Matter Phys/Nanoscience/Optics(Adv)

Credit points: 6 Session: Semester 2 Classes: Fifty-seven 1 hour lectures Prerequisites: Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3052, PHYS3054, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3065, PHYS3066, PHYS3067, PHYS3068, PHYS3069, PHYS3070, PHYS3071, PHYS3075, PHYS3076, PHYS3080, PHYS3081, PHYS3082, PHYS3982 Assessment: One 3 hour exam (100%)

This unit covers the same topics as PHYS3063, but with greater depth and some more challenging material.

PHYS3064
Cond. Matter/Nanoscience

Credit points: 6 Session: Semester 2 Classes: Fifty-seven 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and PHYS (2013 or 2913) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3052, PHYS3054, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3065, PHYS3066, PHYS3067, PHYS3068, PHYS3069, PHYS3070, PHYS3071, PHYS3075, PHYS3076, PHYS3080, PHYS3081, PHYS3082, PHYS3982 Assessment: One 3 hour exam (100%)

The lectures on Condensed Matter Physics provide a basic introduction to condensed matter systems, specifically the physics that underlies the electromagnetic, thermal, and optical properties of solids. The course draws on basic quantum theory and statistical mechanics and considers recent discoveries and new developments in semiconductors, nanostructures, magnetism, and superconductivity. Nanoscience is the study of the behaviour of light and matter as they interact with structures that have features on nanometre scales. The lectures on Astrophysics explore astrophysical environments inside stars and beyond (e.g. the interstellar medium, the intergalactic medium and galaxies themselves) and focus on one of the most important physical processes in astrophysics: the transport of radiative energy.

PHYS3964
Cond. Matter/Nanoscience/Astrophys.(Adv)

Credit points: 6 Session: Semester 2 Classes: Fifty-seven 1 hour lectures Prerequisites: Credit in PHYS (2011 or 2911) and Credit in PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3052, PHYS3054, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3065, PHYS3066, PHYS3067, PHYS3068, PHYS3069, PHYS3070, PHYS3071, PHYS3075, PHYS3076, PHYS3077, PHYS3079, PHYS3080, PHYS3081, PHYS3082, PHYS3982 Assessment: One 3 hour exam (100%)

This unit covers the same topics as PHYS3064, but with greater depth and some more challenging material.

PHYS3065
Condensed Matter/Physics/Optics

Credit points: 6 Session: Semester 2 Classes: Fifty-seven 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067) Corequisites: PHYS (3060 or 3960 or 3961) Prohibitions: PHYS3050, PHYS3052, PHYS3054, PHYS3056, PHYS3057, PHYS3058, PHYS3059, PHYS3065, PHYS3066, PHYS3067, PHYS3068, PHYS3069, PHYS3070, PHYS3071, PHYS3075, PHYS3076, PHYS3077, PHYS3079, PHYS3080, PHYS3081, PHYS3082, PHYS3982 Assessment: One 3 hour exam (100%)

This unit covers the same topics as PHYS3065, but with greater depth and some more challenging material.

PHYS3066
Optics/Astrophysics/Physics

Credit points: 6 Session: Semester 2 Classes: Thirty-eight 1 hour lectures Prerequisites: PHYS (2011 or 2911) and PHYS (2012 or 2912) and MATH (2061 or 2961 or 2067)
PHYS3956

The lectures on Condensed Matter Physics provide a basic introduction to condensed matter systems, specifically the physics that underlies the electromagnetic, thermal, and optical properties of solids. The course draws on basic quantum theory and statistical mechanics and considers recent discoveries and new developments in semiconductors, nanostructures, magnetism, and superconductivity. Nanoscience is the study of the behaviour of light and matter as they interact with structures that have features on nanoscale metres. The lectures cover the fundamental physics of nanoscience and the methods used for manipulating matter and creating structures on these scales. In the practical laboratory classes, students will choose from a range of experiments that aim to give them an appreciation of the analytical, technical and practical skills required to conduct modern experimental work.

PHYS3967

This unit of study offers Neuroscience and Human Cellular Physiology, and the July semester offers Heart and Circulation as well as further study in Neuroscience.

PHSI2005

Integrated Physiology A

Credit points: 6

Teacher/Coordinator: Dr Meloni Muir

Session: Semester 1

Classes: Thirty-eight 1 hour lectures and six 4 hour practicals

Prerequisites: PHYS (2011 or 2911) and PHYS(2012 or 2912)

Prohibitions: PHYS3068, PHYS3968, PHYS3070, PHYS3970, PHYS3074, PHYS3974, PHYS3075, PHYS3975, PHYS3077, PHYS3977, PHYS3078, PHYS3978, PHYS3079, PHYS3979, PHYS3080, PHYS3980, PHYS3081, PHYS3981

Assessment: One 2 hour exam, practical reports (100%)

This unit covers the same topics as PHYS3067, but with greater depth and some more challenging material.

Ask a question

physics.studentservices@sydney.edu.au

PHYSiology

The Department of Physiology provides introductory general Intermediate units of study and for those wishing to major in the subject, in-depth Senior units of study. For Senior units the February semester offers Neuroscience and Human Cellular Physiology, and the July semester offers Heart and Circulation as well as further study in Neuroscience.

PHSI2005

Integrated Physiology A

Credit points: 6

Teacher/Coordinator: Dr Atomu Sawatai

Session: Semester 1

Classes: Five 1 hour lectures, one 3 hour practical and one 3 hour tutorial per fortnight.

Prerequisites: 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Mathematics, Biology, Psychology units of study

Prohibitions: PHSI2905, PHSI2901, PHSI2911, PHSI2901

Assessment: Two written exams; group and individual written and oral presentations (100%)

Note: The completion of 6 credit points of MBLG units of study is highly recommended for progression to Senior Physiology. Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites.

This unit of study offers a basic introduction to the functions of the nervous system, including excitable cell (nerve and muscle) physiology, sensory and motor systems and central processing. It also incorporates haematology and cardiovascular physiology. The practical component involves experiments on humans and isolated tissues, with an emphasis on hypothesis generation and data analysis. Inquiry-based learning tutorial sessions develop critical thinking and generic skills while demonstrating the integrative nature of physiology. Oral and written communication skills are emphasized, as well as group learning and team work.

Textbooks


PHSI2905

Integrated Physiology A (Advanced)

Credit points: 6

Teacher/Coordinator: Dr Meloni Muir

Session: Semester 1

Classes: Five 1 hour lectures, one 3 hour practical and one 3 hour tutorial per fortnight. Advanced students will be required to attend the designated Advanced Practical and tutorial sessions. Students will also be exempt from all inquiry-based learning tutorial sessions.

Prerequisites: 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Mathematics, Biology, Psychology units of study, approval of Coordinator

Prohibitions: PHSI2905, PHSI2901, PHSI2901

Assessment: One written exam; individual and group oral presentations, 2 practical reports (reports will replace other assessment items from regular course) (100%)

Note: Department permission required for enrolment. Note: Permission from the coordinators is required for entry into this course. It is available only to selected students who have achieved a WAM of 75 (or higher) in their Junior units of study. Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites. The completion of 6 credit points of MBLG units of study is highly recommended for progression to Senior Physiology

This unit of study is an extension of PHSI2005 for talented students with an interest in Physiology and Physiological research. The lecture component of the course is run in conjunction with PHSI2005. This unit of study gives a basic introduction to the functions of the nervous system, including excitable cell (nerve and muscle) physiology, sensory and motor systems and central processing. It also incorporates haematology and cardiovascular physiology. The practical component involves experiments on humans, isolated tissues, and computer simulations, with an emphasis on hypothesis generation and data analysis. Both oral and written communication skills are emphasised, as well as group learning. The course will provide an opportunity for
students to apply and extend their understanding of physiological concepts by designing and conducting actual experiments. Small class sizes will provide a chance for students to interact directly with faculty members mentoring the practical sessions. Assessment for this stream will be based on oral group presentations and two practical reports. These items will replace some other assessable activities from the regular course.

Textbooks

PHSI2006
Integrated Physiology B
Credit points: 6
Teacher/Coordinator: Dr Meloni Muir
Session: Semester 2
Classes: Five one-hour lectures, one 3-hour practical and one 3-hour tutorial per fortnight.
Prerequisites: 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Mathematics, Biology, Psychology units of study
Prohibitions: PHSI2006, PHSI2002, PHSI2102, PHSI2902
Assessment: Two written exams; group and individual written and oral presentations (100%)

Note: The completion of Molecular Biology and Genetics (Intro) is highly recommended for progression to Senior Physiology. Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites.

This unit of study offers a basic introduction to the functions of the remaining body systems: gastrointestinal, respiratory, endocrine, reproductive and renal. The practical component involves experiments on humans and computer simulations, with an emphasis on hypothesis generation and data analysis. Inquiry-based learning tutorial sessions develop critical thinking and generic skills while demonstrating the integrative nature of physiology. Oral and written communication skills are emphasized, as well as group learning and team work.

Textbooks

PHSI2906
Integrated Physiology B (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Atomu Sawatari
Session: Semester 2
Classes: Five one-hour lectures, one 3-hour practical and one 3-hour tutorial per fortnight. Advanced students will be required to attend the designated Advanced Practical and Tutorial sessions. Students will also be exempt from all Inquiry-based learning tutorials. Prerequisites: 6 credit points of Junior Chemistry plus 30 credit points from any Junior Chemistry, Physics, Mathematics, Biology, Psychology units of study, approval of coordinator
Prohibitions: PHSI2006, PHSI2902, PHSI2102, PHSI2902
Assessment: One written exam; individual and group oral presentations, 2 practical reports (reports will replace some other assessment items from regular course) (100%)

Note: Department permission required for enrolment. Note: Permission from the coordinators is required for entry into this course. It is available only to selected students who have achieved a WAM of 75 (or higher) in their Junior units of study. Students taking combined degrees or with passes in units not listed should consult a coordinator if they do not meet the prerequisites. The completion of Molecular Biology and Genetics (Intro) is highly recommended for progression to Senior Physiology.

This unit of study is an extension of PHSI2006 for talented students with an interest in Physiology and Physiological research. The lecture component of the course is run in conjunction with PHSI2006. This unit of study gives a basic introduction to the remaining of the body systems: gastrointestinal, respiratory, endocrine, reproductive and renal. The practical component involves simple experiments on humans, isolated tissues, and computer simulations, with an emphasis on hypothesis generation and data analysis. Both oral and written communication skills are emphasised, as well as group learning. The course will provide an opportunity for students to apply and extend their understanding of physiological concepts by designing and conducting actual experiments. Small class sizes will provide a chance for students to interact directly with faculty members mentoring the practical sessions. Assessment for this stream will be based on oral group presentations and two practical reports. These items will replace some other assessable activities from the regular course.

Textbooks

Please note, all NEUR courses are taught and administered jointly by the Disciplines of Physiology and Anatomy & Histology and can form part of a major in Physiology, Anatomy & Histology or Neuroscience. NEUR3001/3901 and 3002/3902 are designed to be taken in conjunction with other. It is also strongly advised that NEUR3003/3903 and 3004/3904 be taken together. For information on NEUR3002 and NEUR3004 refer to the entry under Anatomy in this chapter.

NEUR3001
Neuroscience: Special Senses
Credit points: 6
Teacher/Coordinator: Dr Dario Protti
Session: Semester 1
Classes: Two 1 hour lectures per week; one 3 hour practical per fortnight and one 3 hour tutorial per fortnight.
Prerequisites: For BMedSc students: BMED(2801 or 2503) and BMED(2806 or 2506) For other students: (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. Prohibitions: PHSI3001, NEUR3901
Assumed knowledge: It is strongly recommended that students also take unit NEUR3002. PHSI2005 and ANAT2010 are assumed knowledge.
Assessment: Two 1 hour exams, one prac report (100%)

The aim of this course is to provide students with an introduction to the structure and function of the nervous system and to the main concepts of processing of sensory information. Understanding basic sensory transduction mechanisms and the function of the sensory systems is necessary to understand how perceptual processes work in normal and disease conditions and provides a gateway to unravel the complexity of the mind. Basic aspects of low and high level sensory processing in all sense modalities will be covered, with a special emphasis in the auditory and visual systems. The relationship between sensory systems, perception and higher cognitive functions will be addressed.

Textbooks

NEUR3002
Neuroscience: Special Senses (Advanced)
Credit points: 6
Teacher/Coordinator: Dr Dario Protti
Session: Semester 1
Classes: Two 1 hour lectures per week; one 3 hour practical per fortnight and one 3 hour tutorial per fortnight. Advanced students may be exempt from attending some of these classes to permit meetings with supervisor.
Prerequisites: For BMedSc students: Credit average in BMED(2801 or 2503) and BMED(2806 or 2506) For other students: Credit average in (PHSI(2101 or 2001 or 2901 or 2005 or 2905) or ANAT(2003 or 2010)) and 6 credit points of MBLG. Prohibitions: NEUR3001, PHSI3001, PHSI3901
Assumed knowledge: PHSI3005 and ANAT2010
Assessment: Two 1 hour exams, one prac report, tutorial papers, one research or library essay (research essay will replace some other assessment items from regular course) (100%)

Note: Permission from the coordinators is required for entry into this course. It is strongly recommended that students also take unit NEUR3002 or NEUR3902.

This unit of study is an extension of NEUR3001 for talented students with an interest in Neuroscience and research in this field. The lecture/practical component of the course is run in conjunction with NEUR3001. The aim of this course is to provide students with an introduction to the structure and function of the nervous system and to the main concepts of processing of sensory information. Understanding basic sensory transduction mechanisms and the function of the sensory systems is necessary to understand how perceptual processes work in normal and disease conditions and provides a gateway to unravel the complexity of the mind. Basic aspects of low and high level sensory processing in all sense modalities will be covered, with a special emphasis in the auditory and visual systems. The relationship between sensory systems, perception and higher cognitive functions will be addressed.

Textbooks

NEUR3003
Cellular and Developmental Neuroscience
Credit points: 6
Teacher/Coordinator: Dr Kevin Keay, Dr Catherine Leamey
Session: Semester 2
Classes: Three 1 hour lectures plus one 1 hour tutorial or one 2 hour practical per week.
Prerequisites: For BMedSc: 42 credit points of intermediate BMed units. For others: 18 credit points of Intermediate science
9. Undergraduate units of study

units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics, Physiology, Psychology or Statistics. Prohibitions: NEUR3903, PHSI3002, PHSI3902. Assumed knowledge: Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. Assessment: One 1 hour exam. Major essay/report (100%). Note: Enrolment in NEUR3004 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.

This second semester unit is designed to introduce students to "cutting edge" issues in the neuroscience. This course is a combination of small lectures on current issues in cellular and developmental neuroscience and a research-based library project. Suitably qualified students may have the option of replacing the library project with a laboratory project. Issues covered in the lecture series will include the role of glial on cerebral blood flow and neural transmission, neurochemistry and psychiatric disorders and the development of central and peripheral nervous system.

Textbooks

NEUR3903
Cellular & Developmental Neurosci. (Adv)
Credit points: 6 Teacher/Coordinator: Dr Kevin Keay, Dr Catherine Leamey. Session: Semester 2. Classes: Three 1 hour lectures and one 1 hour tutorial or one 2 hour lab session per week. Prerequisites: For BMedSc: 42 credit points of Intermediate or Intermediate Plus BMed units. For others: 18 credit points of Intermediate or Intermediate Plus. Science units of study from Anatomy & Histology, Biochemistry, Biology, Chemistry, Computer Science, Mathematics, Microbiology, Molecular Biology and Genetics. Physiology, Psychology or Statistics. Plus, students must have a CREDIT (or better) in NEUR3001/3901 and NEUR3002/3902. Prohibitions: NEUR3003, PHSI3002, PHSI3902. Assumed knowledge: Students should be familiar with the material in Bear, Connors & Paradiso Neuroscience: Exploring the Brain. Assessment: One 1 hour exam. Major essay/report. Mini-lecture (100%). Note: Department permission required for enrolment. Note: Enrolment in NEUR3004/3904 is HIGHLY RECOMMENDED. Courses are designed to be taken in conjunction with each other.

This unit encompasses the material taught in NEUR3003. Advanced students perform a research project and present a mini-lecture on a current topic in neurosciences.

Textbooks

For other NEUR units of study, see the entry for the Department of Anatomy and Histology.

PHSI3005
Human Cellular Physiology: Theory
Credit points: 6 Teacher/Coordinator: Dr William Phillips. Session: Semester 1. Classes: Three 1-hour lectures and one 1-hour tutorial slot per week. Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906). For BMedSc: BMED (2801 and 2802). Prohibitions: PHSI3905, PHSI3004, PHSI3904. Assumed knowledge: 6 credit points of MBLG. Assessment: One 2-hour exam and 3-5 quizzes (100%). Note: It is highly recommended that this unit of study be taken in conjunction with PHSI3006.

The aim of this unit of study is to examine key cellular processes involved in the growth, maintenance and reproduction of human life. Processes to be studied include the regulation of cell division and differentiation in developing and adult tissues, the regulation of body fluids through ion transport across epithelia, mechanisms of hormonal and nervous system signalling and the regulation of muscle contraction. Lectures will relate the molecular underpinnings to physiological functions: our current interpretation of how ion channels, hormone receptors and synaptic interactions mediate tissue function and human life. The significance of these molecular mechanisms will be highlighted by considering how mutations and other disorders affect key proteins and genes and how this might lead to disease states such as cancer, intestinal and lung transport disorders and osteoporosis. Please see the Physiology website for details of mentored Advanced research topics.

Textbooks

PHSI3006
Human Cellular Physiology: Research
Credit points: 6 Teacher/Coordinator: Dr William D. Phillips. Session: Semester 1. Classes: Two small group PBL and one 1-hour lecture per week; one 3-hour practical in some weeks. Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906). For BMedSc: BMED (2801 and 2802). Corequisites: PHSI3005. Prohibitions: PHSI3906, PHSI3004, PHSI3904. Assessment: One 1.5-hour exam, PBL assessments by oral presentations and paper summaries, prac reports (100%).

This unit of study complements, and should be taken together with PHSI3005. PHSI3006 focuses deeply upon certain areas of cellular physiology that have particular relevance to human health and disease. In the problem-based learning (PBL) sessions groups of students work together with the support of a tutor to develop and communicate an understanding of mechanisms underlying the physiology and patho-physiology of disorders such as prostate cancer and neuromuscular disorders. Each problem runs over three weeks with two small group meetings per week. Reading lists are constructed to help address written biomedical problems. Lectures provide advice on how to interpret scientific data of the type found in the research papers. Practical classes will emphasize experimental design and interpretation. Collectively, the PBL, lectures and practical classes aim to begin to develop skills and outlook needed to deal with newly emerging biomedical science.

Textbooks

PHSI3905
Human Cellular Physiology (Adv): Theory
Credit points: 6 Teacher/Coordinator: Dr William D. Phillips. Session: Semester 1. Classes: Three 1-hour lectures and one 1-hour tutorial slot per week. Prerequisites: Credit average in PHSI(2005 or 2905) and PHSI(2006 or 2906) or in BMED (2801 and 2802). Students enrolling in this unit should have a WAM of at least 70. Prohibitions: PHSI3905, PHSI3004, PHSI3904. Assumed knowledge: 6 credit points of MBLG. Assessment: One 2-hour exam, one 2000-word report and a report plan arising from a mentored research project (100%). Note: Department permission required for enrolment. Note: It is highly recommended that this unit of study be taken in combination with PHSI3006.

The aim of this unit of study is to examine key cellular processes involved in the growth, maintenance and reproduction of human life. Processes to be studied include the regulation of cell division and differentiation in developing and adult tissues, the regulation of body fluids through ion transport across epithelia, mechanisms of hormonal and nervous system signalling and the regulation of muscle contraction. Lectures will relate the molecular underpinnings to physiological functions: our current interpretation of how ion channels, hormone receptors and synaptic interactions mediate tissue function and human life. The significance of these molecular mechanisms will be highlighted by considering how mutations and other disorders affect key proteins and genes and how this might lead to disease states such as cancer, intestinal and lung transport disorders and osteoporosis. Please see the Physiology website for details of mentored Advanced research topics.

Textbooks

PHSI3906
Human Cellular Physiology (Adv): Research
Credit points: 6 Teacher/Coordinator: Dr William D. Phillips. Session: Semester 1. Classes: Two small group PBL and one 1-hour lecture per week; one 3-hour practical in some weeks. Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906). For BMedSc: BMED (2801 and 2802). Corequisites: PHSI3005. Prohibitions: PHSI3906, PHSI3004, PHSI3904. Assessment: One 1.5-hour exam, PBL assessments by oral presentations and paper summaries, prac reports (100%).

This unit of study complements, and should be taken together with PHSI3905. PHSI3906 focuses deeply upon certain areas of cellular physiology that have particular relevance to human health and disease. In the problem-based learning (PBL) sessions groups of students work together with the support of a tutor to develop and communicate ...
an understanding of mechanism underlying the physiology and patho-physiology of disorders such as prostate cancer and neuromuscular disorders. Each problem runs over three weeks with two small group meetings per week. Reading lists are structured to help address written biomedical problems. Lectures provide advice on how to interpret scientific data of the type found in the research papers. Practical classes will emphasize experimental design and interpretation. Collectively, the PBL, lectures and practical classes aim to begin to develop skills and outlook needed to deal with newly emerging biomedical science. Please see the Physiology website for details of mentored Advanced research topics.

Textbooks

PHSI3007 Heart and Circulation: Normal Function
Credit points: 6
Teacher/Coordinator: Dr Steve Assinder
Session: Semester 2
Classes: Two 1-hour lectures and one 3-hour practical or one 2-hour tutorial per week.
Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of Intermediate Science Units of Study For BMedSc: BMED (2801 and 2803).
Prohibitions: PHSI3907, PHSI3003, PHSI3903
Assumed knowledge: 6 credit points of MBLG
Assessment: One 2-hour exam, 3 practical assignments (100%)

Note: It is recommended that students take PHSI3007 ONLY in combination with PHSI3008.

The aim of this unit of study is to examine in depth the structure and function of the cardiovascular system at the organ system, cellular and molecular levels. There is a particular focus on exercise physiology and the way in which the heart, circulation and skeletal muscles contribute to the limits of sporting achievement. The excitability, contractility and energetics of the heart and blood vessels are studied and the regulation of these organs by local (physical and chemical) factors, hormones and the nervous system are discussed, with emphasis on cellular and molecular mechanisms. At the systemic level, short term (neural) mechanisms controlling the blood pressure and how the system behaves during exercise and other stresses is dealt with. Long term (hormonal) mechanisms regulating blood pressure via the renal control of extracellular fluid volume is also discussed. There is an emphasis in this unit of study on recent advances in cellular and molecular aspects of heart and the blood vessels and the regulation of these organs by local (physical and chemical) factors, hormones and the autonomic nervous system. Lectures will be complemented by practical classes and tutorials that reinforce the theory and emphasize experimental design, data interpretation and presentation.

PHSI3907 Heart & Circulation: Normal Function Adv
Credit points: 6
Teacher/Coordinator: Dr Steve Assinder
Session: Semester 2
Classes: Two 1-hour lectures and one 3-hour practical or one 2-hour tutorial per week.
Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of Intermediate Science Units of Study For BMedSc: BMED (2801 and 2803).
Prohibitions: PHSI3907, PHSI3003, PHSI3903
Assumed knowledge: 6 credit points of MBLG
Assessment: One 2-hour exam, 2000-word essay based on a mentored research project, practical assignment (100%)

Note: Department permission required for enrolment. Note: Available to selected students who have achieved an average of at least 75 in their prerequisite units of study. It is highly recommended that this unit of study be taken ONLY in combination with PHSI3007.

The aim of this unit of study is to examine in depth the structure and function of the cardiovascular system at the organ system, cellular and molecular levels. There is a particular focus on exercise physiology and the way in which the heart, circulation and skeletal muscles contribute to the limits of sporting achievement. The excitability, contractility and energetics of the heart and blood vessels are studied and the regulation of these organs by local (physical and chemical) factors, hormones and the nervous system are discussed, with emphasis on cellular and molecular mechanisms. At the systemic level, short term (neural) mechanisms controlling the blood pressure and how the system behaves during exercise and other stresses is dealt with. Long term (hormonal) mechanisms regulating blood pressure via the renal control of extracellular fluid volume is also discussed. There is an emphasis in this unit of study on recent advances in cellular and molecular aspects of heart and the blood vessels and the regulation of these organs by local (physical and chemical) factors, hormones and the autonomic nervous system. Lectures will be complemented by practical classes and tutorials that reinforce the theory and emphasize experimental design, data interpretation and presentation. Details of mentored Advanced research projects are available on the Physiology website.

PHSI3008 Heart and Circulation: Dysfunction
Credit points: 6
Teacher/Coordinator: Dr Steve Assinder
Session: Semester 2
Classes: Two 1-hour lectures and two 1-hour PBL sessions per week.
Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of Intermediate Science Units of Study For BMedSc: BMED (2801 and 2803).
Prohibitions: PHSI3908, PHSI3003, PHSI3903
Assumed knowledge: 6 credit points of MBLG
Assessment: One 2-hour exam, PBL presentations, 2000-word essay (100%)

Note: It is strongly recommended that students take PHSI3008 ONLY in combination with PHSI3007.

This unit of study complements and should be taken together with PHSI3007, which deals with the normal function of the cardiovascular system. This unit of study focuses on cardiovascular disease which is a major cause of death in western society. Lectures provide the background to understanding (a) the disruption of normal physiological processes, (b) recent advances in cellular and molecular mechanisms underpinning cardiovascular disease. Reading lists are organised into specific topics related to a particular disease. Through analysis and discussion of the readings students develop skills necessary for interpreting and communicating science.

PHSI3908 Heart & Circulation: Dysfunction Adv
Credit points: 6
Teacher/Coordinator: Dr Steve Assinder
Session: Semester 2
Classes: Two 1 hour lecture and two 1 hour PBL sessions per week.
Prerequisites: Except for BMedSc students: PHSI(2005 or 2905) and PHSI(2006 or 2906) plus at least 12 credit points of Intermediate Science Units of Study For BMedSc: BMED (2801 and 2803).
Prohibitions: PHSI3908, PHSI3003, PHSI3903
Assumed knowledge: 6 credit points of MBLG
Assessment: One 2-hour exam, PBL presentations, written assignment on a selected topic (100%)

Note: Department permission required for enrolment. Note: Available to selected students who have achieved an average of at least 75 in their prerequisite units of study. It is highly recommended that this unit of study be taken ONLY in combination with PHSI3907 or PHSI3007.

This unit of study complements and should be taken together with PHSI3007 which deals with the normal function of the cardiovascular system. This unit of study focuses on cardiovascular disease which is a major cause of death in western society. Lectures provide the background to understanding (a) the disruption of normal physiological processes, (b) recent advances in cellular and molecular mechanisms underpinning cardiovascular disease. Reading lists are organised into specific topics related to a particular disease. Through analysis and discussion of the readings students develop skills necessary for interpreting and communicating science. Details of mentored Advanced research projects are available on the Physiology website.

Plant Science
The following units of study form part of the Plant Science program, which has been developed jointly by the Faculty of Agriculture, Food and Natural Resources and the School of Biological Sciences.
Intermediate units of study

PLNT2001
Plant Biochemistry and Molecular Biology

Credit points: 6
Teacher/Coordinator: Dr Meredith Wilkes Prof Les Copeland
Session: Semester 1
Classes: 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2, 1x3-hr practical weekly
Prerequisites: 12 Junior credit points from Chemistry and Biology (or with the Dean’s permission BIOL1201 and BIOL1202)
Prohibitions: PLNT2901, AGCH2004
Assessment: 1x1hr exam (15%) and 1x1.5hr exam (45%) and lab reports (40%)

This unit of study is designed to develop an understanding of the molecular principles that underlie the structure and function of plants and how these principles relate to the use of plants by humans as a source of food and fibre. The unit is a core unit for BScAgr students and an elective for BSc and other degree programs. It recognizes the specialized nature of plant biochemistry and molecular biology and is a platform for students who wish to gain a sound knowledge of plant growth and development.

This unit covers the biochemistry of the main carbohydrate, lipid, protein and nucleic acid constituents of plants, metabolic pathways that regulate plant growth and development, the mobilization and deposition of storage reserves, storage and expression of genetic information and plant responses to environmental influences. The role of molecular biology in the manipulation of plant growth and development will also be explored.

At the completion of this unit students will be able to demonstrate theoretical knowledge of the biochemical structure and function of plants and how molecular biology can enhance our use of plants as food and fibre. Students will also be able to demonstrate abilities in the practice of laboratory methods used to analyse plants and the effective communication of experimental findings. Students enrolled in this unit will gain research and enquiry skills through attendance at lectures and participation in laboratory classes and tutorials, information literacy and communication skills through the synthesis of information used to prepare practical reports, social and professional understanding by participation in groupwork and assessments that seek to understand the role of agriculture in the broader community.

Textbooks
No recommended text. A study guide/laboratory manual will be available for purchase from the Copy Centre during the first week of semester. Lecture notes and readings will be available through WebCT.

PLNT2901
Plant Biochem & Molecular Biology (Adv)

Credit points: 6
Teacher/Coordinator: Dr Meredith Wilkes Prof Les Copeland
Session: Semester 1
Classes: 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2, 1x3-hr practical weekly
Prerequisites: Distinction average in 12 Junior credit points from Chemistry and Biology (or with the Dean’s permission BIOL1201 and BIOL1202)
Prohibitions: PLNT2901, AGCH2004
Assessment: 1x1hr exam (15%) and 1x1.5hr exam (45%) and project report (40%)

This unit of study is designed to develop an understanding of the molecular principles that underlie the structure and function of plants and how these principles relate to the use of plants by humans as a source of food and fibre.

This unit is offered at an advanced level and is available to students in BScAgr, BSc and other degree programs. It recognizes the specialized nature of plant biochemistry and is of interest to students in BScAgr, BSc and other degree programs. This unit is offered at an advanced level and is available to students in BScAgr, BSc and other degree programs. It recognizes the specialized nature of plant biochemistry and is of interest to students in BScAgr, BSc and other degree programs.

This unit covers the biochemistry of the main carbohydrate, lipid, protein and nucleic acid constituents of plants, metabolic pathways that regulate plant growth and development, the mobilization and deposition of storage reserves, storage and expression of genetic information and plant responses to environmental influences. The role of molecular biology in the manipulation of plant growth and development will also be explored.

At the completion of this unit students will be able to demonstrate theoretical knowledge of the biochemical structure and function of plants and how molecular biology can enhance our use of plants as food and fibre. Students will also be able to demonstrate abilities in the practice of laboratory methods used to analyse plants and the effective communication of experimental findings by completing a short research project.

Students enrolled in this unit will gain research and enquiry skills through attendance at lectures and tutorials and by completing a small research project and information literacy and communication skills through the synthesis of information used to prepare a report on the findings of the research project.

Textbooks
No recommended text. A study guide/laboratory manual will be available for purchase from the Copy Centre during the first week of semester. Lecture notes and readings will be available through WebCT.

PLNT2002
Aust Flora: Ecology and Conservation

Credit points: 6
Teacher/Coordinator: Dr Glenda Wardle, Dr Murray Henwood
Session: Semester 1
Classes: 2x hrs lec & 3 hrs prac/wk, audiovisual
Prerequisites: 6 credit points of a Junior unit of study
Prohibitions: PLNT2902
Assessment: One 2-hr exam (40%), laboratory reports (20%) herbarium (20%), one 2-hr practical exam (20%)

This unit provides a broad understanding of the evolution, classification and diversity of terrestrial plants, and the principles of plant ecology in an Australian context. The major types of Australian vegetation are discussed across a range of temporal and spatial scales, and their current distribution related to their environment and origins. Selected contemporary issues in plant conservation from Australian natural and managed systems are explored. There is a strong emphasis on practical skills such as phylogenetic inference, plant identification and the collection and analysis of ecological data. The practical component of the unit of study uses examples taken from the Australian flora (including plants of horticultural significance) and major crop plants. Important elements of this unit are half-day field trips to the Royal National Park, and the construction of student herbaria. The practical sessions and interactions with staff encourage students to develop their intrinsic learning style and enhance a strong sense of self-reliance. Critical thinking, effective communication and other vocational and generic skills are emphasized. The content is well suited to students with interests in botany, plant science and ecology, and is often combined with units of study offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources.

This unit of study also complements a wide range of units of study from: science (e.g. plant science, earth and environmental science, animal science, bioinformatics, molecular and cell biology, genetics and biotechnology); agriculture (e.g. horticulture, land and water science, and natural resources); and broader disciplines (e.g. education, arts, and environmental law).

Textbooks
A Laboratory Manual for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT2002

Credit points: 6
Teacher/Coordinator: A/Prof Robyn Overall, Dr Lindsay Campbell
Session: Semester 1
Classes: 2 lec & 3 prac/wk, audiovisual
Prerequisites: Distinction average in 6 credit points of Junior units of study
Prohibitions: PLNT2902
Assumed knowledge: The contents of BIOL1(1992) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL 1) and Plant Science (PLNT) units of study using BIOL1(1992) will need to do some preparatory reading. Assessment: One 2-hr exam (40%), laboratory reports (20%) research project (20%), one 2-hr practical exam (20%).

Qualified students will participate in alternative components of PLNT2002. The content and nature of these components may vary from year to year. See prerequisites for Senior units of study in Biology.

Textbooks
A Laboratory Manual for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT2003
Plant Form and Function

Credit points: 6
Teacher/Coordinator: A/Prof Robyn Overall, Dr Lindsay Campbell
Session: Semester 2
Classes: 24 lectures; 10 tutorials; 8 x 2 hr and 2x3hr labs; 2x6 hr field trips
Prohibitions: PLNT2903, BIOL2003, BIOL2903, CROP2001
Assumed knowledge: 12 credit points of Junior Biology, or
This unit of study investigates the structure of cells, tissues and organs of flowering plants and relates them to function. Topics include: how photosynthesis, translocation, water transport and nutrition relate to the structures that carry out these processes. Most of the information on plant structure will be provided in self-instructional audio-visual sessions augmented by small group discussions. This is integrated with experiments carried out in the laboratory or on field excursions to investigate the physiological aspects of plant structures. There is a focus on recent advances in plant molecular biology where they have been critical in enhancing our understanding of the form and function of plants. The physiological and anatomical responses of plants to extreme environments such as drought and salinity will also be addressed. Attention will be paid to the anatomy and physiology of crop, horticultural and Australian native plants. This unit of study complements Plant Biochemistry and Molecular Biology, Australian Flora: ecology and conservation and Cell Biology and leads onto senior units of study in plant sciences, including Plant Growth and Development. It is essential for those seeking a career in plant molecular biology.

**Textbooks**

Buchanan BB, Crussem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockville, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of semester.

**PLNT2903 Plant Form and Function (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Robyn Overall, Dr Lindsay Campbell  
**Session:** Semester 2 Classes: 24 lectures; 10 tutorials; 8 x 2 hr and 2x3hr labs; 2x6 hr field trips  
**Prohibitions:** PLNT2002, BIOL2003, BIOL2903, CROP2001  
**Assumed knowledge:** 12 credit points of Junior Biology, or equivalent eg BIOL (1001 or 1101 or 1901 or 1911) and BIOL (1002 or 1902 or 1003 or 1903)  
**Assessment:** One 2hr theory exam (40%), prac exam (20%), research project oral and written presentation (25%), field report (15%).

The content will be based on PLNT2003 but qualified students will participate in alternative components at a more advanced level. The content and nature of these components may vary from year to year.

**Textbooks**

Buchanan BB, Crussem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockville, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of semester.

**Senior units of study**

**PLNT3001 Plant, Cell and Environment**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Charles Warren and Dr Brian Jones  
**Session:** Semester 2  
**Classes:** 2-3 lec per wk, one 4 hr practical (6 weeks only), one 3 hr presentation of research project in week 13  
**Prohibitions:** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2903, BIOL2001, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent  
**Assessment:** One 2hr exam (30%), 2 reports (30%), two essays (30%) one group presentation (10%).

This unit of study comprises lectures/workshops and practical sessions that will explore how plants and ecosystems function. Classes will examine the central role of plants in the function of terrestrial ecosystems (e.g. global and ecosystem cycles of carbon and nutrients), Plants shape how ecosystems function, and at the same time the environment affects how plants function. Hence, you will also examine the mechanisms plants employ to adapt and acclimate to their (often stressful) environment. Adaptation and acclimation of plants to their environment will be examined at molecular through to whole plant scales. You will need to draw on knowledge from intermediate units of study and explore the published literature to successfully integrate information from areas unfamiliar to yourself. The purpose of this Unit of Study is to develop an understanding of current directions in Plant Science at an advanced level. When you have successfully completed this unit of study, you should be able to: be familiar with modern approaches of physiology, biophysics and molecular biology in the study of plant function; understand how domains of knowledge interact to describe plant function; understand how plants function in stressful environments; carry out a small research project; draft a manuscript for publication in a peer-reviewed journal.

**Textbooks**

Students will be drawing on the current research literature for content. A Study Guide for the unit will be available for purchase during the first week of semester from the Copy Centre at a cost to be advised.

**PLNT3901 Plant, Cell and Environment (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Charles Warren and Dr Brian Jones  
**Session:** Semester 2  
**Classes:** Workshops and discussions 2 hr/wk; laboratories: alternate weeks 30 hr total (6 pracs: 5 hr each)  
**Prohibitions:** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent with average grade of distinction  
**Assessment:** PLNT3001 Assessment: One 2hr exam (30%), 2 two essays (30%), one advance student project report (30%), one individual oral presentation (10%).

Note: Department permission required for enrolment.

This unit of study comprises lectures/workshops and practical sessions that will explore how plants and ecosystems function. Classes will examine the central role of plants in the function of terrestrial ecosystems (e.g. global and ecosystem cycles of carbon and nutrients), Plants shape how ecosystems function, and at the same time the environment affects how plants function. Hence, we will also examine the mechanisms plants employ to adapt and acclimate to their (often stressful) environment. Adaptation and acclimation of plants to their environment will be examined at molecular through to whole plant scales. You will need to draw on knowledge from intermediate units of study and explore the published literature to successfully integrate information from areas unfamiliar to yourself. The purpose of this Unit of Study is to develop an understanding of current directions in Plant Science at an advanced level. When you have successfully completed this unit of study, you should be able to: be familiar with modern approaches of physiology, biophysics and molecular biology in the study of plant function; understand how domains of knowledge interact to describe plant function; understand how plants function in stressful environments; carry out a small research project; draft a manuscript for publication in a peer-reviewed journal.

**Textbooks**

Students will be drawing on the current research literature for content. A Study Guide for the unit will be available for purchase during the first week of semester from the Copy Centre at a cost to be advised.

**PLNT3902 Plant Growth and Development**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Jan Marc (Executive Officer), Prof Robyn Overall, Prof David Guest, Dr Brian Jones  
**Session:** Semester 2  
**Classes:** 2-3 lec per wk, one 4 hr practical (6 weeks only), one 3 hr presentation of research project in week 13  
**Prohibitions:** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2903, BIOL2001, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent  
**Assessment:** PLNT3902, BIOL3021, BIOL3931 Assessment: One 2 hr exam (60%), project presentation and report (20%), laboratory quizzes, report and book (20%).

This unit explores the mechanisms underlying plant growth and development from seed to maturity. It covers the process of building the plant body from embryogenesis, development and operation of meristems, polarity, patterning, controls of flowering and fruit development to programmed cell death and senescence. It includes the role of signals such as plant hormones in coordinating plant growth and development and the molecular and cellular mechanisms underlying plant responses to environmental signals such as gravity and light. There is a focus on recent plant molecular biology that has been critical in enhancing our current understanding of plant growth
and development. The unit uses examples from crop, horticultural and native plants as well as the model plant Arabidopsis. Lectures are augmented by experimental work, including and independent research project. The laboratory work will include plant tissue culture, protoplast production and modern cell biological techniques used in study plant development. This unit of study complements other senior units of study in the Plant Science Major and is essential for those seeking a career in plant molecular biology.

Textbooks


Recommended reading:


Buchanan BB, Grissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants. ASPPP, Rockville, Maryland

A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of the semester.

PLNT3902 Plant Growth and Development (Advanced)

Credit points: 6

Teacher/Coordinator: Dr Jan Marc (Executive Officer), Prof Robyn Overall, Prof David Guest, Dr Brian Jones

Session: Semester 2

Classes: 2.5 lec per wk, one 4 hr practical (6 weeks only), one 3 hr presentation of research project in week 13

Prerequisites: 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2003, PLNT2005, PLNT2006, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit Executive Officer.


Assessment:

One 2 hr exam (60%), project presentation and report (20%), laboratory quizzes and book (20%).

Qualified students will participate in alternative components of PLNT3002 Plant Growth and Development, representing 30% of the total assessment, as follows: the students will be exempt from one standard laboratory report and the standard independent group project.

Instead, the students will conduct an advanced individual practical or theoretical research project under the supervision of a member of the academic staff. The program includes a formal presentation of the results of the project in verbal and written reports.

Textbooks


Recommended reading:


Buchanan BB, Grissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants. ASPPP, Rockville, Maryland

A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of the semester.

PLNT3003 Systematics and Evolution of Plants

Credit points: 6

Teacher/Coordinator: A/Prof Murray Henwood

Session: Semester 1

Classes: 2x1 hr lectures/week, 1x3 hr practical/week, 2-day field-trip during semester.

Prerequisites: 6 credit points of any Intermediate unit of study from BIOL, PLNT, LWS, HORT, GEOG, GEOG, ENVI, SOIL.

Prohibitions: PLNT3903

Assessment:

1x2 hr take-home exam (45%), oral presentation (5%), nomenclature exercise (15%), research project (35%)

This unit of study introduces students to the practical aspects of Plant Systematics and Evolution. Students will gain a working knowledge of the general techniques and approaches used in Plant Systematics (including an understanding of plant taxonomy, phylogenetics and evolutionary processes). A range of data sources (nucleotide sequences and morphology) will be used to address questions concerning the evolution, classification and historical biogeography of various plant groups. A two-day field-trip will provide tuition in plant identification and an opportunity to acquire skills in field-planting. This unit of study is recommended for students with an interest in the areas of: botany, plant science, horticulture, fungal biology (including plant pathology), environmental science, bioinformatics and ecology. It is often combined with units of study offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources.

Textbooks


PLNT3903 Systematics and Evolution of Plants Adv

Credit points: 6

Teacher/Coordinator: A/Prof Murray Henwood

Session: Semester 1

Classes: See PLNT3003

Prerequisites: Distinction average in 6 credit points of any Intermediate unit of study from BIOL, PLNT, LWS, HORT, GEOG, GEOG, ENVI, SOIL. These requirements may be varied and students with lower averages should consult the Unit Executive Officer.

Prohibitions:

PLNT3003

Assessment:

1x2 hr take-home exam (45%), oral presentation (5%), nomenclature exercise (15%), research project (35%)

Qualified students will participate in alternative components of PLNT3003 Systematics and Evolution of Plants. The content and nature of these components may vary from year to year.

Textbooks

Same as PLNT3003.

BIOC3009 Terrestrial Field Ecology

Credit points: 6

Teacher/Coordinator: Dr G Wardle

Session: S2 Intensive Classes

Note: 1x6 day field trip held in the pre-semester break and 4x4 hr practical classes during weeks 1-4 in Semester 2.

Prerequisites: 12 credit points of Intermediate Biology or ANSC2004 and BIOC2001

Prohibitions: BIOC3009

Assumed knowledge: BIOC (2006 or 3906). Prior completion of one of these units is very strongly recommended.

Assessment:

Discussions and quiz (10%), research project proposal and brief presentation (10%), sampling project report (20%), specimen collection (10%), research project report (50%).

Note: One 6 day field trip held in the pre-semester break (17 - 22 July 2011) and 4x4 hr practical classes during weeks 1-4 in Semester 2.

This field course provides practical experience in terrestrial ecology suited to a broad range of careers in ecology, environmental consulting and wildlife management. Students learn a broad range of ecological sampling techniques and develop a detailed understanding of the logical requirements necessary for manipulative ecological field experiments. The field work incorporates survey techniques for plants, small mammals and invertebrates and thus provides a good background for ecological consulting work. Students attend a week-long field course and participate in a large-scale research project as well as conducting their own research project. Invited experts contribute to the lectures and discussions on issues relating to the ecology, conservation and management of Australia's terrestrial flora and fauna.

BIOC3909 Terrestrial Field Ecology (Advanced)

Credit points: 6

Teacher/Coordinator: A/Prof G Wardle

Session: S2 Intensive Classes

Note: See BIOC3009

Prerequisites: Distinction average in 12 credit points of Intermediate Biology or ANSC2004 and BIOC2001

Prohibitions: BIOC3009

Assumed knowledge: BIOC (3006 or 3906). Prior completion of one of these units is very strongly recommended.

Assessment:

Discussions and quiz (10%), research project proposal and brief presentation (10%), sampling project report (20%), sample and data processing (10%), research project report (50%).

Note: One 6 day field trip held in the pre-semester break (17 - 22 July 2011) and 4x4 hr practical classes during weeks 1-4 in Semester 2.

This unit has the same objectives as BIOC3009 Terrestrial Field Ecology, and is suitable for students who wish to pursue certain aspects in greater depth. Entry is restricted, and selection is made from applicants on the basis of previous performance. Students taking this unit of study will complete an individual research project on a topic negotiated with a member of staff. It is expected that much of the data collection will be completed during the field trip but some extra time may be needed during semester 2. Specific details of this unit of study and assessment will be announced in meetings with students at the beginning of the unit. This unit of study may be taken as part of the BSc (Advanced) program.

BIOC3017 Fungi in the Environment

Credit points: 6

Teacher/Coordinator: A/Prof P McGee

Session: S1 Intensive Classes

Note: 40 hours of practicals in a two week intensive program held immediately prior to semester one (laboratory component held from 14-25 February 2011), plus the equivalent of 30 hours self-guided study during the semester.

Prerequisites: 12 credit points of Intermediate Biology or Plant Science, or 6 credit points of Intermediate Biology, or Plant Science, and 6
The unit is designed to develop understanding of fungal ecology in relation to environmental and rehabilitation biology, biological control of pests and pathogens, and soil microbiology. Emphasis will be placed on the function of fungi, and the benefit provided by fungi in symbiotic interactions with plants, including mycorrhizal funghi and shoot-borne endophytes. Physiological and ecological implications of the interactions will also be considered. Each student will design and implement a research project. Analytical thinking and research-led activity will be encouraged. Using broad scientific approaches, each student will gain the capacity to work cooperatively to find and analyse information from primary sources, develop approaches to test their understanding, and to present their work in a scientifically acceptable manner. Students will develop a deeper understanding of one area of fungal biology through independent study. Part of the learning material will be available on the internet.

**BIOL3917 Fungi in the Environment (Advanced)**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof P McGee  
**Session:** S1 Intensive Classes: See BIOL3017.  
**Prerequisites:** Distinction average in 12 credit points of Intermediate Biology and Plant Science, or 6 credit points of Intermediate Biology, or Plant Science, and 6 Intermediate credit points of either Microbiology or Geography.  
**Prohibitions:** BIOL3017  
**Assessment:** Selected from 1x2 hr take home exam, laboratory and written assignments (100%).

Qualified students will be encouraged to develop a research project under supervision. The content and nature of the research will be agreed on with the executive officer.

**PPAT3003 Plant Disease**

**Credit points:** 6  
**Teacher/Coordinator:** Prof David Guest  
**Session:** Semester 1 Classes: (2lec, 3h prac/ wk)  
**Prerequisites:** MICR2024  
**Assessment:** One 2h end of semester exam (60%), one prac exam (25%), six take-home quizzes (15%).

This unit introduces plant disease and the pathogens that limit agricultural and horticultural production. The unit is core to the BScAgr and BHortSc degrees and is available as an elective to BLWS and BSc students. It builds on the material introduced in MICR2024. The lecture component of the unit discusses the aetiology of plant disease and symptom development; diagnosis of plant disease; the biology; epidemiology and management of fungi and other microbes that cause plant disease; breeding for disease resistance; plant-parasite relationships; and disease resistance in plants. The practical component introduces techniques used in handling and identifying fungi and in studying plant disease, and develops skills in experimental design, execution and interpretation of experimental data. At the completion of this unit, students will be able to exercise problem-solving skills (developed through practical experiments and lecture discussions), think critically, and organise knowledge (from consideration of the lecture material and preparation of practical reports), expand from theoretical principles to practical explanations (through observing and reporting on practical work), use certain computer software for analysing data and reporting on laboratory projects. Students learn to work in a research team, plan effective work schedules (to meet deadlines for submission of assessable work), use statistical analysis in research, keep appropriate records of laboratory research, work safely in a research laboratory and operate a range of scientific equipment. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through assessment tasks and personal and intellectual autonomy through working in groups.

**Textbooks**  
Schumann GL & Darcy CJ 2006. Essential Plant Pathology. APS Press, St Paul, Minn., USA.

**HORT3005 Production Horticulture**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Jenny Jobling  
**Session:** Semester 1  
**Classes:** (2x1hr lec; 1x3hr prac/workshop/ wk)  
**Prerequisites:** Two of PLNT2001, PLNT2002, PLNT2902, PLNT2003, PLNT2903  
**Assumed knowledge:** AFNR1001, AFNR1002 and HORT2002  
**Assessment:** One 3 hr exam (55%), three assignments (45%).

This unit of study covers topics on the production of perennial fruit crops, wine grapes, the sustainable production of vegetables and it also covers the key aspects of the postharvest handling and quality assurance of fresh produce. At the end of this unit students are expected to have a detailed understanding of these areas of horticulture and be able to discuss related literature and the physiological principles underlying the commercial success of these horticultural enterprises. Students will also gain research and enquiry skills through research based practical sessions and assignments.

**Textbooks**  
Recommended reading:  

**Psychology**

Psychology is the study of behaviour and it is approached on a scientific basis, with provision for professional training at the postgraduate level. The research activities of the School cover almost all of the main branches of the discipline. Extensive information about the subject and the School is available on the School web-site: sydney.edu.au/science/psychology. A major in Psychology that is accredited by the Australian Psychological Society and can lead to registration as a Psychologist in NSW (upon completion of further studies) can be gained through a number of degree programs. A normal three year sequence required for a major in Psychology is: PSYC 1001, 1002, 2011, 2012, 2013, 2014, 3018 and at least three Senior units of study selected from PSYC3010 (required for entry into Honours), 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3020 and HPSC3023. The senior units must include at least one of PSYC 3011, 3012, 3013 and 3014. Mid-year entry is possible and involves modification of this sequence.

**Enquiries**  
The main enquiry office of the School is Room 325, Level 3 Brennan MacCallum Building, A18. Staff members available to discuss particular courses may be contacted directly or through this office.

**Examinations**  
Undergraduate units of study are examined at the end of each semester and include classwork by way of essays, reports or practical/laboratory work. At the beginning of each unit of study students are advised of the contributions of exam and classwork for assessment purposes.

**Summer School: January-February**  
PSYC1001 and PSYC1002 are offered in the Sydney Summer School. Consult the Sydney Summer School website for more information: sydney.edu.au/summer.

**PSYC1001 Psychology 1001**

**Credit points:** 6  
**Session:** Semester 1, Summer Main  
**Classes:** Three 1 hour lectures and one 1 hour tutorial per week, plus 1 hour per week of additional web-based (self-paced) material related to the tutorial.  
**Assessment:** One 2.5hr exam, one 1000w essay, multiple tutorial tests, experimental participation (100%)
behavioural neuroscience; applied psychology; social psychology; personality theory; human development.

This unit is also offered in the Sydney Summer School. For more information consult the website:
http://sydney.edu.au/summer_school/

**Textbooks**

**PSYC1002**
Psychology 1002
Credit points: 6  
Session: Semester 2, Summer Main Classes: Three 1 hour lectures and one 1 hour tutorial per week, plus one hour per week of additional web-based (self-paced) material related to the tutorial.  
Assessment: One 2.5 hour exam, one 1250 word research report, multiple tutorial tests, experimental participation (100%)

Psychology 1002 is a further general introduction to the main topics and methods of psychology, and it is the basis for advanced work as well as being of use to those not proceeding with the subject. Psychology 1002 covers the following areas: human mental abilities; learning, motivation and emotion; visual perception; cognitive processes; abnormal psychology.

This unit is also offered in the Sydney Summer School. For more information consult the web site:
http://sydney.edu.au/summer_school/

**Textbooks**

**Intermediate units of study**

**PSYC2011**
Brain and Behaviour
Credit points: 6  
Teacher/Coordinator: Dr Ian Johnston  
Session: Semester 1 Classes: Three 1 hour lectures and one 1 hour tutorial per week.  
Prerequisites: PSYC (1001 and 1002).  
Prohibitions: PSYC2111 Assessment: One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quizzes) (100%)

This unit of study examines a range of phenomena and principles in learning and perception and their relations to underlying neural substrates. The emphasis in learning is on instrumental conditioning and the principle of reinforcement, ranging from applications of this principle to its neural substrates. Also covered are analyses of aversive-based learning, such as punishment and avoidance, and anxiety, together with related neurochemical mechanisms and the effects of various psychopharmacological agents on these processes. A number of perceptual phenomena will be studied (e.g., motion detection, recognition of faces, identification of emotion). A series of practical classes and demonstrations allow students to gain hands-on experience of how some of these principles and phenomena may be studied experimentally.

**Textbooks**
See School website

**PSYC2012**
Statistics & Research Methods for Psych
Credit points: 6  
Teacher/Coordinator: Dr Margaret Charles  
Session: Semester 1 Classes: Two 1 hour lectures and one 1 hour tutorial per week, plus one hour lecture and one 1 hour tutorial per fortnight.  
Prerequisites: PSYC (1001 and 1002).  
Prohibitions: PSYC2112 Assumed knowledge: Recommended: HSC Mathematics, any level Assessment: One 2 hour exam, class tests, online quizzes, one 1500 word group project, one 45 minute mid-semester exam (100%)

The aim is to introduce students to fundamental concepts in statistics as applied to psychological research. These include summary descriptive statistics, an introduction to the principles and practice of research design, and the use of inferential statistics. Building upon this framework, the unit of study aims to develop each student's expertise in understanding the rationale for, and application of, a variety of statistical tests to the sorts of data typically obtained in psychological research.

**Textbooks**
See School website

**PSYC2013**
Cognitive and Social Psychology
Credit points: 6  
Teacher/Coordinator: Dr Karen Gonsalkorale  
Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week.  
Prerequisites: PSYC (1001 and 1002).  
Prohibitions: PSYC2113 Assessment: One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quizzes) (100%)

This unit expands the depth and range of topics introduced in the first year lectures on Cognitive Processes, Developmental Psychology and Social Psychology. The section on Cognitive Processes focuses on current theories of memory, attention, problem solving and decision making and discusses the methods and issues involved in investigating these processes in both healthy individuals and people with cognitive dysfunctions. The section on Developmental Psychology discusses early social and cognitive development. The section on Social Psychology examines salient topics in social psychology, such as impression management.

**Textbooks**
Cognitive: See School website  
Social: White, Hayes & Livesey (2010). Developmental Psychology from Infancy to Adulthood (2nd ed.) Pearson Education, Australia

**PSYC2014**
Personality and Intelligence 1
Credit points: 6  
Teacher/Coordinator: Dr Niko Tilipoulos  
Session: Semester 2 Classes: Three 1 hour lectures and one 1 hour tutorial per week.  
Prerequisites: PSYC (1001 and 1002).  
Prohibitions: PSYC2114 Assessment: One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quizzes) (100%)

The main aim of this course is to introduce students to a number of influential theories in personality and intelligence. Students will be exposed to some conceptual analysis and will be expected to gain an understanding and be able to examine critically the various theories covered. Furthermore, students will be introduced to key topics in the scientific study and assessment of individual differences (Psychometrics) in personality and intelligence. The course will cover both conceptual (e.g. validity and reliability) and applied (e.g. Factor Analysis) elements of statistical psychometric inference.

**Textbooks**
See School website

**Senior units of study**

**PSYC3010**
Advanced Statistics for Psychology
Credit points: 6  
Teacher/Coordinator: Dr Sabina Kleitman  
Session: Semester 2 Classes: Two 1 hour lectures and one 2 hour tutorial per week.  
Prerequisites: PSYC (2012 or 2112) plus at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2013 or 2113), PSYC (2014 or 2114).  
Prohibitions: PSYC3201 Assessment: One 2 hour exam, class tests, 1500 word assignment, practical exercises (100%)

This unit of study expands upon students' knowledge of the general linear model and its applications in the analysis of data from psychological research. The first half of the course is focused on research for which analysis of variance would be appropriate, and develops students' ability to test more focused questions than can be answered by omnibus F tests. Issues that arise in testing contrasts, such as inflation of Type I error, will also be considered. In the second half of the course, students will further their understanding of multivariate techniques, such as multiple regression analysis.

**Textbooks**
See School website

**PSYC3011**
Learning and Behaviour
Credit points: 6  
Teacher/Coordinator: Dr Justin Harris  
Session: Semester 1 Classes: Two 1 hour lectures and one 2 hour tutorial per week.  
Prerequisites: PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from
PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114).

**Prohibitions:** PSYC2009  
**Assumed knowledge:** PSYC (2012 or 2112)

**Assessment:** One 2-hour exam, one 2000 word prac report, tutorial assessment (100%)  

This unit addresses the fundamental concepts and more important research findings related to contemporary theories of associative learning in animals and humans. It examines the application of such fundamental research to issues such as drug use and food choice. It is designed to foster skills in reading primary sources in this area, and provide the opportunity for hands-on experience in carrying out a research project.

**Textbooks**  
See School website

**PSYC3012**  
**Cognition, Language and Thought**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Bruce Burns  
**Session:** Semester 1  
**Classes:** Two 1 hour lectures and one 2 hour practical per week.  
**Prerequisites:** PSYC (2013 or 2113) and at least one other Intermediate Psychology unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).

**Prohibitions:** PSYC2205  
**Assumed knowledge:** PSYC (2012 or 2112)

**Assessment:** One 2 hour exam, 2000 word prac report, practical exercise(s) (100%)  

This unit extends the theories and methods of investigating memory and attentional processes discussed in PSYC2013 to consider a number of domains of higher cognitive processing. One strand of the course will focus on the cognitive processes involved in speech perception, language comprehension, language production, and reading. The remainder of the course will deal with the cognitive processes involved in reasoning and skill acquisition. The practical program will expose students to a variety of the research methods used to investigate higher cognitive processes, develop their understanding of how these methods can be used to investigate hypotheses about mental processes and consider applications of cognitive research to real-world problems and issues.

**Textbooks**  
See School website

**PSYC3013**  
**Perceptual Systems**

**Credit points:** 6  
**Teacher/Coordinator:** to be announced  
**Session:** Semester 2 classes  
**Classes:** Two 1-hour lectures and one 2-hour tutorial per week.  
**Prerequisites:** PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114) or ANAR2012.

**Prohibitions:** PSYC2106  
**Assumed knowledge:** PSYC2012  
**Assessment:** One 2-hour exam, one 2500 word report, tutorial quiz, group presentation (100%)  

Perception poses many challenges: how do we see colour and movement? How do we perceive surfaces and materials? How does combining information from multiple senses improve our perception? This unit draws on behavioural and neurophysiological perspectives to deepen understanding of current research topics in perception. The emphasis is on how visual information is processed to accomplish functions such as perceiving a single edge, extracting the contours that form a face, or the spatial relations needed to call offside on the sports field. Students also gain conceptual tools for evaluating the empirical and theoretical worth of recent research in perception. During the tutorial component of the course students will develop a practical experiment in which they formulate and test a hypothesis. In this way students gain important research experience that gives them valuable insight into the scientific process as it exists both in professional work and in the empirical research project required for the Honours degree.

**Textbooks**  
See School website

**PSYC3014**  
**Behavioural and Cognitive Neuroscience**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Karen Croot  
**Session:** Semester 2  
**Classes:** Two 1 hour lectures and one 2 hour practical per week.  
**Prerequisites:** (PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114)) OR (ANAR2010 plus PCOL2011).

**Prohibitions:** PSYC2004, PSYC3215  
**Assumed knowledge:** PSYC (2113 or 2114)  
**Assessment:** One 2-hour exam, one major essay/report 2000-2500 words, tutorial quiz and participation (100%)  

This unit of study will focus on approaches to studying neurosciences incorporating molecular, pre-clinical and clinical models of brain function. These biological models of brain function will be linked with behavioural, affective and cognitive function and dysfunction. The implications of focal cognitive deficits in neurological patients and models of normal cognitive function will also be explored. Specific topics to be covered will be selected from the following areas: sensorimotor integration, and the neural and molecular basis of learning and memory, attention, language, visual cognition and praxis. In addition to lectures, a practical component will cover basic neuroanatomy, histology and neuropsychology, and will introduce students to experimental and case-study approaches to studying neurosciences.

**Textbooks**  
See School website

**PSYC3015**  
**Personality and Intelligence 2**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Carolyn MacCann  
**Session:** Semester 1  
**Classes:** Two 1 hour lectures and one 2 hour tutorial per week.  
**Prerequisites:** PSYC (2014 or 2114) and PSYC(2011 or 2111 or 2012 or 2112 or 2013 or 2113).  
**Assumed knowledge:** PSYC(2012 or 2112); PSYC(2013 or 2113).  
**Assessment:** One 2-hour exam; one 2000 word report; tutorial quizzes (100%)  

The aim of this unit of study is to provide an overview of the different areas of research and practice in personality, intelligence, and individual differences. Students will examine the development of the different theoretical models of personality, intelligence, metacognition and emotional intelligence and encouraged to critically evaluate these theories based on the supporting research evidence. The methods of conducting and evaluating individual differences research will also be a focus of the course. Students will be encouraged to take multiple perspectives, evaluating theories of personality and intelligence in terms of their empirical and theoretical support as well as their potential applications.

**Textbooks**  
See school website.

**PSYC3016**  
**Developmental Psychology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Pauline Howie  
**Session:** Semester 2  
**Classes:** Two 1-hour lectures and one 2-hour tutorial per week.  
**Prerequisites:** PSYC (2013 or 2113) and at least one other Intermediate Psychology unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).  
**Prohibitions:** PSYC3206  
**Assessment:** One 2-hour exam, one 2000 word report (100%)  

This unit examines various theoretical approaches to human development and selected issues within Developmental Psychology. The major issues/controversies in developmental theory are examined in relation to a number of the more influential theoretical approaches. Students are expected to gain an understanding of the main theoretical influences upon current developmental research and to be able to compare and contrast theories of development. The unit introduces students to a range of issues in selected areas of contemporary Developmental Psychology. Students are expected to gain knowledge of these areas, and to develop a critical approach to the analysis of current research and theoretical issues. They are also expected to apply their knowledge in practical exercises involving observations of children.

**Textbooks**  

**PSYC3017**  
**Social Psychology**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Lisa Zadro  
**Session:** Semester 1  
**Classes:** Two 1 hour lectures and one 2 hour tutorial per week.  
**Prerequisites:** PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).  
**Prohibitions:** PSYC3212  
**Assumed knowledge:** PSYC (2012 or 2112).
Assessment: One 2 hour exam, one 2500 word research report, tutorial presentation and on-line quiz (100%)

This unit continues the coverage of topics in Social Psychology begun in PSYC1001 and PSYC2013. The unit is divided into topic areas, where the emphasis is on evaluating theories and the relevant evidence. Topics areas include antisocial behaviours, discrimination, stigma, the self, emotion, ostracism, and interpersonal attraction. Tutorials provide first-hand experience of research by involving students in a small group research project based on topics covered in the lectures. The tutorials also provide an opportunity to discuss issues pertaining to each step of the research process (e.g., ethical issues that underlie social psychological research, proper practice when collecting and handling data, how to communicate research findings in written and verbal form).

Textbooks
See School website.

PSYC3018 Abnormal Psychology
Credit points: 6 Teacher/Coordinator: Dr Marianna Szabo Session: Semester 1 Classes: Two 1 hour lectures and one 2 hour tutorial per week. Prerequisites: At least two intermediate Psychology units of study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2013 or 2113) and PSYC(2014 or 2114). Prohibitions: PSYC3203 Assumed knowledge: PSYC(2012 or 2112) and PSYC(2014 or 2114). Assessment: One 2 hour exam, one 2000 word essay, quiz, tutorial presentation (100%) This unit of study critically examines core issues in Abnormal Psychology, concerning the description, explanation and treatment of psychological disorders. The unit of study will include topics such as:
(a) Adult abnormal psychology: Anxiety disorders (specific phobias, panic disorder, generalised anxiety disorder, OCD); Addictive disorders (drug, alcohol, gambling); Eating disorders (anorexia nervosa, bulimia nervosa); Mood disorders (dysthymia, major depressive disorder, cyclothymia, bipolar disorder); Schizophrenia, Personality disorders.
(b) Child abnormal psychology: Attention Deficit Hyperactivity disorder; Conduct disorder; Anxiety disorders, Depression.

Textbooks
See School website.

PSYC3020 Applications of Psychological Science
Credit points: 6 Teacher/Coordinator: Dr Helen Paterson Session: Semester 2 Classes: Two 1 hour lectures and one 2 hour tutorial per week. Prerequisites: 12 credit points of junior psychology and 12 credit points in Intermediate Psychology. Prohibitions: PSYC3019 Assessment: One 2 hour examination, one 2500 word written assignment, class quizzes (100%)
The aim of this unit is to introduce students to various ways in which psychological theory and research can be applied in the real world. In particular, this unit will focus on Health Psychology, Forensic Psychology, and Organisational Psychology. The Health Psychology component of this course may include investigation into why we engage in risky health behaviours including smoking, overeating and alcohol use; inequalities in health including Aboriginal and Torres Strait Island health; dealing with chronic illness including death & dying, and survivorship. The Forensic Psychology component of the course may include investigation into lie detection, criminal offenders, victims of crime, and eyewitness memory. The Organisational Psychology component of the course may focus on personnel selection, training in organisations, performance measurement, workplace motivation, and leadership.

Textbooks
Morrison, Bennett, Butow, Mullan and White. An Introduction to Health Psychology: An Australian perspective. Pearson Education, Australia. 2007

HPSC3023 Psychology & Psychiatry History & Phil
HPSC3023 Psychology & Psychiatry History & Phil can be counted towards a Psychology Major. Successful completion of this unit of study is essential for students intending to take the Theoretical Thesis option in Psychology Honours.

Virology
Details for Virology units can be found under the Microbiology entry.
10. Honours in the Faculty of Science

Honours in the BSc (including all streams and combined degrees), BMedSc, BST and BLAS.

Admission
To qualify to enrol in an Honours course, students shall:

- have qualified for the award of a relevant pass degree from the Faculty of Science, or
- be a pass graduate of the Faculty of Science, or
- be a pass graduate holding an equivalent qualification from another institution, and
- have achieved either
  - a SCIWAM of at least 65 (or equivalent at another institution); or
  - a credit average in 48 credit points in relevant intermediate and senior science units of study;

and

- satisfy any additional criteria set by the Head of Department concerned
- have completed a minimum of 24 credit points of Senior units of study relating to the intended Honours course (or equivalent at another institution)

You should also note the following:

- Students shall complete the requirements for the Honours course full-time over two consecutive semesters. If the faculty is satisfied that a student is unable to attempt the Honours course on a full-time basis and if the Head of Department concerned so recommends, permission may be granted to undertake Honours half-time over four consecutive semesters.
- Not all departments offer students part time enrolment in Honours, or Honours enrolment commencing in the July semester. Students considering these types of Honours enrolments are urged to contact the department concerned.
- A student may not re-attempt an Honours course in a single subject area. A student who is qualified to enrol in two Honours courses may either complete the Honours courses in the two subject areas separately and in succession, or complete a joint Honours course, equivalent to an Honours course in a single subject area, in the two subject areas.
- A joint Honours course shall comprise such parts of the two Honours courses as may be decided by the Dean.
- An interdisciplinary Honours course shall comprise such parts as determined by the Coordinating Committee for the interdisciplinary course.

SCIWAM for all degrees
SCIWAM means the weighted average mark calculated by the faculty from the results for all intermediate and senior units of study with a weighting of 2 for intermediate units and 3 for senior units.

The SCIWAM is calculated by summing the products of the marks achieved and the weighted credit point values of the units of study taken in the degree and then dividing by the sum of the weighted credit point values, with all attempts at units of study being included in the calculation, except where units of study are discontinued with permission; the formula used is:

\[
\text{SCIWAM} = \frac{\sum (Wc \times Mc)}{\sum Wc}
\]

where \(Wc\) is the weighted credit point value, ie, the product of the credit point value and level of weighting of 2 for 2000–2999 units of study and 3 for 3000–3999 units of study; where \(Mc\) is the mark out of 100 for the unit of study.

In calculating the SCIWAM for a student transferring from another university, units of study are assigned level weightings and credit point values consistent with their equivalent units of study at the University of Sydney.

A mark is assigned to each unit of study credited based on the results provided on a validated academic transcript from the University. Where no mark is provided by the institution an appropriate estimate is used. Students are encouraged to obtain actual marks from departments at those universities that do not issue formal marks.

Ranking for postgraduate scholarships
For the purposes of ranking for APAs and UPAs at the University of Sydney the final ranking mark consists of the SCIWAM and/or Honours 1 (or Honours 1 equivalent) mark and Research Potential Indicator.

The use of these components is based on whether the applicant has attained an Honours 1 degree, has completed his/her most recent studies within the last five years by the time the scholarship is being awarded, and the extent of any relevant research/professional experience. A greater weight is given to the Honours 1 (or H1E) mark. More information can be found on the Research Office’s website.

Honours units of study
Honours units of study are listed in Table VI: Honours units of study or in the tables associated with the relevant degree.

Please note that enrolment in Honours requires both Faculty and Departmental permission.

Honours in the BPsych

Admission
To qualify to enrol in the Honours course, students shall have completed 144 credit points as specified in Resolution 5 (1) of the BPsych including completion of all intermediate and senior units of study in Psychology with an average grade of Distinction or better.

You should also note the following:

- Students shall complete the requirements for the Honours course full-time over two consecutive semesters. If the faculty is satisfied that a student is unable to attempt the Honours course on a full-time basis and if the Head of School of Psychology so recommends, permission may be granted to undertake Honours half-time over four consecutive semesters. A student may not re-attempt an Honours course.

Determination of marks and grades
To qualify for the award of an Honours degree, students shall complete 48 credit points of Honours units of study in the table of Honours units of study, as prescribed by the Head of Department concerned.

The grade of Honours and the Honours mark are determined by performance in the Honours course.

Departments and schools are required to make recommendations concerning Honours marks and grades of Honours for consideration by the faculty. Final marks and grades of Honours are determined by
10. Honours in the Faculty of Science

The faculty is aware that, because the Honours units of study in some departments are wholly or predominantly formal course work and in others a research project, and because some subjects are not taught until well into the undergraduate program, the way in which departments take cognisance of performance in the Honours year in arriving at a recommendation for a grade of Honours must be left to their discretion. However the faculty has established a set of guidelines for departments to use in determining their recommendations.

The faculty has adopted the following guidelines for assessment of student performance in Honours:

95–100
Outstanding First Class quality of clear Medal standard, demonstrating independent thought throughout, a flair for the subject, comprehensive knowledge of the subject area and a level of achievement similar to that expected by first rate academic journals. This mark reflects an exceptional achievement with a high degree of initiative and self-reliance, considerable student input into the direction of the study, and critical discussion of the outcomes.

80–89
Clear First Class quality, showing a command of the field both broad and deep, with the presentation of some novel insights. Student will have shown a solid foundation of conceptual thought and a breadth of factual knowledge of the discipline, clear familiarity with and ability to use central methodology and experimental practices of the discipline, and clear evidence of some independence of thought in the subject area.

75–79
Second class Honours, first division – student will have shown a command of the theory and practice of the discipline. They will have demonstrated their ability to conduct work at an independent level and complete tasks in a timely manner, and have an adequate understanding of the background factual basis of the subject. Student shows some initiative but is more reliant on other people for ideas and techniques and project is dependent on supervisor's suggestions. Student is dedicated to work and capable of undertaking a higher degree.

65–69
Third class Honours – performance indicates that the student has successfully completed the work, but at a standard barely meeting Honours criteria. The student's understanding of the topic is extremely limited and they have shown little or no independence of thought or performance.

0–64
The student's performance in fourth year is not such as to justify the award of Honours.

Honours
Examiners are also asked to return their recommendation for the grade of Honours to be awarded bearing in mind the Honours mark and the faculty's guidelines for the award of Honours which are listed below.

The examiners’ recommendations are to be indicated on the examination result sheets by the use of the following valid symbols:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Honours Class I 80+</td>
</tr>
<tr>
<td>H21</td>
<td>Honours Class II (Division 1) 75–79</td>
</tr>
<tr>
<td>H22</td>
<td>Honours Class II (Division 2) 70–74</td>
</tr>
<tr>
<td>H3</td>
<td>Honours Class III 65–69</td>
</tr>
<tr>
<td>F</td>
<td>Fail * below 65</td>
</tr>
<tr>
<td>AF</td>
<td>Absent Fail</td>
</tr>
</tbody>
</table>

* In these cases the award of the Pass degree is recommended.

Note:

1. The biannual Honours meetings of the department and school representatives of the faculty shall consider a motion that those recommendations from the departments and schools that accord with the faculty's guidelines for the award of Honours and medal be approved. Cases where the recommendations do not accord with the guidelines will be considered individually; and departments and schools will be required to have a representative present with the authority to make revised recommendations if requested to do so at the biannual Honours meetings of departmental and school representatives of the faculty.

2. In order to qualify for the award of a University medal, it is necessary but not sufficient for a candidate to achieve a SCIWAM of 80 or greater and an Honours mark of 90 or greater. Faculty has agreed that more than one medal may be awarded in the subject of an Honours course. The relevant Senate Resolution reads "A candidate with an outstanding performance in the subject of an Honours course shall, if deemed of sufficient merit by the Faculty, receive a bronze medal."

3. In order to qualify for Honours Class 1, a candidate must achieve an Honours mark of 80 or greater.

4. The rolling five year average mark difference (student Honours mark minus SCIWAM) for each department and school should fall within the range 10 plus or minus 2. A department or school whose rolling five year average mark difference in any year falls above or below this range is required to justify its recommended marks for that year to the Senate Honours meetings of departmental and school representatives of the faculty. Each department or school should each year present a plot of SCIWAM versus Honours mark for its Honours student cohort. It is not acceptable to balance inflated marks for some students with low marks for other students.

5. Equivalent Honours grades are not awarded to Graduate Diploma in Science students by the biannual Honours meetings of departmental and school representatives of the faculty but can be determined by the Scholarships Ranking Meeting if the student qualifies for an equivalent grade and applies for an APA scholarship.
Biannual Honours meetings of Departmental and School representatives of the Faculty

Biannual Honours meetings of Departmental and School representatives of the Faculty will be called to consider the results.

Register of results

Departments and Schools are required to make recommendations concerning marks for consideration by the biannual Honours meeting of departmental and school representatives of the faculty. Final marks are determined by the biannual Honours meetings of departmental and school representatives of the faculty so as to ensure consistency across the faculty. Therefore, final results for individual students may differ from those recommended.

A register and copies of the Honours ranking report are produced by the faculty for use by the biannual Honours meetings of departmental and school representatives of the faculty.

Agricultural Chemistry Honours

Honours in Agricultural Chemistry aims to provide students with problem-solving and communication skills required by professional chemists in enterprises concerned with agricultural production and processing, foods and beverages, and environmental science; enable students to learn to work independently in a laboratory environment; familiarise students with the research literature and methodology of biological chemistry; and provide a basis for students who wish to proceed to postgraduate research.

Candidates should consult the department as soon as possible after results in senior units of study are obtained. The unit of study consists of a research project and four 6 credit point units of study. The research project component includes oral as well as written forms of assessment. Projects are usually available in one of the following areas of current research interest in the department: carbohydrate and nitrogen metabolism in plants, biological nitrogen fixation and biofertilisers, greenhouse gas production, the biochemistry and environmental chemistry of pesticides and herbicides, environmental risk assessment, acidification of ecosystems, residue analysis in foods, aspects of food science including oil seed and cereal chemistry and biochemistry.

Anatomy and Histology Honours

Taking an Honours degree provides the opportunity for students to do research on a project supervised by a member of staff. Assessment is based on a thesis summarising the results of the year’s research, along with additional studies. To qualify for admission to Honours year, the student must obtain an appropriate standard in Senior Anatomy or Histology or Neuroscience.

Biochemistry Honours

An Honours program of study designed for those wishing to enter research or to undertake work leading to a higher degree is conducted in the fourth year. The program runs from early February until mid-November. It provides the opportunity for laboratory research on a project supervised by a staff member, culminating in the production of a research thesis. During the year each student is also required to undertake a coursework program that involves six tutorials and an exam based on the critical evaluation of scientific manuscripts. Assessment of the year’s work is based largely on the student’s performance on the research project, and a written report on that project.

Honours Research Areas

Biochemistry Honours is conducted within the School of Molecular and Microbial Biosciences. The School offers projects in a wide range of research areas including Physical Biochemistry and Structural Biology, Microbiology, Proteomics and Biotechnology, Nutrition and Metabolism and Molecular Biology and Genetics.

Specific research topics currently offered include: Anticancer drugs; synthesis and mechanism of action; Biochemistry of cellular signal transduction; The causes of diabetes and/or obesity; Chaperones and amyloid formation; X-ray crystallography of proteins and drug DNA complexes; NMR studies of membrane transport and metabolism in cells; Antibiotic resistance mechanisms in microbial pathogens; Eukaryotic transcription factors; Protein structure modeling; Molecular biology of humans and yeasts; Gene expression in transgenic mice; Glycaemic index of foods; oligosaccharides in human milk.

Applying for admission to Honours

An application form providing the list of possible research projects is provided to interested students and is available from the Honours coordinator. Students must arrange to speak with potential supervisors and should choose two discipline areas and three supervisors in order of preference on the application form. A decision on Honours entry is made in December. Attempts will be made where possible to assign students to the supervisor of their choice but this will not always be possible. In such cases the School will work with students to find an available project. Students should note that some supervisors cannot accommodate mid-year entrants. The usual requirement for acceptance into the Honours program is a credit average in a major relevant to the project of interest; any student with an undergraduate background relevant to specific projects (including Chemistry, Biochemistry, Nutrition and Dietetics, Microbiology, Immunobiology, Physiology, Neuroscience, Mathematics, Physics, Biology or other related Medical Sciences) may be admitted. It should be noted that the number of students accepted into the Honours program may be limited because of resource restrictions (availability of a supervisor and/or laboratory space) and that, in the event of there being more applicants than resources will allow, offers will be made on the basis of academic merit. The Honours year coordinator is Dr Stuart Cordwell.

Biology Honours

A single Honours program in Biology accommodates students who have completed 24 credit points of Senior Biology Life Sciences units and have a minimum WAM of 65. Information about qualifications for entry into Honours is available from the School Office (Science Road Cottage, A10), or on the School of Biological Sciences website. During the Honours year the principles established in the first three years of the undergraduate award course are further developed, and students are introduced to a wider field of biology and biological techniques. Students may elect to specialise in any of the aspects of biology that are studied in the School. Projects jointly supervised by staff in other Schools or Departments within the University may also be considered. Students who have indicated their intention of entering the Honours program will be notified of acceptance after the publication of the second semester Senior examination results. Honours students start their academic year in late January, or in July.

The Honours year comprises:

1. A project in which the student investigates a problem and presents oral and written accounts of his or her research.
2. A coursework unit – BIOL4015 Scientific Research in Biology, instruction in experimental design, and other technical training. The degree will be awarded on the basis of: (a) written assignments from coursework units; (b) marks awarded for a thesis on the subject of the project.

Chemistry

The Chemistry Honours program gives students the opportunity to get involved in a research program in an area that is of interest to them. It provides training in research techniques and experience using modern research instrumentation. The Honours program adds a new dimension to the skills that the students have acquired during their undergraduate years and enhances their immediate employment prospects and, more significantly, their future career potential. All students with a sound record in Chemistry are encouraged to apply for entry to the Honours program. Further information is available from the Honours Coordinator, or at sydney.edu.au/science/chemistry/study/honours.html

The Honours program

The School of Chemistry offers a wide range of possible projects in all areas of contemporary chemistry including Computational and Theoretical Chemistry, Chemical Education, Molecular Design and 183

Workload and assessment
In the Honours year, each student undertakes a research project under the supervision of a member of staff, attends a series of lectures aimed at developing generic skills, and attends research seminars. At the culmination of the research year, the student presents a seminar and a thesis which which explains the problem, outlines the research undertaken and the results obtained.

Units of study
CHEM4011
CHEM4012
CHEM4013
CHEM4014

Honours coordinator
Dr Tim Schmidt

Computer Science
To be awarded Honours in Computer Science, a student must complete units of study (from the Honours table) to a total of 48 credit points.

Note that the Faculty requires that Honours be completed in two consecutive semesters of full-time study, or four consecutive semesters of part-time study; a single final grade and mark is given for the Honours course, as determined by the Faculty based on performance in Honours and in prior undergraduate study.

Geography or Geology and Geophysics Honours
Offered February and July. Information sessions about Geography or Geology and Geophysics Honours are held for interested third year students during Second Semester. Students contemplating Honours in their fourth year should consider possible thesis topics and discuss these with potential staff supervisors.

Entry into fourth year Honours will require completion of units in Intermediate and Senior Geoscience units (to be passed at the level of credit or better) and a satisfactory WAM. In some years when the number of applicants exceeds resources (availability of supervisors, laboratory space etc.) offers will be made according to academic merit. Students will be notified in January of their formal acceptance into the Honours program.

Honours students are required to undertake formal coursework during their first semester and to participate in seminars throughout the year as arranged. They will be required to study original problems, working as appropriate in the field, the laboratory, libraries, and in some instances in conjunction with other university or government departments. A dissertation of not more than 20,000 words must be submitted during the second semester, followed by an examination that may include both written and oral work.

Further details relating to Geography or Geology and Geophysics Honours are available from the Honours Coordinator.

History and Philosophy of Science Honours
An Honours course in HPS is available to students of sufficient merit who have satisfied the requirements for the degree of BSc or BA or BLibSt with a major in HPS or another relevant area. Students who have obtained the TSP Certificate in HPS are also eligible for the Honours program. The Honours course consists of 48 points of Honours level units of study, which must include HPSC4201 HPS Research Project 1, HPSC4202 HPS Research Project 2, HPSC4203 HPS Research Project 3 and HPSC4204 HPS Research Project 4. In their final semester all students must also enrol in the zero credit point non-assessable unit HPSC4999. Students intending to proceed to Honours or to enrol in the Graduate Diploma in Science (HPS) are strongly advised to contact the Unit towards the end of the previous academic year to discuss thesis topic and supervision. Note: Honours level (4000) Units of Study are available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission. A number of our Honours-level courses are also open to students in the medical humanities and liberal studies.

Immunology Honours
The Honours program in Immunology provides the opportunity for full-time research on a proposed project supervised by a staff member expert in that field. Experimental research, a seminar and a thesis constitute the major part of the program and of assessment. Guidance in research techniques is given in training programs covering experimental design, data analysis, written and oral communication and critical appraisal of the literature. Student contributions to this program are also assessed. In addition, a supplementary seminar program keeps students informed and abreast of wider issues in immunology.

Applying for Honours
Students are invited to apply for Honours enrolment during semester two of the year preceding Honours. Applicants should consult the Honours coordinator in the first instance. A list of possible research topics is provided, and students select projects of interest, speak with prospective supervisors and apply for permission to enrol, before the end of semester two. Within the constraints of availability, an attempt is made to assign students to the project of their choice.

General Requirements for Admission
Usually Honours candidates will have achieved a Credit in Senior Immunology units of study and will also have successfully completed Senior study in Biochemistry, Biology, Cell Pathology, Microbiology, Physiology or Virology. BSc candidates will have gained a major in Immunobiology, or a related discipline such as Biochemistry, Biology, Cell Pathology, Microbiology or Physiology. Usually Honours candidates will have an overall SCIWAM of 65 or greater. Departmental permission is required for enrolment.

Honours coordinator
The Immunology Honours coordinator is Dr Allison Abendroth (alison.abendroth@sydney.edu.au, 93516867).

Infectious Diseases Honours - Medical Science Honours
The Honours program in Infectious Diseases provides the opportunity for full-time research on a proposed project supervised by a staff member expert in that field. Experimental research, a seminar and a thesis constitute the major part of the program and of assessment. Guidance in research techniques is given in training programs covering experimental design, data analysis, written and oral communication and critical appraisal of the literature. Student contributions to this program are also assessed. In addition, a supplementary seminar program keeps students informed and abreast of wider issues in infectious diseases.

Applying for admission to Infectious Diseases Honours
Students are invited to apply for Honours enrolment during semester two of the year preceding Honours. Applicants should consult the Honours coordinator in the first instance. A list of possible research topics is provided, and students select projects of interest, speak with prospective supervisors and apply for permission to enrol, before the end of semester two. Within the constraints of availability, an attempt is made to assign students to the project of their choice. Usually Honours candidates will have achieved a Credit in the senior unit Infectious Diseases and will also have successfully completed Senior study in Biochemistry, Microbiology, or Virology. Usually Honours candidates will have an overall SCIWAM of 65 or greater. Departmental permission is required for enrolment.

10. Honours in the Faculty of Science
Information Systems Honours
To be awarded Honours in Information Systems, a student must complete units of study (as specified below) to a total of 48 credit points.

Note that the Faculty requires that Honours be completed in two consecutive semesters of full-time study, or four consecutive semesters of part-time study; a single final grade and mark is given for the Honours course, as determined by the Faculty based on performance in Honours and in prior undergraduate study.

Marine Sciences Honours
The structure of Honours in Marine Science will be about one third formal coursework, seminars and reading, and about two thirds devoted to preparation of a thesis on a topic with a clear marine or estuarine orientation. The formal coursework may comprise units of study mainly chosen from existing Honours options offered in the Department of the student's principal interest. Background study in a subsidiary field of interest may be required. Students may commence Honours in either semester 1 or semester 2. Generally, Honours enrolments will be with the School in which the project research is undertaken.

Admission to Honours
In general, a Credit average or better in Senior Marine Sciences units of study and at least a Pass in another Senior unit of study are required for entry. Arrangements for the supervision and School of primary location of students will be made in the light of their proposed thesis topic. Joint supervision involving staff of more than one School may be arranged if a thesis topic is deemed to be interdisciplinary. Upon acceptance, students should register formally with the Undergraduate Advisor of USIMS.

Mathematics and Statistics Honours
In general, 4 units of study (24 credit points) are required in order to major in Mathematics and a credit average is required to progress to an Honours year. Potential Honours students are strongly encouraged to include one or more Advanced level unit(s) of study and seek advice from a Senior year coordinator.

Particular combinations would be suitable for students with special interests.

Microbiology Honours
During the Honours year, students will be involved in a study program designed for those wishing to further develop their laboratory skills and critical thinking. The program is very strongly recommended for any student wishing to enter a research career or undertake further work leading to a higher degree. The program runs from early February to mid-November and provides the opportunity for individual laboratory research work under the direction of a supervisor. This project culminates in the production of a research thesis and presentation of the key findings in a seminar. During the year each student is also expected to attend research seminars and complete a coursework component that consists of six tutorials and an exam based on the critical evaluation of scientific manuscripts. Assessment is based on the research project (including laboratory performance, written report and oral presentation) and the coursework (tutorial performance and written exam). The Microbiology Honours co-ordinator is Dr Andrew Holmes.

Honours research areas
Microbiology Honours is conducted within the School of Molecular and Microbial Biosciences. All Honours programs within the school operate according to the same applications process, timetable and assessment format. The School offer microbiology Honours projects in a wide range of research areas including molecular microbiology, microbial genetics, applied and environmental microbiology, biotechnology, and virology. An overview of research projects is available through the school office, or web site. For further information on specific research projects prospective students should consult individual academic staff members.

Applying for admission to Honours
An application form providing the list of possible research projects is provided to interested students and is available from the Honours coordinator. Students must arrange to speak with potential supervisors and should choose two discipline areas and three supervisors in order of preference on the application form. A decision on Honours entry is made in December. Attempts will be made where possible to assign students to the supervisor of their choice but this will not always be possible. In such cases the School will work with students to find an available project. Students should note that some supervisors cannot accommodate mid-year entrants. The usual requirement for acceptance into the Honours program is a credit average in a major relevant to the project of interest; any student with an undergraduate background relevant to specific projects (including Chemistry, Biochemistry, Nutrition and Dietetics, Microbiology, Immunobiology, Physiology, Neuroscience, Mathematics, Physics, Biology or other related Medical Sciences) may be admitted. It should be noted that the number of students accepted into the Honours program may be limited because of resource restrictions (availability of a supervisor and/or laboratory space) and that, in the event of there being more applicants than resources will allow, offers will be made on the basis of academic merit. The Honours unit of study codes are listed in the Honours chapter of this handbook - chapter 12. The Honours year coordinator is Dr Stuart Cordwell.

Neuroscience Honours
There are many opportunities for high-achieving students to undertake Honours study within the field of Neuroscience. Honours projects are typically undertaken within individual departments: Physiology, Anatomy, Pharmacology, Psychology, Pathology and associated institutes. Students should canvass respective departments during their senior studies for details of projects, admission criteria and enrolment details.

Nutrition Honours
The coordinators for Nutrition Honours are Ms Beth Rohrlach and Ms Margaret Nicholson. Students who have completed the three year Bachelor (Nutrition) may complete an Honours year in either the clinical strand, or by research. Students who want accreditation as a dietitian will need to complete the clinical strand.

Clinical Strand
Students in this strand enrol in and complete: NUTR4001 Clinical Nutritional Science A and NUTR4002 Clinical Nutritional Science B (Practical Placement). The contact hours per week are a minimum of 24 and during intensive practicals will be 35. With problem based learning it is expected that a student will need to spend minimum of 20 hrs in self-directed learning. At the completion of this course students will be able to describe the pathophysiology and biochemistry of disease processes where nutrition is an important part of prevention and/or treatment and will be able to construct appropriate treatment regimes and prevention strategies for these diseases using their nutritional science knowledge and be able to apply this to patient care in practice.

Research Strand
Students in this strand enrol in and complete: NUTR 4101 Nutrition Research A; NUTR 4102 Nutrition Research B; NUTR 4103 Nutrition Research C; NUTR 4103 Nutrition Research D; Students will be involved in full-time research under the supervision of a staff member within the Human Nutrition Unit or a cognate department. During the year, students will be required to:

- carry out a supervised research project
- present a written project proposal and present orally a brief literature survey and aims of the project
- write an essay based on the project; and
- deliver a seminar on the project.

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Students will prepare a project proposal, which should outline the aims, significance and background of the project, including an indication of the relationship of the project to the work of others, citing key references (not to be included in the 1000 word limit) where appropriate and a brief outline of methods and techniques to be used.

**Pharmacology Honours**

Subject to meeting the Faculty of Science entry criteria for Honours, a student may apply to conduct a research project in the Pharmacology Honours program. Interested students are advised to contact the Honours Co-ordinator and potential supervisors listed in their area(s) of interest. Written assessments include a research proposal, literature review and 50-page thesis based on the research topic. The students will also be required to give an introductory talk and a final talk about the progress of the project.

**Physics Honours**

*Honours Coordinator*

Associate Professor Stephen Bartlett and Professor Cathy Stampfl

**Qualifying**

To be considered for admission to the Honours program, students need 24 credit points of senior Physics units of study or equivalent with a SciWAM as specified in the degree resolutions.

**Classes**

Six lecture courses and a research project

**Assessment**

Coursework examinations, a 40-page Research report and oral presentation of the Research project. Physics Honours comprises formal coursework (weight 50%) and a research project (weight 50%).

** Undertaking an Honours year in Physics**

The Honours program in Physics provides students with an opportunity to undertake an original research project as well as attend advanced lecture courses to give students a broad understanding of modern physics at a high level. All students satisfying the qualifying requirements as set out above and in the Science Faculty Honours section of this handbook are strongly encouraged to apply for entry into Physics Honours. Fulltime enrolment is equivalent to 48 credit points for the year. Students are offered an opportunity to carry out independent research as a member of one of the active research groups in the School of Physics, under the supervision of a member of staff. Students may also study with staff from complementary disciplines, subject to the approval of the Honours coordinator. Honours students join a research group in the School of Physics and are encouraged to participate with staff and research students in activities within the School. They are provided with office accommodation, and are expected to attend colloquia and seminars. They may be employed for several hours per week in Junior teaching. Further information is available from Physics Student Services, the Honours coordinator or from the website www.sydney.edu.au/science/physics.

**Physiology Honours**

During fourth year, no formal series of lectures is provided but students are given a relevant problem to investigate. This problem usually represents a small facet of one of the major current research projects within the Department, and the students work in collaboration with members of the staff. Students write a thesis embodying the results of their work.

**Psychology**

In order to be eligible to enter Psychology Honours, it is necessary (except as provided in the by-laws or resolutions) to gain a year average of at least Pass with Credit in Intermediate and in Senior Psychology units of study constituting a major in Psychology, and must include PSYC3010. Students wishing to graduate with Honours in Psychology are urged to discuss their choice of other subjects with a Faculty adviser as soon as practicable. There is currently a quota on entry to Psychology Honours. Entry is competitive on the basis of academic merit.

**Prerequisites for admission**

A Major in Psychology with a minimum Credit average or better across both the Intermediate and Senior Psychology Units of Study comprising the 48 credit points of Intermediate and Senior Psychology Units that constitute the minimum required for the major. PSYC (3010 or 3201) must be included in the Senior Units. BPysch students should consult resolutions in chapter 6. School permission required. Due to restricted resources for research supervision, the intake to Psychology Honours will be limited to approximately 80 students and will be determined by academic merit in Intermediate and Senior Psychology.

**Assessment**

Formal exams in Ethics and Issues in Psychology and in Research Methods; report of empirical research project; theoretical thesis or assessment in two Special Fields modules.

Students are required to:

(a) devise, conduct and report upon an empirical research project (research area dependent on interests and specialities of staff members);

(b) write a theoretical thesis or attend two Special Fields seminars and complete required assessment tasks; and

(c) attend one lecture series in Ethics and Issues in Psychology and two series of lectures in Research Methods.

**Soil Science Honours**

The Honours program consists of several parts:

(i) supplementary lectures and seminars;

(ii) topics of study selected from Agricultural Chemistry, Biometry, Botany, Geology, Physical Chemistry, Mathematics, Soil Mechanics, Soil Microbiology, etc;

(iii) a small amount of field work performed under direction; and

(iv) a project in one branch of soil science.
## Honours units of study

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<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
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## 10. Honours in the Faculty of Science

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<td><strong>History and Philosophy of Science Honours</strong></td>
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<td>All students must enrol in HPSC4999. Honours students must complete 48 credit points from the following units:</td>
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Immunology Honours

| IMMU4011 Immunology Honours A                     | 12            | N BMED4011 Note: Department permission required for enrolment | Semester 1, Semester 2 |
| IMMU4012 Immunology Honours B                     | 12            | C IMMU4011 N BMED4012 | Semester 1, Semester 2 |
| IMMU4013 Immunology Honours C                     | 12            | C IMMU4013 N BMED4014 | Semester 1, Semester 2 |
| IMMU4014 Immunology Honours D                     | 12            | C IMMU4013 N BMED4014 | Semester 1, Semester 2 |

Information Systems Honours

| ISYS4301 Information Systems Honours A           | 12            | Note: Department permission required for enrolment | Semester 1, Semester 2 |
| ISYS4302 Information Systems Honours B           | 12            | C ISYS4301 | Semester 1, Semester 2 |
| ISYS4303 Information Systems Honours C           | 12            | C ISYS4302 | Semester 1, Semester 2 |
| ISYS4304 Information Systems Honours D           | 12            | C ISYS4303 | Semester 1, Semester 2 |

Marine Sciences Honours

| MARS4011 Marine Sciences Honours A                | 12            | Note: Department permission required for enrolment | Semester 1, Semester 2 |
| MARS4012 Marine Sciences Honours B               | 12            | C MARS4011 | Semester 1, Semester 2 |
| MARS4013 Marine Sciences Honours C               | 12            | C MARS4012 | Semester 1, Semester 2 |
| MARS4014 Marine Sciences Honours D               | 12            | C MARS4013 | Semester 1, Semester 2 |

Pure Mathematics Honours

| MATH4301 Pure Mathematics Honours A              | 12            | Note: Department permission required for enrolment | Semester 1, Semester 2 |
| MATH4302 Pure Mathematics Honours B             | 12            | C MATH4301 | Semester 1, Semester 2 |
### Honours in the Faculty of Science

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**Microbiology Honours**

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<td>P C MICR4011 Entry into the School Honours program normally requires a credit average in a major relevant to the chosen project or relevant 24 credit points of senior study. The School will consider entry to students who do not have this requirement if their overall academic performance indicates an equivalent performance in other subject areas or if their SCIWAM exceeds 65.</td>
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**Molecular Biotechnology Honours**

Students enrolled in the Bachelor of Molecular Biotechnology (Honours) degree enrol in units in the School/Department in which they are undertaking Honours.

**Pharmacology Honours**

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**Physiology Honours**

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**Physics Honours**

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### 10. Honours in the Faculty of Science

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11. Overview of postgraduate study

This chapter gives an overview of postgraduate study in the Faculty of Science. Following is a brief outline of the types of postgraduate degrees offered by the Faculty of Science, a list of degrees available and an outline of the layout of the postgraduate section of the Faculty of Science handbook.

Degree types
The Faculty of Science offers a range of postgraduate coursework and research degrees in a variety of disciplines.

Coursework programs
Coursework programs usually involve the completion of a required series of units of study as detailed in the subsequent chapters of this handbook. A coursework program normally requires attendance at lectures and tutorials. Although coursework programs may sometimes include a component of original work in the form of a research project; other forms of instruction and learning will normally be dominant.

Graduate certificate
Graduate certificates usually require the completion of at least 24 credit points of study, and take one semester of full-time study or the equivalent duration of part-time study. The entry requirement is normally a bachelor's degree.

Graduate diploma
Graduate diplomas usually require the completion of at least 36 credit points of study, and take two semesters of full-time study or the equivalent of part-time study. The entry requirement is also usually a bachelor's degree or equivalent.

Coursework master's
Coursework master's degrees usually require the completion of at least one to two years of full-time study or the equivalent of part-time study. The entry requirement is also usually a bachelor's degree or its equivalent.

Students who complete a research project that is worth a minimum of 25 per cent of a coursework master's are eligible to apply for admission to a research degree (Master of Science or Doctor of Philosophy).

Articulated degree programs
Many of the coursework programs available in the Faculty of Science are articulated master's programs. This means that students may enter a program at a range of levels, including graduate certificate, graduate diploma or master's level. This also means that students can exit a program on completion of a particular level. Please see individual course information for more details.

Research degrees
Students in research degrees in the Faculty of Science undertake supervised research leading to the writing of a thesis or other piece of written work.

Research master's
A research master's degree usually requires one to two years of full-time study or the equivalent of part-time study during which a candidate undertakes supervised research and a thesis, or in some cases coursework and an essay. The entry requirement is usually a bachelor's degree with first or second class honours or equivalent.

Doctor of Philosophy
The degree of Doctor of Philosophy is a research degree awarded for a thesis considered to be substantially original contribution to the subject concerned. Some coursework may be required, but in no case is it a major component. Applicants should normally hold a master's degree or a bachelor's degree with first class honours. The usual minimum period of candidature is three years of full-time study, or the equivalent of part-time study.

Admission requirements
Admission requirements vary according to degree. Applicants must consult the individual admission requirements for each degree given in the relevant resolutions.

Degrees offered
The Faculty of Science offers the following postgraduate degrees, graduate diplomas and graduate certificates:

1. Degrees of Doctor
   • Doctor of Philosophy (PhD)
   • Doctor of Clinical Psychology/Master of Science DCP/MSc

2. Degrees of Master
   • Master of Science (MSc)
   • Master of Environmental Science and Law (MEnvSciLaw)
   • Master of Medical Physics (MMedPhys)
   • Master of Nutrition and Dietetics (MNutrDiet)
   • Master of Bioethics (MBEth)
   • Master of Photonics and Optical Science
   • Master of Applied Nuclear Science (MApplNucSci)
   • Master of Applied Science (MApplSci), which shall also incorporate the streams:
     • Master of Applied Science (Bioinformatics) (MApplSci(Bioinf))
     • Master of Applied Science (Environmental Science) (MApplSci(EnvSc))
     • Master of Applied Science (Health Psychology) (MApplSci(HlthPsych))
     • Master of Applied Science (Microscopy and Microanalysis) (MApplSci (Microsc & Microanal))
     • Master of Applied Science (Molecular Biotechnology) (MApplSci(MBT))
     • Master of Applied Science (Psychology of Coaching) (MApplSci(PsycoCoach))
     • Master of Applied Science (Spatial Information Science) (MApplSci(SIS))
     • Master of Applied Science (Wildlife Health and Population Management) (MApplSci(Wild Hlth Pop Man))
     • Master of Sustainability (MSust)

3. Graduate Diplomas
   • Graduate Diploma in Science (GradDipSc)
   • Graduate Diploma in Photonics and Optical Science (GradDipPhotOptSci)
   • Graduate Diploma in Psychology (GradDipPsych)
   • Graduate Diploma in Medical Physics (GradDipMedPhys)
   • Graduate Diploma in Bioethics (GradDipBEth)
   • Graduate Diploma in Applied Nuclear Science (GradDipApplNucSci)

To view the latest updates, or to purchase or search a handbook, please visit the website: sydney.edu.au/handbooks
4. Graduate Certificates

- Graduate Certificate in Science (History and Philosophy of Science) (GradCert(HPS))
- Graduate Certificate in Applied Science (GradCertApplSc), which shall also incorporate the streams:
  - Graduate Certificate in Applied Science (Bioinformatics) (GradCertApplSc(Bioinf))
  - Graduate Certificate in Applied Science (Microscopy and Microanalysis) (GradCertApplSc(Microsc & Microanal))
  - Graduate Certificate in Applied Science (Molecular Biotechnology) (GradCertApplSc(MBT))
  - Graduate Certificate in Applied Science (Psychology of Coaching) (GradCertApplSc(PsychCoach))
  - Graduate Certificate in Applied Science (Spatial Information Science) (GradCertApplSc(SIS))
  - Graduate Certificate in Applied Science (Wildlife Health and Population Management) (GradCertApplSc(WildHlthPopMan))
  - Graduate Certificate in Bioethics (GradCertBEth)
  - Graduate Certificate in Sustainability (GradCertSust)

- Graduate Certificate in Applied Science (Wildlife Health and Population Management) (GradCertApplSc(WildHlthPopMan))
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- Graduate Certificate in Applied Science (Psychology of Coaching) (GradCertApplSc(PsychCoach))
- Graduate Certificate in Applied Science (Spatial Information Science) (GradCertApplSc(SIS))
- Graduate Certificate in Applied Science (Applied Positive Psychology) (GradCertApplSc(AppPosPsyc))
- Graduate Certificate in Applied Science (Wildlife Health and Population Management) (GradCertApplSc(WildHlthPopMan))
- Graduate Certificate in Sustainability (GradCertSust)

Organisation of the postgraduate chapters

Chapter 11 contains an overview of postgraduate study within the Faculty of Science and a list of all the degrees offered.

Chapter 12 contains details of doctorates offered by the faculty, including enrolment advice and degree resolutions.

Chapter 13 contains information about master's research degrees, including enrolment advice and degree resolutions.

Chapter 14 outlines the requirements for the graduate diploma in science.

Chapters 15-26 includes enrolment advice and resolutions for the postgraduate coursework degrees offered by the faculty. These chapters also contain unit of study descriptions. The chapters are sorted alphabetically by area of study.

University of Sydney (Coursework) Rule 2000 (as amended)

The Resolutions in the postgraduate section of the handbook must be read in conjunction with the University of Sydney (Coursework) Rule 2000 (as amended), which sets out the requirements for all coursework courses. See sydney.edu.au/senate/policies/Cwk_Rule.pdf. The relevant Senate Resolutions are available in Policy Online at sydney.edu.au/policy
12. Doctorates in the Faculty of Science

Research doctorate degrees

Research degrees offered by the Faculty of Science are listed in this chapter in the following order:

- Doctor of Philosophy (PhD)
- Doctor of Clinical Psychology/ Master of Science (DCP/MSc)

Valuable resources for intending and current research students are the Postgraduate Studies Handbook and the Thesis Guide published by SUPRA (Sydney University Postgraduate Representative Association).

Doctor of Philosophy (PhD)

Degree Code: LB000

The degree of Doctor of Philosophy is a research degree awarded for a thesis considered to be a substantially original contribution to the subject concerned. Some coursework may be required (mainly in the form of seminars) but in no case is it a major component. The Resolutions of the Senate and Academic Board relating to the degree of Doctor of Philosophy are printed in University of Sydney Calendar.

Applicants should normally hold a Master's degree or a Bachelor's degree with first or second class Honours from the University of Sydney, or an equivalent qualification from another university or institution. The Master's degree may be a research Master's or a coursework Master's which contains a project or thesis component equivalent to half a semester's load.

With permission from the Dean, additional training (coursework) may be undertaken either prior to commencement of candidature or during the first semester of candidature. This coursework may be general research preparation or discipline-specific.

The degree may be taken on either a full-time or part-time basis. In the case of full-time candidates, the minimum period of candidature can, with the permission of the faculty, be two years for candidates holding an MSc degree or equivalent, or shall be three years in the case of candidates holding a bachelor's degree with first class or second class honours; the maximum period of candidature is normally four years.

Part-time candidature may be approved for applicants who can demonstrate that they are engaged in an occupation or other activity, which leaves them substantially free to pursue their candidature for the degree. Normally the minimum period of candidature will be determined on the recommendation of the faculty but in any case will be not less than three years; the maximum period of part-time candidature is normally eight years.

Doctor of Philosophy Resolutions: see the University of Sydney Calendar.

Doctor of Clinical Psychology/Master of Science

Course resolutions

1 Course code

<table>
<thead>
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<tr>
<td>LB001/LC083</td>
<td>Doctor of Clinical Psychology/Master of Science</td>
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</table>

2 Admission

(1) The Dean of the Faculty of Science may admit to candidature:

(a) graduates of the University of Sydney with a result of Honours 2.1 or better in Psychology holding the degree of Bachelor of Psychology, Bachelor of Science (Honours), Bachelor of Arts (Honours), Bachelor of Economics (Social Sciences) (Honours), or Bachelor of Liberal Studies (Honours) or any other equivalent award of the University of Sydney and who have satisfied the Department of their personal suitability for the practice of clinical psychology determined by personal interview and by analysis of units of study completed; or

(b) graduates of other universities who have qualifications equivalent to those specified in subsection 2(1)(a); and who have satisfied the Department of their personal suitability for the practice of clinical psychology determined by personal interview and by analysis of units of study completed.

3 Units of study

(1) The units of study for the combined Doctor of Clinical Psychology/Master of Science, together with

(a) credit point value;

(b) assumed knowledge;

(c) corequisites/prerequisites/assumed learning/assumed knowledge; and

(d) any special conditions;

(2) are listed in the table of units of study for the Doctor of Clinical Psychology/ Master of Science in this chapter of the Faculty of Science Handbook.

4 Requirements for the Doctor of Clinical Psychology/Master of Science

(1) Candidates for the Doctor of Clinical Psychology/Master of Science are required to:

(a) complete satisfactorily all units of study listed in the table of units of study in this chapter of the Faculty of Science Handbook. A unit of study shall consist of such lectures, seminars, tutorial instruction, essays, exercises, practical work, or project work as may be prescribed. In these resolutions, 'to complete a unit of study' or any derivative expression means:

(i) to attend all the lectures and the meetings, if any, for seminars or tutorial instruction;

(ii) to complete satisfactorily the essays, exercises, practical and project work if any; and

(iii) to pass any other examination of the unit of study that may apply;

(iv) to complete an examination of the degree when required by the Senate and Academic Board.

The degree may be taken on either a full-time or part-time basis. In the case of full-time candidates, the minimum period of candidature will be normally eight years.

Part-time candidature may be approved for applicants who can demonstrate that they are engaged in an occupation or other activity, which leaves them substantially free to pursue their candidature for the degree. Normally the minimum period of candidature will be determined on the recommendation of the faculty but in any case will be not less than three years; the maximum period of part-time candidature is normally eight years.
12. Doctorates in the Faculty of Science

13 Satisfactory progress

(1) The Dean may:
   (a) call upon any candidate to show cause why that candidate should not be terminated by reason of unsatisfactory progress towards the completion of the combined award course; and
   (b) terminate the candidature where the candidate does not show good cause.

(2) Satisfactory progress is prescribed as follows:
   (a) a candidate for the combined award course must complete satisfactorily (at a pass level) all units of study;
   (b) if a candidate fails to complete satisfactorily a unit of study at the first attempt, they can make a second attempt at completing that unit of study. Clinical Internship units of study should be taken in sequence, but this sequence may be varied with permission from the Director of Clinical Training;
   (c) any candidate who fails to complete satisfactorily a unit of study at the second attempt will normally be deemed to have failed to complete the course requirements and their candidature will be terminated by the Dean; and
   (d) if a candidate fails to complete satisfactorily two units of study within the same key topic area at the first attempt, they will normally be deemed to have failed to complete the course requirements and their candidature will be terminated by the Dean.

14 Time limit

A candidate shall complete the requirements for the Doctor of Clinical Psychology/Master of Science in a minimum enrolment of six semesters and a maximum enrolment of twelve semesters, except with permission of the Dean within nine calendar years of admission to candidature.

15 Assessment policy

(1) The procedures for the examination and award of the Master of Science shall be prescribed in the Resolutions of the Senate and Faculty relating to that degree.

(2) On completion of the requirements for the combined award course, the Faculty, on the recommendation of the Head of Department and the Director of Clinical Training, shall determine the results of the candidature.

16 Credit transfer policy

A candidate who, before admission to candidacy, has spent time in graduate study and, within the previous three years, has completed coursework considered by the Dean to be equivalent to units of study prescribed for the combined award course, may receive credit of up to 48 credit points towards the requirements for the Doctor of Clinical Psychology provided that the completed work was not counted toward the requirements of another degree.

17 Transfer to and from Doctor of Philosophy Candidature

(1) The Director of Clinical Training in consultation with the Head of Department may recommend to the Dean of the Faculty of Science that a candidate withdraw from candidacy for the combined award course and complete requirements for the degree of Doctor of Philosophy under such conditions as the University may determine.

(2) The Dean of the Faculty may readmit to candidacy a candidate who has previously withdrawn from the combined award course as provided for in subsection 1 above and who has completed the requirements for the award of the degree of Doctor of Philosophy. Such a candidate shall complete the requirements for the degree of Doctor of Clinical Psychology under such conditions as the Dean may determine but shall not be permitted to continue candidacy for the award of the degree of Master of Science.
Course overview

The School of Psychology offers a double degree which trains psychology graduates in the professional specialisation of clinical psychology: Doctor of Clinical Psychology/Master of Science course.

The Doctor of Clinical Psychology/Master of Science is recognised, in principle, by the New South Wales Department of Health as qualifying the holder for progression to the grade of Clinical Psychologist. The course is accredited by the Australian Psychology Accreditation Council (APAC) as a 5th, 6th and 7th year of training, and is an approved qualification for Associate Membership of the Australian Psychological Society (APS). College of Clinical Psychologists and the Australian Clinical Psychology Association (ACPA). The Psychology Board of Australia (PBA), through APAC, recognises the course for the purposes of registration and endorsement of practice in clinical psychology.

The Doctor of Clinical Psychology/Master of Science (DCP/MSc) involves three years of full-time study and includes three components: academic course work, supervised clinical internships and research. The academic coursework involves lectures, workshops, forums and seminars by the University academic staff. Qualified Clinical Psychologists provide Interns with supervised clinical practice in the internal off-campus Psychology Clinic as well as a variety of external teaching hospitals and clinics. The program includes a minimum of 1500 hours of clinical internship experience and 600 client contact hours. The research component requires students to produce a Research Thesis on a clinical topic that fulfills the requirements for a Master of Science degree.

All students enrol in the DCP degree and in their second year enrol in an MSc degree as well. On completion of all the course requirements at the end of third year, students will graduate with a DCP and MSc degree.

Students who demonstrate acceptable academic ability in their initial application and who meet the School’s requirements for acceptance into a PhD program (including having a supervisor who agrees to supervise the PhD project) may take the PhD research path, and in their second year enrol directly into a PhD. Students in the MSc research path who wish to upgrade, and who have made excellent progress, and whose projects are of sufficient scope and merit may apply in the first semester of the third year for transfer to a PhD degree, subject to approval and satisfactory production of a thesis proposal which outlines how the thesis, on completion, will make a contribution to knowledge in a specialist area of study.

Admission requirements

• Completion of an APAC accredited, four-year honours degree in Psychology, gaining at least an upper second class (2.1) honours, or equivalent: all qualifications obtained from a non-Australian University must be assessed by the Australian Psychological Society (APS) before an application may be submitted. To determine equivalency visit the Australian Psychological Society (APS) website or the Australian Psychological Accreditation Council (APAC) website.

• English language proficiency: you must provide evidence of English language proficiency if you have not completed a tertiary qualification in Australia or your qualifications were obtained from a university or other institution where the language of instruction was not English. Only IELTS is accepted.

• Two referee reports.

Selection

Applicants are selected following the evaluation of application forms, supporting documentation and a selection interview. Applicants must meet the admission requirements to be considered for the selection interview (an essential part of the selection process). Offering of places are dependent upon the ranking of applicants and competition for places.

Selection interview criteria:

• Undergraduate academic performance
• Additional academic qualifications in psychology: MSc or PhD in psychology
• Publications: published journal articles, published reports, conference presentations
• Referee reports
• Relevant clinical work experience: Paid work experience (Psychologist, Counselor, clinically relevant research), Voluntary work experience (teaching, research, other). NB: Receptionist, Shop Assistant, babysitting or similar work is not considered relevant work experience.

Clinical relevance for application

Students applying for the DCP/MSc are not required to have completed an empirical research project in the area of Abnormal Psychology, Clinical Psychology or Neuropsychology.

The selection process aims to identify students with a demonstrated interest in these areas, an awareness of clinical issues, and relevant experience. Clinical relevance can be demonstrated on the basis of projects in many areas of psychology or relevant work experience.

Application submission

Applications should be sent to:

The Postgraduate Assistant
Faculty of Science
Carslaw Building, F07
University of Sydney
NSW 2006 Australia

International applicants should apply in writing to:

The International Office
Jane Foss Russell, G02
University of Sydney
NSW 2006 Australia

Provisional registration

All intending candidates are required to apply for and gain provisional registration with the Psychology Board of Australia before commencing their candidature, or if applicable, full registration. Please note that the Psychology Board of Australia requires that all overseas qualifications be assessed by the Australian Psychological Society (APS).

www.psychologyboard.gov.au

Course structure

The DCP/MSc program is based on a Scientist-Practitioner model with cognitive-behavioural an emphasis, providing students with expertise, both practical and academic, to enable them to work as professional Clinical Psychologists in a variety of clinical settings. Advanced units of study and external placements allow students to develop a breadth of clinical experience as they are introduced to additional therapeutic approaches such as Schema therapy, ACT, DBT, Systems and Child and Family therapy.

Our graduates will have a highly developed knowledge base and strong clinical skills necessary for both the practice of professional...
psychology on the one hand and conducting psychological research on the other.

**Doctor of Clinical Psychology/ Master of Science table**

<table>
<thead>
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<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
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Unit of study descriptions 2011

PSYC6065
Psychological Assessment
Credit points: 6  
Teacher/Coordinator: Dr Suncica Sunny Lah and Dr David Henry  
Session: Semester 1  
Classes: 13 three- or four-hour lectures  
Assessment: WAIS-IV Pass out; Adult Report Writing assignment; WISC-IV Pass out; Child Case assignment (100%)

This course introduces students to the basic theory and the general practice of neuropsychological assessment in children and adults. It will foster clinical approach that relies on integration of information obtained from a clinical history with results obtained on testing. It will develop conceptual framework for understanding of core developmental disorders and assessment of these disorders. The course will focus on the following components of cognition: intelligence, memory, attention, executive abilities and achievement. Students will be taught how to administer, score and interpret a variety of tests in these areas and how to report the results in written form.

PSYC6051
Adult Psychological Disorders
Credit points: 6  
Teacher/Coordinator: Dr Maree Abbott  
Session: Semester 1  
Classes: 13 four-hour lectures/practicals  
Assessment: Written examination; Clinical viva (100%)

This course is designed to introduce students to therapeutic work with common psychological problems of adulthood through a series of lectures and practical skills-based sessions. Micro-counselling and cognitive-behavioural interviewing skills are reviewed and practiced. Diagnostic assessment, mental status examination and cognitive behavioural case formulation are taught with a view to developing individual treatment plans. Skills training in cognitive behavioural strategies is combined with theoretical knowledge about different disorders to form strong theory-practice links. Emphasis is placed upon the learning of strong practical skills in the application of evidence-based therapies to the common psychological disorders encountered in adulthood, such as anxiety disorders, mood disorders and eating disorders.

PSYC6049
Child Psychological Disorders
Credit points: 6  
Teacher/Coordinator: Dr David Hawes  
Session: Semester 1  
Classes: 12 three-hour lectures  
Assessment: Clinical role-play (including videotaped interview and written self-critique) (100%)

This course introduces current perspectives on child and adolescent psychopathology, examining the historical development and current status of theory and practice. Core theories are presented within a development-ecological framework and examined in relation to the etiology and course of common internalising and externalising disorders. Skills training addresses basic family consultation as well as multi-method forms of assessment (e.g., interviewing, observation, self-report) and intervention (e.g., parent skills training, individual and group child therapy). Attention is also given to essential aspects of professional practice related to school and community contexts, ethics, and the scientist-practitioner model.

PSYC6069
Ethics and Professional Practice
Credit points: 6  
Teacher/Coordinator: Professor Stephen Touyz  
Session: Semester 1  
Classes: 13 four-hour seminars; 13 one-hour clinical observations; 12 three-hour case and research presentations.  
Assessment: Child protection assessment; ethics clinical viva; weekly clinical log; attendance at weekly case and research seminars; research preferences form; preliminary research proposal (100%). Students must demonstrate satisfactory performance on all assessments to satisfy requirements for this unit of study.

This course will introduce students to the highest standards of ethical and clinical practice in clinical psychology. The course will strengthen theory-practice links by exposing students to a range of mental health presentations and ethical and professional practice issues that present in the Psychology Clinic. Students will also attend weekly case and research seminars with cases and research presented by students in senior years.

A. Ethics and Professional Practice
This component will familiarise students with relevant codes of conduct, ethical issues, and legislation pertaining to contemporary practice in clinical psychology. These wide ranging seminars will cover Psychology Board of Australia, Guardianship Tribunal and College of Clinical Psychologists of the Australian Psychological Society.

B. Clinical Observation
This component is designed to introduce students to the work of clinical psychology strengthening theory-practice links, by exposing students to a range of mental health presentations seen in the Psychology Clinic. Specific issues relevant to ethical and professional clinical practice will also be covered, including writing case notes, and dealing with difficult issues in both the therapeutic and supervisory relationship. This work may be supplemented by viewing of the clinical work of experts in the field of Clinical Psychology. Students will be required to submit a weekly clinical log with the de-identified details of patients, their presenting problem and their treatment, as observed. The course coordinator must sign logs prior to their submission.

C. Case and Research Seminars
Attendance at the case seminars introduces students to history taking, conducting a mental status examination, formulation, diagnosis and treatment. These clinical case conferences will allow students to recognise a wide range of psychiatric diagnoses, the interrelationships between medical illness and psychiatric/psychological symptomatology as well as working within a multidisciplinary framework. Students are required to attend the research seminars and are expected to attend the School Colloquium. During this semester, students will commence the process of exploring potential research areas and negotiating supervision arrangements with academic staff. The Director of Clinical Research, using information collected from the Research Preferences form and Preliminary Research Proposal form, will guide this process as outlined in the Research section of the DCP/MSc Course Handbook.

Textbooks
Recommended readings

PSYC6055
Advanced Adult Psychological Disorders
Credit points: 6  
Teacher/Coordinator: Professor Alex Blaszczynski  
Session: Semester 2  
Classes: 13 three-hour lectures  
Prerequisites: PSYC6051  
Assessment: Assignment (3 Qs: 250-300 words each); Mental Health Review Tribunal Report (500 words) (100%)

The advanced adult therapy component will cover major mental health problems such as schizophrenia, bipolar disorder, anorexia nervosa, drug and alcohol problems and disorders of impulse control. It will also include a workshop on working with older adults and cover issues that relate to the Mental Health Review Tribunal process. Students will gain exposure to the Mental Health Review Tribunal process via direct observation as part of this unit.

PSYC6032
Health Psychology
Credit points: 6  
Teacher/Coordinator: Dr Catalina Lawsin  
Session: Semester 2  
Classes: 13 three-hour lectures  
Prerequisites: PSYC6051  
Assessment: Health Project Proposal; Presentation (100%). Further information will be provided at the first lecture.

Health Psychology is the aggregate of the specific educational, scientific, and professional contributions of the discipline of psychology applied to the promotion and maintenance of health, the prevention and treatment of illness, and the identification of etiologic and diagnostic correlates of health, illness, and related dysfunction (Matarazzo, 1980).

This course aims to understand the relationships between psychological and physical functioning across a range of medical disorders and the way in which cognitive and behavioural factors
influence psychological and physical functioning of those with health related problems. The course will be concerned with theories and interventions that promote health related behaviours and improve quality of life for people with medical problems. The course will aim to investigate theories and practice in the areas of adjustment to illness, adherence to medical treatments, working with patients with chronic illness, facilitating doctor-patient communication and dealing with death and dying. In addition, the psychological issues relevant to particular illnesses will be discussed.

**PSYC6067 Clinical Internship 1**

**Credit points:** 6  
**Teacher/Coordinator:** Associate Professor Caroline Hunt and Dr Judy Hyde  
**Session:** Semester 2  
**Classes:** 13 two-hour case and research seminars  
**Assessment:** Written case report; Research proposal; Attendance at case and research seminars; Attendance at the School of Psychology Colloquium; Students must demonstrate satisfactory performance on all assessments to satisfy requirements for this unit of study (100%)

This unit is designed to provide Interns with intensely supervised practice in conducting the fundamentals of clinical assessment, formulation, treatment planning and treatment implementation for adult patients. A cognitive-behavioural approach is predominant in this internship, although supervisors may allow variation for particular cases. It will also provide an introduction to the process of conducting psychometric assessments. An adult psychometric assessment case will be undertaken in Internship 1 under the intense supervision of a clinical neuropsychologist. Four further cases will be required to be undertaken over internships 1 and 2; these may be undertaken under the intense supervision of a clinical neuropsychologist or further adult/child/adolescent cases may be undertaken under the less intense supervision of a clinical psychologist. Interns will be allocated to psychometric cases as required and as they become available. All interns will also have the equivalent of one semester of child, adolescent and family therapy under the supervision of clinical psychologists with expertise in this area. This is offered for interns either in Internship 1 or Internship 2. All interns are expected to run a group at some point in Internship 1 or Internship 2 subject to availability. Interns may also be assigned to supervisors to conduct group programs for adults, children or adolescents. While supervisors vary in the way they offer supervision, with a mixture of individual, group and observation formats being offered, supervision is intense with a high level of observation by supervisors throughout this Internship.

**PSYC6072 Case and Research Seminars 1**

**Credit points:** 6  
**Teacher/Coordinator:** Professor Stephen Touyz  
**Session:** Semester 2  
**Classes:** 13 two-hour case and research seminars  
**Assessment:** Four short essays/case analyses (100%)

This unit of study will continue the case and research seminars introduced in PSYC6068 Ethics and Professional Practice. The unit of study will comprise attendance at formal weekly presentations, where Year 2 students will present a clinical case for discussion and Year 3 students will present their research findings and All students are required to attend throughout the semester, and are expected to attend the School Colloquium. It is expected that students will spend one day per week during this semester researching their chosen topic. Students are expected to be meeting with their supervisors during this semester to finalise aspects of their study design and methodology. If the research involves the recruitment of clinical samples off-site, students should expect to meet with their key individuals who will be involved with their research off-campus to negotiate the details of their project, the recruitment of subjects and to ensure its feasibility. Students are required to submit a formal written research proposal, which will form the basis of the research proposal presentation in the following semester.

**PSYC6068 Clinical Internship 2**

**Credit points:** 6  
**Teacher/Coordinator:** Associate Professor Caroline Hunt and Dr Judy Hyde  
**Session:** Semester 1  
**Classes:** 13 three-hour lectures  
**Assessment:** Contract; Mid-internship review; End of internship review; Log; Intern’s evaluation (100%)

This unit of study follows on from PSYC6067 Clinical Internship 1 and is designed to extend clinical assessment formulation, treatment planning, and treatment implementation skills and knowledge for adult patients. It also extends Interns’ knowledge and experience conducting and interpreting psychometric assessments. Interns will be allocated to new supervisors for this Internship and supervision methods will become less intense, more individual and begin to reflect formats available in external internships. Those Interns who have not undertaken child, adolescent and family therapy or conducted group therapy will be offered these formats in this Internship.

**PSYC6070 Neuropsychology and Disability**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Sunny Lah  
**Session:** Semester 1  
**Classes:** 13 three-hour lectures  
**Assessment:** Short essays/case analyses (100%)

This unit of study is concerned with neuropsychological and pervasive developmental disorders, and related forms of disability across the lifespan. Students will be introduced to the neuro-cognitive and behavioural correlates of a range of neurological, developmental, and medical conditions (including traumatic brain injury, epilepsy, autism, dementia, etc.) in children and adults. The course aims to develop students’ understanding of functional brain organisation, recovery of function and rehabilitation, and principles of early intervention in these areas. In addition, attention will be given to evidence-based methods for assessing and intervening in emotional problems commonly encountered in these populations. Lectures will include theoretical components, case presentations and discussions.

**PSYC6073 Case and Research Seminars 2**

**Credit points:** 6  
**Teacher/Coordinator:** Professor Stephen Touyz  
**Session:** Semester 1  
**Classes:** 13 two-hour case and research seminars  
**Assessment:** Case presentation; Case report; Contract; Mid-internship review; Attendance at case and research seminars; Attendance at the School of Psychology Colloquium; Students must demonstrate satisfactory performance on both assessments to satisfy requirements for this unit of study (100%)

This unit of study will continue the case and research seminars introduced in PSYC6072 Case and Research Seminars 1. The unit of study will comprise attendance at formal weekly presentations, where Year 2 students will present their research findings and Year 3 students will present a clinical case for discussion. All students are required to attend throughout the semester. Students are to prepare a written case report.

**PSYC6071 Research Project**

**Credit points:** 6  
**Teacher/Coordinator:** Associate Professor Louise Sharpe  
**Session:** Semester 1  
**Assessment:** Assessed on research progress throughout the semester (100%)

This unit of study requires students to undertake significant work on their research project. During this semester it is expected that students will submit appropriate applications for research ethics, so that they are in a position to commence data collection in this semester, no later than the middle of their second year. Students will also present a formal research proposal presentation, where they will receive formal feedback from the Director of Clinical Research, as part of requirements for PSYC6073 Case and Research Seminars 2.

**PSYC6056 Advanced Seminars**

**Credit points:** 6  
**Teacher/Coordinator:** Associate Professor Caroline Hunt  
**Session:** Semester 2  
**Classes:** 4 three-hour seminars, 3 six-hour seminars  
**Prerequisites:** PSYC6051 Assessment: Child Protection; written assessment,
Advanced Neuropsychology: in-class presentation; Other seminars: class participation (100%)

This course is designed to provide interns with advanced level training in the professional practice of clinical psychology. The advanced level seminars will include Clinical Supervision, Working in Private Practice, Child Protection, Advanced Eating Disorders and Advanced Neuropsychology, and may from time to time include seminars by visiting clinical academics.

PSYC6074
Advanced Models of Therapy
Credit points: 6 Teacher/Coordinator: Dr Paul Rhodes Session: Semester 2
 Classes: 10 six-hour seminars Prerequisites: PSYC6051 Assessment: Family therapy assignment; Schema therapy assignment; DBT assignment; Class participation; Students must demonstrate satisfactory performance on all assessments to satisfy requirements for this unit of study (100%)

This course is designed to provide students with advanced level training in psychotherapeutic approaches. For example, this course will deal with responses to complex human problems, including family problems and personality disorders, from a wider variety of clinical orientations. It focuses on a range of advanced models of therapy, including family therapy, dialectic behavior therapy, schema therapy and integrated approaches to psychotherapy, and will include from time to time, seminars by visiting clinical academics or practitioners with expertise in specific therapeutic approaches.

PSYC6066
Clinical Internship and Case Seminars 3
Teacher/Coordinator: Associate Professor Caroline Hunt and Dr Judy Hyde Session: Semester 2 Classes: Case and Research Seminars: 13 two-hour seminars; Internship: 2 days/week for 24 weeks Assessment: Case seminars: case presentation, case report; Internship: contract, mid-internship review, end of internship review, log, intern's evaluation (100%)

This course provides students with a range of therapy and assessment experiences in accordance with their clinical and research interests. The specific nature of learning outcomes will depend on the setting for the internship, the client group and the nature of the clinical work. Students will also attend case and research seminars, where students present their research findings and complex clinical cases for discussion that pose either diagnostic dilemmas or difficulties in treatment.

PSYC6061
Clinical Internship and Case Seminars 5
Teacher/Coordinator: Associate Professor Caroline Hunt and Dr Judy Hyde Session: Semester 1 Classes: Case and Research seminars: 13 two-hour seminars; Internship: 2 days/week for 24 weeks Assessment: Case seminars: case presentation, case report; Internship: contract, mid-internship review, end of internship review, log, intern's evaluation (100%)

This course provides students with a range of therapy and assessment experiences in accordance with their clinical and research interests. The specific nature of learning outcomes will depend upon the setting for the internship, the client group and the nature of the clinical work. Students will also attend case and research seminars where students present their research findings and complex clinical cases for discussion which pose either diagnostic dilemmas or difficulties in treatment.

PSYC6058
Clinical Internship and Case Seminars 6
Teacher/Coordinator: Associate Professor Caroline Hunt and Dr Judy Hyde Session: Semester 2 Classes: Case and Research seminars: 13 two-hour seminars; Internship: 2 days/week for 24 weeks Assessment: Case Seminars: attendance, case report; Internship: contract, mid-internship review, end of internship review, log, intern's evaluation (100%)

This course provides students with a range of therapy and assessment experiences in accordance with their clinical and research interests. The specific nature of learning outcomes will depend upon the setting for the internship, the client group and the nature of the clinical work. Students will also attend case and research seminars, where students present their research findings and complex clinical cases for discussion which pose either diagnostic dilemmas or difficulties in treatment.
Presentation of theses - for research degrees

The following information is presented for the guidance of candidates. It should be regarded as a summary only. Candidates should also consult Policy Online sydney.edu.au/policy, the Postgraduate Studies Handbook sydney.edu.au/handbooks/handbooks_admin/postgraduate.shtml and the Faculty of Science for the most current and detailed advice.

Formal requirements

Number of copies to be submitted for the Doctor of Philosophy: 4

The four copies of theses submitted for examination for the degree of Doctor of Philosophy and the three copies of theses submitted for examination for the degree of Master of Science may be bound in either a temporary or a permanent form.

Theses submitted in temporary binding should be strong enough to withstand ordinary handling and postage. Full details of requirements for the Master of Science (Research) may be found in the following chapter.

The degree shall not be awarded until the candidate has submitted a permanently bound copy of the thesis (containing any corrections or amendments that may be required) and printed on acid-free or permanent paper.

The thesis shall be accompanied by a certificate from the supervisor stating whether in the supervisor's opinion the form of presentation of the thesis is satisfactory.

Theses in permanent form shall normally be on International Standard A4 size paper sewn and bound in boards covered with bookcloth or buckram or other binding fabric.

The title of the thesis, the candidate's initials and surname, the title of the degree, the year of submission and the name of the University of Sydney should appear in lettering on the front cover or on the title page.

The lettering on the spine, reading from top to bottom, should conform as far as possible to the above except that the name of the University of Sydney may be omitted and the thesis title abbreviated. Supporting material should be bound in the back of the thesis as an appendix or in a separate sheet of covers.

Additional information

At the request of the Academic Board, the Science Faculty has resolved that a thesis should not normally exceed 80,000 words. With the permission of the Chair of the Faculty of Science's Postgraduate Studies Committee, a thesis may have an absolute upper limit of 100,000 words.

Amendments do not have to involve rekeying if a black ink/biro amendment is clear. Amendments can also be made by way of an appendix to the thesis.

Candidates are advised to consult the SUPRA publication, Practical Aspects of Producing a Thesis at the University of Sydney, for other guidelines and suggestions in addition to the formal requirements above.

Summary

Within the Faculty of Science, there are no formal requirements or guidelines other than those listed above. There are no requirements for single/double spacing or single/double sided presentation, nor font size, figure presentation, format of bibliographic citations, etc.

Candidates should, however, be aware that if the degree is awarded, the thesis becomes a public document, the quality of which reflects on the ability of the candidate. Moreover, utilising a format that will make the examiners' tasks easier is obviously sensible.
13. Master's research degrees

This chapter sets out the requirements for master's level research postgraduate degrees offered in the Faculty of Science. Following is a brief description of the research degrees, notes on the presentation of theses, and a description of the master's level research degrees.

Research degrees

Research master's degrees offered by the faculty are listed in this chapter in the following order:

- Master of Science (MSc)
- Master of Science (Environmental Science)


Master of Science

1 Course codes

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<th>Code</th>
<th>Course title</th>
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<tbody>
<tr>
<td>LC080</td>
<td>Master of Science</td>
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</table>

2 Admission

(1) The Faculty of Science may, on the recommendation of the Head of the Department concerned, admit to candidature for the degree of Master of Science an applicant who:
(a) is a graduate of the University of Sydney; and
(b) has, in the opinion of the Faculty, reached a first or second class honours standard:
(i) in the final year of an honours program for the degree of Bachelor of Science, or
(ii) in a program considered by the Faculty to be equivalent to a unit of study referred to in subsection 2(1)(b)(i), or has, in some other manner, acquired a standard of knowledge considered by the Faculty to be equivalent to a first or second class honours standard in a unit of study referred to in subsection 2(1)(b)(i).

(2) Notwithstanding subsection 1, the Academic Board may admit a person to candidature for the degree in accordance with the provisions of Part 9 of the University of Sydney (Amendment Act) Rule 1999.

3 Requirements for the Master of Science (MSc)

(1) A candidate for the degree is required to:
(a) carry out an original investigation on a topic approved by the Head of Department; and
(b) write a thesis embodying the results of this investigation, stating in the thesis the sources from which the work of others has been used, and the proportion of the thesis claimed as original work.

4 Enrolment in more/less than minimum load

(1) Subject to the approval of the Head of the Department, a candidate for the degree shall elect to proceed:
(a) either as a full-time or as a part-time candidate;
(b) either by research and thesis in accordance with subsections 7(1)-7(8) or by coursework and essay in accordance with subsection 7(9)-7(12); and
(c) except in the case of a candidate proceeding in accordance with Part 9 of the University of Sydney (Amendment Act) Rule, either within The University of Sydney or elsewhere.

5 Restrictions on enrolment

(1) A candidate to be full-time shall not keep the normal semesters but shall pursue candidature continuously throughout the year, except for a period of recreation leave and shall not have any substantial employment during the day.

(2) A candidate who does not comply with subsection 4(1) shall be regarded as a part-time candidate.

6 Time Limits

(1) A candidate shall not present for examination for the degree earlier than one year after commencement of candidature.

(2) Except with the permission of the Faculty, a full-time candidate proceeding by research and thesis or any candidate proceeding by coursework and essay shall complete the requirements for the degree not later than two years after the commencement of candidature.

(3) Except with the permission of the Faculty, a part-time candidate proceeding by research and thesis shall complete the requirements for the degree not later than four years after the commencement of candidature.

(4) Time spent by a candidate in advanced study in The University of Sydney before admission to candidature may be deemed by the Faculty to be time spent after such admission.

7 Supervision

(1) The Dean of the Faculty, on the recommendation of the Head of the Department concerned, shall appoint a full-time member of the academic staff or research staff of the University to act as supervisor of each candidate.

(2) Where the supervisor is a member of the research staff, the Dean of the Faculty, on the recommendation of the Head of the Department concerned, shall also appoint a member of the full-time academic staff as associate supervisor. Any person so appointed as associate supervisor must be capable of acting as supervisor in the event that the supervisor is no longer able to act.

(3) The Dean of the Faculty, on the recommendation of the Head of the Department concerned, may appoint a full-time member of the academic staff of the University or other appropriately qualified person to act as associate supervisor.

(4) The supervisor shall report annually to the Faculty, through the Head of Department, on the progress towards completion of the requirements for the degree of each candidate under his or her supervision.
8 Satisfactory Progress

The Faculty, on the recommendation of the Head of the Department concerned, may terminate the candidature of any candidate who has not shown evidence of sufficient progress, in the opinion of the Faculty.

9 Assessment and Examination

(1) A candidate proceeding by research and thesis shall:
   (a) carry out an original investigation on a topic approved by the Head of the Department concerned;
   (b) write a thesis embodying the results of this investigation, and
   (c) state in the thesis generally in a preface and specifically in notes, the sources from which the information was taken, the extent to which the work of others has been used, and the proportion of the thesis claimed as original;
(2) lodge with the Registrar three copies of the thesis, typewritten and bound; and
(3) if required by the examiners, sit for an examination in the branch or branches of science to which the thesis relates.
(4) The thesis shall be accompanied by a certificate from the supervisor stating whether in the supervisor's opinion the form of presentation of the thesis is satisfactory.
(5) The Dean of the Faculty of Science on the recommendation of the Head of Department concerned, shall appoint two, or where the Dean considers it appropriate, more than two examiners of whom at least one shall be external to the University, i.e. not being a member of the staff of the University or holding a clinical academic title, and of whom one may be the person appointed to act as supervisor of the candidate.
(6) The examiners shall report to the Faculty which shall determine the result of the examination.
(7) A candidate may not present as the thesis any work which has been presented for a degree or diploma at this or another tertiary institution, but the candidate shall not be precluded from incorporating such work in the thesis, provided that in presenting the thesis the candidate indicates the part of the work which has been so incorporated.
(8) The Registrar shall lodge one copy of the thesis with the Librarian if the degree is awarded.

Master of Science (Environmental Science)

Course Rules

1 Course codes

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<tr>
<th>Code</th>
<th>Course title</th>
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<tbody>
<tr>
<td>LC014</td>
<td>Master of Science (Environmental Science)</td>
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2 Admission

(1) The Dean of the Faculty of Science may admit to candidature:
   (a) graduates who have completed an Honours degree majoring in a Science discipline that has a significant environmental emphasis, or in Environmental Science, or equivalent; or
   (b) graduates who have completed the requirements for a Graduate Diploma majoring in a Science discipline that has a significant environmental emphasis, or in Environmental Science, or equivalent as provided for by Subsection 2(2); or
   (c) graduates who have completed prior postgraduate study in a Science discipline that has a significant environmental emphasis, or in Environmental Science.
(2) A candidate may seek admission into the MSc (Environmental Science) from any of the Graduate Diploma of Science programs, including those of Applied Science and Environmental Science, as follows:
   (a) A candidate who has fully completed the requirements for a Graduate Diploma of Science or Applied Science is eligible to apply for admission into the MSc (Environmental Science). Candidates who are considered not to have the required breadth of knowledge in environmental issues may need to complete some further coursework as provided for by section 5.
   (b) A candidate who has completed 24 credit points of Environmental Science coursework at Credit grade or above towards the requirements for a postgraduate qualification in Science or Applied Science may apply for admission into the MSc (Environmental Science). Candidates who gain admission in this manner may still need to complete some further coursework as provided for by section 2 (faculty rules).

3 Requirements for the Master of Science (Environmental Science)

(1) A candidate for the degree is required to:
   (a) carry out an original investigation on a topic approved by the Chair of the Program Committee for Environmental Science; and
   (b) write a thesis embodying the results of this investigation, stating in the thesis the sources from which the information was taken, the extent to which the work of others has been used, and the proportional of the thesis claimed as original work.
(2) Candidates for the degree must prove to the satisfaction of the Program Committee for Environmental Science a breadth of knowledge in environmental issues.
(3) Candidates for the degree must satisfactorily complete any coursework requirements prescribed by the Chair of the Program Committee for Environmental Science. This can include up to 24 credit points of coursework covering material new to the candidate and selected from units of study approved from time to time by the Faculty.

Faculty rules

4 Enrolment in more/less than minimum load

A candidate may proceed on either a full-time or a part-time basis.
5 Cross-institutional study
Cross-institutional study shall not be available to students enrolled in the Master of Science (Environmental Science) course, except where the University of Sydney has a formal Cooperation Agreement with another University.

6 Restrictions on enrolment
(1) Admission to candidature may be limited by a quota. In determining the quota the University will take into account:
(a) availability of resources including space, laboratory and computing facilities; and
(b) availability of adequate and appropriate supervision.
(2) In considering an application for admission to candidature the Program Committee for Environmental Science and the Faculty shall take account of the quota and will select, in preference, applicants who are most meritorious in terms of section 2 above.

7 Discontinuation of enrolment
A student who does not enrol in any semester without first obtaining written permission from the Dean to suspend candidature will be deemed to have discontinued candidature for the degree. Students who have discontinued candidature will be required to apply for admission to the candidature and be subject to admission requirements pertaining at that time.

8 Suspension of candidature
(1) A student may seek written permission from the Dean to suspend candidature for the degree.
(2) Suspension may be granted for a maximum of one year.

9 Re-enrolment after an absence
A student who plans to reenrol after a period of suspension must advise the Faculty of Science Office in writing of their intention by no later than the end of October for First Semester of the following year or the end of May for Second Semester of the same year.

10 Satisfactory progress
(1) The Faculty may:
(a) call upon any candidate to show cause why that candidate should not be terminated by reason of unsatisfactory progress towards completion of the degree; and
(b) terminate the candidature where the candidate does not show good cause.

11 Time limit
(1) A full-time candidate shall complete the requirements for the degree not earlier than the end of the third semester and not later than the end of the fourth semester of candidature, except as described in subsection 9 or unless otherwise determined by the Faculty. A full-time candidate shall not keep the normal semesters but shall pursue candidature continuously throughout the year, except for periods of leave approved by the candidate's supervisor, and shall not have any substantial employment during the day.
(2) A part-time candidate shall complete the requirements for the degree not earlier than the end of the third semester and not later than the end of the eighth semester of candidature, except as described in subsection 9 or unless otherwise determined by the Faculty.
(3) Any candidate who does not comply with subsection 1 shall be deemed to be a part-time candidate.
(4) For a candidate who gains admission into the MSc (Environmental Science) from a Graduate Diploma of Science or Applied Science, the duration of candidature is as follows:

(a) Where a full-time candidate has completed the requirements for a Graduate Diploma of Science or Applied Science immediately prior to admission into the MSc (Environmental Science), the minimum duration for completion of the requirements of the MSc (Environmental Science) is two semesters.
(b) Where a part-time candidate has completed the requirements for the Graduate Diploma of Science or Applied Science immediately prior to admission into the MSc (Environmental Science), the minimum duration for completion of the Master of Science (Env Sc) requirements of the MSc (Environmental Science) is three semesters.
(c) In these resolutions, the term 'immediately' means that the Graduate Diploma requirements were completed in the previous semester.

12 Assessment policy
(1) A candidate shall:
(a) attend such course of study and pass such examinations in each unit of study as prescribed under subsection 3(3);
(b) carry out an original investigation on a topic approved by Chair of the Program Committee - Environmental Science;
(c) write a thesis embodying the results of this investigation and state in the thesis generally in a preface and specifically in notes, the sources from which the information was taken, the extent to which the work of others has been used, and the proportion of the thesis claimed as original;
(d) lodge with the Registrar three copies of the thesis, typewritten and bound; and
(e) if required by the examiners, sit for an examination in the branch or branches of science to which the thesis relates.
(2) The thesis shall be accompanied by a certificate from the supervisor stating whether in the supervisor's opinion the form of presentation of the thesis is satisfactory.
(3) The Dean of the Faculty of Science on the recommendation of the Head of Department concerned, shall appoint two, or where the Dean considers it appropriate, more than two examiners of whom at least one shall be external to the University - ie, not being a member of the staff of the University or holding a clinical academic title, and of whom one may be the person appointed to act as supervisor of the candidate.
(4) The examiners shall report to the Faculty which shall determine the result of the examination.
(5) A candidate may not present as the thesis any work which has been presented for a degree or diploma at this or any another tertiary institution, but the candidate shall not be precluded from incorporating such work in the thesis, provided that in presenting the thesis the candidate indicates the part of the work which has been so incorporated.
(6) The Registrar shall lodge one copy of the thesis with the Librarian if the degree is awarded.

13 Credit transfer policy
A candidate who, before admission to candidature, has spent time in graduate study and, within the previous three years, has completed coursework considered by the Dean to be equivalent to units of study prescribed for the combined award course, may receive credit of up to 6 credit points towards the requirements for the Master of Science (Environmental Science) provided that the completed work was not counted toward the requirements of another degree.
14. Graduate Diploma in Science

Graduate Diploma in Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

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<tr>
<th>Code</th>
<th>Course</th>
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<tr>
<td>LF008</td>
<td>Graduate Diploma in Science</td>
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2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Admission to candidature

(1) With approval from the Dean available places will be offered to qualified applicants, according to the following admissions criteria.

(2) Admission to this course requires a Bachelor’s degree from the Faculty of Science or equivalent qualification, containing a minimum of 24 credit points of senior units of study (or equivalent at another institution) relating to the nominated science subject area of study. The nominated science subject area must be one listed in Table VI, the honours units of study table, except that Psychology is not available in the Graduate Diploma in Science.

4 Requirements for award

(1) To qualify for the Graduate Diploma in Science a candidate must complete 48 credit points of honours level units of study in a single science subject area, or, in the case of joint courses, across two science subject areas.

(2) An applicant who is qualified to enrol in two science subject areas may complete a course joining the two areas, equivalent to a course in a single subject area. A joint course shall comprise such parts of the two subject areas as may be decided by the Dean.

5 Award of the diploma/ advanced diploma/ degree

The Graduate Diploma in Science is awarded as a Pass degree only.

6 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Relationship of Graduate Diploma to research degrees

The Graduate Diploma in Science serves as an entry qualification for the degrees of Master of Science or Doctor of Philosophy. It consists of equivalent work to that carried out by candidates enrolled in the fourth year honours courses, and is normally available to candidates who may not be eligible to enrol in those courses. The normal duration of the degree is one year full-time or two years part-time.

Course requirements

Intending students should consult the table of honours units of study for the range of disciplines offered. After discussion of your interests with a relevant member of academic staff, an application should be lodged with the Faculty of Science. Entry to the Graduate Diploma is subject to approval by the relevant Head of Department, the faculty, and confirmation that requirements for the award of a relevant bachelor’s degree have been met.

To view the latest updates, or to purchase or search a handbook, please visit the website: sydney.edu.au/handbooks
14. Graduate Diploma in Science
15. Bioethics coursework degrees

Graduate Certificate in Bioethics
Graduate Diploma in Bioethics
Master of Bioethics

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG019</td>
<td>Graduate Certificate in Bioethics</td>
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<tr>
<td>LF037</td>
<td>Graduate Diploma in Bioethics</td>
</tr>
<tr>
<td>LC047</td>
<td>Master of Bioethics</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Bioethics
   (b) Graduate Diploma in Bioethics
   (c) Master of Bioethics

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean available places will be offered to qualified applicants according to the following admissions criteria.

(2) Admission to the Graduate Certificate in Bioethics requires a bachelor's degree from the University of Sydney or equivalent qualification in the field of Science, Medicine, Nursing, Allied Health Sciences, Philosophy/Ethics, Sociology, Anthropology, History, Law or other relevant field.

(3) Admission to the Graduate Diploma in Bioethics requires:
   (a) a bachelor's degree from the University of Sydney or equivalent qualification in the field of Science, Medicine, Nursing, Allied Health Sciences, Philosophy/Ethics, Sociology, Anthropology, History, Law or other relevant field; or
   (b) completion of the requirements of an embedded graduate certificate or equivalent qualification.

(4) Admission to the Master of Bioethics requires:
   (a) a bachelor's degree with a credit average from the University of Sydney or equivalent qualification in the field of Science, Medicine, Nursing, Allied Health Sciences, Philosophy/Ethics, Sociology, Anthropology, History, Law or other relevant field; or
   (b) completion of the requirements of an embedded graduate diploma or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in tables for Bioethics postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master's degree with special aims or interests may be allowed to substitute up to 12 credit points with relevant postgraduate units (eg. history, medical humanities or law) from outside the table.

(2) Candidates for the Graduate Certificate of Bioethics are required to complete 24 credit points including:
   (a) 6 credit points from core units of study; and
   (b) 6 credit points from elective or foundational units of study.

(3) Candidates for the Graduate Diploma of Bioethics are required to complete 36 credit points including:
   (a) 6 credit points from core units of study; and
   (b) 12 credit points from foundational units of study; and
   (c) 18 credit points from elective units of study.

(4) Candidates for the Master of Bioethics coursework pathway are required to complete 48 credit points including:
   (a) 12 credit points from core units of study; and
   (b) 18 credit points from foundational units of study; and
   (c) 18 credit points from elective units of study.

(5) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

(6) Candidates for the Master of Bioethics research pathway are required to complete 48 credit points including:
   (a) 24 credit points from core units of study; and
   (b) 18 credit points from foundational units of study; and
   (c) 6 credit point elective unit of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

These courses are designed to meet the widely recognised growing need for ethics education for scientists, researchers, and professionals working in medicine, nursing, public health, health law, health policy/administration, public policy, and science communication. They will also be attractive to students with general interests in relationships between science and society or relevant social science disciplines.

Particular units of study – such as Core Concepts in Bioethics (BETH5000), Human and Animal Research Ethics (BETH5202), Ethics and Biotechnology (BETH5201), and Ethics and Public Health
The discipline of bioethics is concerned with ethical questions arising in contexts of biological and medical science. Social concern about such issues has grown with advances in biomedical technology, as illustrated by contemporary debate over reproductive technologies, genetic engineering, cloning, and stem cell research. Traditional topics in bioethics include abortion, euthanasia, relationships between health care providers and patients, research involving humans and animals, and justice in the distribution of medical resources. Emerging topics include ethical issues related to global public health.

Falling at the intersections of ethics, policy, and biomedical science, bioethics is an inherently interdisciplinary field. The University of Sydney’s postgraduate program in Bioethics uniquely addresses this interdisciplinarity head-on.

In addition to the core unit of study (BETH5101), which provides interdisciplinary grounding in ethical philosophy, our capstone unit (BETH5000) provides a broad and critical survey of the field of bioethics. Our foundational units are philosophy of science/medicine (BETH5102), interdisciplinary approaches to the study of medicine and society (BETH5103), and bioethics law (BETH5104).

Specialisation in areas of particular interest is provided via elective units with focus on biotechnology (BETH5201), research ethics (BETH5202), public health (BETH5203), clinical ethics (BETH5204) and mental health (BETH5205). All of these units of study include historical components.

The Master of Bioethics degree can be completed in one year by full-time students or over two years by part-time students. Further details on duration of study are provided below.

Course outcomes

The University of Sydney postgraduate Bioethics degree courses provide breadth and depth of coverage of both traditional and alternative/emerging issues in, and approaches to, bioethics.

Our students will gain advanced understanding of the bearing of ethical philosophy, epistemology, law, sociology, linguistics, and history on issues in bioethics. They will develop interdisciplinary appreciation of relationships between values, science, and society. They will become familiar with both the historical and philosophical bases of local and international legislation and regulatory guidelines regarding the ethics of health care and research.

They will develop, and be able to defend, their own reasoned judgements about how ethical issues arising in health care, research, and public policy contexts should be resolved; and they will be able to recognise novel, or previously unappreciated, ethical issues arising in the professional workplace or in social policy contexts.

Our degrees contribute to the professional development of those working in health care and they offer the skills and knowledge base necessary for critical analysis in health policy making or in relevant areas of social science disciplines.

All of our degrees contribute to development of general skills in research, reading, writing, and oral expression. Expertise will vary with level of degree completed.

The program has been designed to enable progression from Graduate Certificate to Graduate Diploma, and Master’s.
BETH5000

Core Concepts in Bioethics

Credit points: 6 Session: Semester 2 Classes: 13 x 2 hr seminars Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1x750 wd review (15%) and 1x1500wd essay (35%) and 1x200-2500 wd essay (50%) Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit of study provides a broad overview of the primary issues in, and theoretical approaches to, bioethics. Following an introduction to the history of bioethics and review of the major theoretical approaches to applied ethics, central debates in bioethics surrounding doctor-patient relationships, informed consent, privacy/confidentiality, research ethics, abortion, euthanasia, genetics, cloning, stem cell research, justice and distribution of health care resources, etc., are examined. In addition to classical cases and traditional theoretical perspectives, emerging topics and alternative perspectives are explored. The unit concludes with the topic of global public health and socio-political critique(s) of the discipline of bioethics itself. Learning activities will include seminars, small group sessions, and project work.

BETH5101

Introduction to Ethical Reasoning

Credit points: 6 Session: Semester 1 Classes: 13 x 2hr seminars Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1x2000wd essay (35%); 1x4000wd essay (55%); participation (10%) Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit prepares students for advanced analysis of issues in bioethics by laying foundations in both critical thinking and ethical theory. Following an introduction to the construction and assessment of arguments, central issues of debate in meta-ethics, normative ethics, and political philosophy are examined. Major traditional (historical, consequential, deontological, contractarian/egalitarian, and communitarian) theoretical frameworks as well as postmodern/continental perspectives are introduced and critically evaluated. The unit concludes with an introduction to applied and professional ethics. It is recommended, but not required, that BETH5101 is taken during students' first semester in the program.

BETH5102

Philosophy of Medicine

Credit points: 6 Session: Semester 1 Classes: 13 x 2hr seminars Assumed knowledge: A three-year degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field - or by special permission. Assessment: 1 x exercise 1200wds (30%); 1 x essay 3000-4000wds (60%); Participation (10%) Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit of study introduces students to the broader philosophical issues and epistemological structures that underlie medicine and the biomedical sciences. The unit will begin by introducing students to the philosophy of science and medicine, epistemology and the concepts of health, illness and disease. The second part of the unit will review debates regarding disease causation and the social construction of disease. Students will then consider issues relating to the generation and use of knowledge and evidence, and the differences between conventional and alternative/non-Western approaches to illness and healing. The final part of the unit will focus on diagnosis, nosology and classification of disease, with particular reference to mental illness.

BETH5103

Biomedicine and Society

Credit points: 6 Session: Semester 2 Classes: 13 x 2hr seminars Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1 x exercise 1200 wds (30%); 1 x 3000-4000 wd essay (60%); Participation (10%) Note: A limited number of students may be granted permission to take this unit during their honours year.

How does biomedicine both influence and reflect the broader society of which it is a part? This unit of study addresses this general question by examining a series of ethical and social issues relating to sex and drugs. The issues relate to gender, reproduction and sexual behaviour, and some of the drugs that have played a key role in the medicalisation of human experience in these domains. The course readings explore the issues from a range of different perspectives (i.e. history, sociology, politics, health policy, philosophy, religion, feminism, public health, and personal experience) with the aim of broadening the scope of bioethical inquiry. Each topic introduces specific concepts which students are encouraged to apply. Students are also encouraged to draw on their own disciplinary and/or professional background. Seminars, on-line discussions and coursework will provide opportunities to learn from other students, and apply learning from other units of study.
BETH5104
Bioethics, Law and Society
Credit points: 6 Session: Semester 1 Classes: 3 x 8 hr intensives Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1 x Problem 1500 wds (40%); 1 x 2000wd essay (60%)

This unit will provide students with an overview of the broader philosophical, ethical, sociopolitical and cultural issues that underlie public health and public health research. Students will first review the history of public health and examine the values that underpin health promotion and disease prevention. The second part of the unit will critique the place of facts and values in public health and the construction and use of information, with particular reference to evidence-based-medicine. The third part of the unit will examine the cultural, moral and social context of public health including the social determinants of health, the construction of health services, the determination of research priorities and issues relating to human rights and global health. Learning activities will include 2-hour weekly seminars and readings. Assessment tasks will consist of essays and a presentation/project.

BETH5201
Ethics and Biotech: Genes and Stem Cells
Credit points: 6 Session: Semester 1 Classes: 6 x 2hr seminars 1 x 8 hr intensive Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health science, philosophy/ethics, sociology/anthropology history, or other relevant field, or by special permission. Assessment: 3 Tutorial assessments - 400 wds each (3x 10%); 1 x 1200-1500 wd essay (30%); 1 x 2200 - 2500 wd essay (40%)

Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit introduces students to the broader social/political, ethical/philosophical and legal/regulatory issues that underlie genetics, stem cell research and the emerging biotechnologies. The unit will provide a brief overview of the relevant science before considering scientific, cultural and religious understandings of life and human identity. The second part of the unit will review the political, regulatory and commercial context of biotechnology and the control of information. Students will then review the history of genetics and eugenics and the ethical issues that arise in clinical and population genetics, stem cell research and cloning. The final part of the unit will explore the boundaries of research and knowledge and the issues raised by emerging biotechnologies, such as nanotechnology and proteomics. Learning activities will include an intensive seminar program, small group sessions and reading. Students will be able to concentrate on stem cell research, clinical or molecular genetics or other biotechnologies according to their clinical and scientific interests and experience.

BETH5202
Human and Animal Research Ethics
Credit points: 6 Session: Semester 2 Classes: 3 x 8 hr intensive Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: Continuous assessment (20%); Briefing paper (30%); Position Paper (50%)

Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit introduces students to research ethics in its social context. Students will first analyse the philosophical underpinnings of the research endeavour, including the justifications for engaging in research, research priorities and research integrity. The unit will then review the history of research and research abuses, the evolution of research ethics and the regulation of research in Australia. The second part of the unit will focus on issues arising in the conduct of research including: the protection of research subjects (both human and animal), consent, confidentiality and risk/benefit analysis.

BETH5203
Ethics and Public Health
Credit points: 6 Session: Semester 2 Classes: 3 x 8hr Intensives Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 10 x Online tasks 250-400wds (20%); 1 x 1000 wd essay (30%); 1 x 2500 wd essay (50%)

BETH5204
Clinical Ethics
Credit points: 6 Session: Semester 1 Classes:3 x 8hr Intensives Assumed knowledge: Honours or equivalent degree, or other appropriate terminal undergraduate degree (such as a three-year nursing degree) in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field or by special permission. Assessment: 1 x 1500 wd case study (30%); 1 x 3000 wd essay (50%); 10 x online tasks 25-400 wd (20%)

Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit will provide students with an overview of the broader philosophical, ethical, sociopolitical, and cultural issues that underlie the delivery of healthcare. Students will first explore major conceptual models for ethical reasoning in the clinical context; the design and delivery of clinical ethics consultation; and issues relating to the role of the professions. The second part of the unit will examine the foundations of clinical practice, including consent, competence, veracity, confidentiality, and decision-making. The third part of the unit will consider specific issues and populations within clinical practice, such as the care of vulnerable populations, mental health, and chronic illness. The next part of the unit will focus on skills associated with clinical ethics including analytic and mediation skills. The unit will conclude with reflections on current debates in the Australian healthcare context, particularly issues associated with healthcare rationing. Learning activities will include lectures (in an intensive format), facilitated discussion, case study presentations, and readings. Assessment tasks will consist of essays, a portfolio/journal, and a presentation/project.

BETH5205
Ethics and Mental Health
Credit points: 6 Session: Semester 2 Classes: 3 x 8hr Intensives Assessment: 1 x 1000 - 1500 wd essay (25%); 1 x 2200 - 2500 wd essay (50%); On line learning participation (15%); Attendance (10%)

Mental health and mental illness are unique in the field of health care and bioethics. The very nature of psychiatric disorder and its relationship with prevailing social and cultural factors, in addition to the unique status of the mental health patient, necessitate a specific discourse in biomedical ethics in the area of mental health. This course will provide participants with a broad perspective of issues in bioethics applied to mental health and mental illness. Students will examine the history of the psychiatric profession and consider the adequacy of current safeguards against the abuses of power seen in the history of the profession of psychiatry. Other areas considered in the course include the current ethical dilemmas in mental health care, the implications of technological advances in the neurosciences, the philosophical basis of the concept of mental disorder, the relationship between power and the psychiatric profession and the complex relationship between morality, mental health and the law. The course aspires to inform future decision makers in health, public policy, clinical settings and academia in the unique aspects of biomedical ethics in the field of mental health.
PUBH5500
Introducing Qualitative Health Research
Credit points: 6  Teacher/Coordinator: Dr Stacy Carter  Session: Semester 1a
Classes: Block mode (2 x 3 days)  Assessment: 2x 2000wd assignments (2x40%) plus 2x 500wd reflections on workshops (2x10%)

This unit overviews qualitative inquiry. It is perfect if you’re a beginner or unsure about the basics of qualitative research. Workshop One answers these questions: What is qualitative research? How is it different from quantitative research? What is its history? What research questions can it answer? How can I search for it? How do I design a qualitative study? You will learn about qualitative data collection: interviewing, focus groups and observing. Workshop Two answers these questions: What is the place of qualitative research in health and medicine? Is methodology different to method? What are ontology and epistemology? What is reflexivity (and aren’t qualitative researchers biased)? How are methodologies and theories used in qualitative research? How is qualitative research synthesised and evaluated? Can I generalise qualitative findings? You will analyse qualitative data two ways in class (for concepts and for social processes), and briefly explore the qualitative data management software NVivo. In both workshops you will meet working qualitative researchers and hear about their projects. This Unit will show you a new way of thinking critically about research and researching. By the end of the Unit you will be ready to begin evaluating and doing qualitative research for yourself.
15. Bioethics coursework degrees
Graduate Certificate in Applied Science (Bioinformatics)

Graduate Diploma in Applied Science (Bioinformatics)

Master of Applied Science (Bioinformatics)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
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</thead>
<tbody>
<tr>
<td>LG015</td>
<td>Graduate Certificate in Applied Science (Bioinformatics)</td>
</tr>
<tr>
<td>LF030</td>
<td>Graduate Diploma in Applied Science (Bioinformatics)</td>
</tr>
<tr>
<td>LC042</td>
<td>Master of Applied Science (Bioinformatics)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice, except the Graduate Certificate in Applied Science (Bioinformatics) that is available part time only.

3 Master’s type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Applied Science (Bioinformatics)
   (b) Graduate Diploma in Applied Science (Bioinformatics)
   (c) Master of Applied Science (Bioinformatics)

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) In exceptional circumstances the Dean may admit applicants to the Graduate Certificate or Graduate Diploma without the following qualifications, but whose evidence of experience and achievement is deemed by the Dean to be equivalent.

(2) With approval from the Dean available places will be offered to qualified applicants according to the following admissions criteria:

(3) Admission to the Graduate Certificate in Applied Science (Bioinformatics) requires a Bachelor of Science with a molecular life science or information technology major from the University of Sydney, or equivalent qualification.

(4) Admission to the Graduate Diploma in Applied Science (Bioinformatics) requires:
   (a) a Bachelor of Science with a molecular life science or information technology major from the University of Sydney, or equivalent qualification; or
   (b) completion of the embedded graduate certificate in this discipline from the University of Sydney, or equivalent qualification.

(5) Admission to the Master of Applied Science (Bioinformatics) requires:
   (a) a Bachelor of Science with a molecular life science or information technology major with a credit average from the University of Sydney or equivalent qualification; or
   (b) a Bachelor of Science with Honours with a molecular life science or information technology major from the University of Sydney, or equivalent qualification; or
   (c) completion of the embedded graduate diploma in this discipline from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Bioinformatics postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master's degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.

(2) Candidates from an Information Technology background must complete a set of units of study listed in Part A (Information Technology background) of the table. Candidates from a Life Sciences background must complete a set of units of study listed in Part B (Life Sciences background) of the table.

(3) Information Technology background:
   (a) To qualify for the Graduate Certificate in Applied Science (Bioinformatics) a candidate must complete 24 credit points of core units of study.
   (b) To qualify for the Graduate Diploma in Applied Science (Bioinformatics) a candidate must complete 36 credit points, including:
      (i) 24 credit points of core units of study; and
      (ii) 12 credit points of elective units of study.
   (c) To qualify for the Master of Applied Science (Bioinformatics) coursework pathway a candidate must complete 48 credit points, including:
      (i) 24 credit points of core units of study; and
      (ii) 24 credit points of elective units of study.
   (d) To qualify for the Master of Applied Science (Bioinformatics) research pathway a candidate must complete 48 credit points, including:
      (i) 24 credit points of core units of study; and
      (ii) 6 credit points of elective units of study.

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To qualify for the Master of Applied Science (Bioinformatics) coursework pathway a candidate must complete 48 credit points, including:
(i) 30 credit points of core units of study; and
(ii) 18 credit points of elective units of study.

Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

To qualify for the Master of Applied Science (Bioinformatics) research pathway a candidate must complete 48 credit points of core units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Graduate Certificate in Applied Science (Bioinformatics), Graduate Diploma in Applied Science (Bioinformatics) and Master of Applied Science (Bioinformatics) are articulated award courses that provide a professional qualification to biologists and computer scientists working in industry, research and education.

Bioinformatics postgraduate coursework degree table

Units of study listed in the table as optional are recommended; other Information Technology units of study are also available with approval from the Program Coordinator.

Units of study listed as compulsory for a particular degree or stream do not need department permission for enrolment.

The award program brings together the disciplines of computer science, statistics and the life sciences, developing and enhancing skills in bioinformatics. Students with little background in molecular biology who want to extend their understanding of the biosciences, statistics and bioinformatics follow Stream A. Students with a strong background in molecular biology who want to study bioinformatics, statistics and computer science follow Stream B.

The program has core and optional units of study to satisfy both of these requirements and will produce graduates with skills in the disciplines that underpin bioinformatics and in bioinformatics itself. Graduates from the Bioinformatics program will be proficient in molecular biology, genetics and bioinformatics. (Biology graduates who want to learn about computer programming are directed to the Graduate Diploma in Computing).

Candidates will normally commence their study in Semester 1, except with the permission of the Dean.

Course outcomes

The aim of this articulated coursework program is to provide students with a coordinated approach to bioinformatics, thus developing expertise to perform and develop the analysis of biological data with underlying competencies in the life sciences, computer science and statistics. Upon completion of the graduate certificate, graduate diploma or master’s, graduates will have a broad understanding of the topic of bioinformatics. In addition, the master’s will provide the option of experience in carrying out and completing a research project and report.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<tr>
<td>Stream A (Information Technology Background)</td>
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<tr>
<td>All Degrees: Compulsory Units</td>
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<tr>
<td>BIOL5001 Molecular Genetics and Inheritance</td>
<td>6</td>
<td>Note: Department permission required for enrolment for Stream A Bioinformatics students.</td>
<td></td>
<td></td>
<td>Semester 1</td>
<td></td>
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<tr>
<td>BIOL5002 Bioinformatics: Sequences and Genomes</td>
<td>6</td>
<td>Note: Department permission required for enrolment for Bioinformatics students. BIOL5001 corequisite not required for Molecular Biotechnology students or Stream B Bioinformatics students.</td>
<td>BIOL5001, BIOL3927</td>
<td></td>
<td>Semester 2</td>
<td></td>
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<tr>
<td>MOBT5201 Applied Molecular Biotech A (Theory)</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
<td>BCHM3098, BCHM5001, MOBT5101</td>
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<td>Semester 1</td>
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<tr>
<td>STAT5001 Applied Statistics for Bioinformatics</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>Diploma and Masters: Recommended Optional Units</td>
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<tr>
<td>Diploma students must complete 12 credit points from the following:</td>
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<tr>
<td>COMP5208 Object-Oriented Design</td>
<td>6</td>
<td>A Intermediate level of object oriented programming such as Java</td>
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<td>Semester 2</td>
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<tr>
<td></td>
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<td>N INFO2220</td>
<td></td>
<td>Semester 2</td>
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<tr>
<td>COMP5211 Algorithms</td>
<td>6</td>
<td></td>
<td></td>
<td>Semester 1</td>
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<tr>
<td>COMP5318 Knowledge Discovery and Data Mining</td>
<td>6</td>
<td>A COMP5138 and familiarity with basic statistics</td>
<td></td>
<td>Semester 1</td>
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<td>Note: Department permission required for enrolment in the following sessions: Semester 2</td>
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<tr>
<td>COMP5424 Information Technology in Biomedicine</td>
<td>6</td>
<td>A Basic programming skills</td>
<td></td>
<td>Semester 1</td>
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<tr>
<td>COMP5426 Parallel and Distributed Computing</td>
<td>6</td>
<td>A Equivalent of COMP5116</td>
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<tr>
<td>COMP5456 Computational Methods for Life Sciences</td>
<td>6</td>
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<td></td>
<td>Semester 2</td>
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<tr>
<td>MCAN5104 Image Analysis</td>
<td>6</td>
<td></td>
<td></td>
<td>Semester 1</td>
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</tr>
</tbody>
</table>

216
### Unit of Study

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Credit Points</th>
<th>A: Assumed Knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETH5000 Core Concepts in Bioethics</td>
<td>6</td>
<td>A A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. A limited number of students may be granted permission to take this unit during their honours year.</td>
<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BETH5201 Ethics and Biotech: Genes and Stem Cells</td>
<td>6</td>
<td>A A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. A limited number of students may be granted permission to take this unit during their honours year.</td>
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<td>Semester 1</td>
</tr>
</tbody>
</table>

### Masters Research Stream: Additional Core Units

- **BINF5002 Bioinformatics Research Project A**: 6 C BINF5003, BIOL5001, BIOL5002, MOBT5201 and STAT5001 Note: Department permission required for enrolment Semester 2
- **BINF5003 Bioinformatics Research Project B**: 6 C BINF5002, BIOL5001, BIOL5002, MOBT5201 and STAT5001 Note: Department permission required for enrolment Semester 2
- **MCANS510 Research Methodology**: 6 Core for research path, optional for Masters Semester 2

### Stream B (Life Science Background)

**All Degrees: Compulsory Units**
- **BIOL5002 Bioinformatics: Sequences and Genomes**: 6 C BIOL5001 N BIOL3927 Note: Department permission required for enrolment Department permission not required for Biotechnology students. BIOL5001 corequisite not required for Molecular Biotechnology students or Stream B Bioinformatics students Semester 2
- **COMP5212 Software Construction**: 6 Semester 1
- **MOBT5201 Applied Molecular Biotech A (Theory)**: 6 N BCHM3098, BCHM5001, MOBT5101 Semester 1
- **STAT5001 Applied Statistics for Bioinformatics**: 6 Semester 1

### Diploma and Masters: Additional Core Units

**COMP5211 Algorithms**: 6 Semester 1 Semester 2

### Diploma and Masters: Recommended Optional Units

Diploma students must complete 6 credit points from the following:
- **COMP5206 Introduction to Information Systems**: 6 N INFOS210 Semester 1 Semester 2
- **COMP5213 Computer and Network Organisation**: 6 Semester 1 Semester 2
- **COMP5214 Software Development in Java**: 6 Note: Department permission required for enrolment in the following sessions: Semester 1 Semester 2
- **COMP5456 Computational Methods for Life Sciences**: 6 N COMP3456 Semester 2
- **MCANS5104 Image Analysis**: 6 Semester 1 Semester 2

**BETH5000 Core Concepts in Bioethics**: 6 A A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. A limited number of students may be granted permission to take this unit during their honours year. Semester 2

**BETH5201 Ethics and Biotech: Genes and Stem Cells**: 6 A A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. A limited number of students may be granted permission to take this unit during their honours year. Semester 1

### Master Research Stream: Additional Core Units

Masters research stream students must complete 18 credit points from the following:

- **MCANS510 Research Methodology**: 6 Core for research path, optional for Masters Semester 2
- **BINF5002 Bioinformatics Research Project A**: 6 C BINF5003, BIOL5001, BIOL5002, MOBT5201 and STAT5001 Note: Department permission required for enrolment Semester 2
- **BINF5003 Bioinformatics Research Project B**: 6 C BINF5002, BIOL5001, BIOL5002, MOBT5201 and STAT5001 Note: Department permission required for enrolment Semester 2
Unit of study descriptions 2011

BETH5000
Core Concepts in Bioethics
Credit points: 6  Session: Semester 2  Classes: 13 x 2 hr seminars  Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1x750 wd review (15%) and 1x1500wd essay (35%) and 1x200-2500 wd essay (50%)  Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit of study provides a broad overview of the primary issues in, and theoretical approaches to, bioethics. Following an introduction to the history of bioethics and review of the major theoretical approaches to applied ethics, central debates in bioethics surrounding doctor-patient relationships, informed consent, privacy/confidentiality, research ethics, abortion, euthanasia, genetics, cloning, stem cell research, justice and distribution of health care resources, etc., are examined. In addition to classical cases and traditional theoretical perspectives, emerging topics and alternative perspectives are explored. The unit concludes with the topic of global public health and socio-political critique(s) of the discipline of bioethics itself. Learning activities will include seminars, small group sessions, and project work.

BETH5201
Ethics and Biotech: Genes and Stem Cells
Credit points: 6  Session: Semester 1  Classes: 6 x 2hr seminars 1 x 8 hr intensive  Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 3 Tutorial assessments - 400 wds each (3x 10%); 1 x 1200-1500 wd essay (30%); 1 x 2200 - 2500 wd essay (40%)  Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit introduces students to the broader social/political, ethical/philosophical and legal/regulatory issues that underlie genetics, stem cell research and the emerging biotechnologies. The unit will provide a brief overview of the relevant science before considering scientific, cultural and religious understandings of life and human identity. The second part of the unit will review the political, regulatory and commercial context of biotechnology and the control of information. Students will then review the history of genetics and eugenics and the ethical issues that arise in clinical and population genetics, stem cell research and cloning. The final part of the unit will explore the boundaries of research and knowledge and the issues raised by emerging biotechnologies, such as nanotechnology and proteomics. Learning activities will include an intensive seminar program, small group sessions and reading. Students will be able to concentrate on stem cell research, clinical or molecular genetics or other biotechnologies according to their clinical and scientific interests and experience.

BINF5002
Bioinformatics Research Project A
Credit points: 6  Teacher/Coordinator: Dr N Lo  Session: Semester 2  Classes: 1 lecture or tutorial per week, 1 three hour practical per fortnight  Assumed knowledge: BINF5001, BIOL5001, BIOL5002, MOBT5201 and STAT5001  Prohibitions: BINF5001, Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1 x project plan (up to 4 A4 pages) (10%), 1x20 minute research seminar (including question time) (30%), 1 x final report (3000-5000 words) (60%).  Note: Department permission required for enrolment.

BINF5002 comprises the commencement of a research project on a topic with significant emphasis on the use of bioinformatics tools to address important questions in the areas of biology, biochemistry, mathematics and statistics, computer science, crop and veterinary sciences, and medical science. Students will be working with an appointed supervisor from the Faculties of Agriculture, Science, Veterinary Science, and Medicine or from industry under the guidelines of the convenor. Students will commence a small research project in an area agreed by the student, the supervisor and the convenor. Research experience is highly valued by prospective employers as it shows a willingness and ability to undertake independent, as well as guided, research in bioinformatics. The project is not conducted in the way of contact hours per week for a semester. Rather, the student is expected to work in a continuous manner throughout the semester.

BINF5003
Bioinformatics Research Project B
Credit points: 6  Teacher/Coordinator: Dr N Lo  Session: Semester 2  Classes: Meetings by arrangement with the supervisor  Corequisites: BINF5002, BIOL5001, BIOL5002, MOBT5201 and STAT5001  Assessment: 1 x Project (up to 4 A4 pages) (10%), 1 x 20 minute Research Seminar (30%), 1 x Final Report (3000-5000) (60%).  Note: Department permission required for enrolment.

BINF5003 comprises the continuation of a research project commenced in BINF5002.

BIOL5001
Molecular Genetics and Inheritance
Credit points: 6  Teacher/Coordinator: Dr Jenny Saleeba  Session: Semester 1  Classes: 2-3 tutorials per week. Assessment: Formal exam, quizzes (100%)  Note: Department permission required for enrolment. Note: Department permission not required for Stream A Bioinformatics students.

The fundamentals of inheritance and applications of molecular genetics will be covered. At the completion of the Unit, students will be able to recognise the most common modes of inheritance, understand the fundamentals of linkage analysis, be familiar with common genome structures, be familiar with modes of transmission and mechanisms of change in genetic material, be familiar with the genetic mechanisms behind complex biological systems, understand basic methods in recombinant DNA technology, be adept at applying genetics to solving problems in biology and understand the fundamentals of quantitative and population genetics.

BIOL5002
Bioinformatics: Sequences and Genomes
Credit points: 6  Session: Semester 1, Semester 2  One 2 hour practical per week. 1 three hour practical per fortnight  Corequisites: BIOL5001  Prohibitions: BIOL3027, BIOL3927  Assessment: Formal exam, projects (100%)  Note: Department permission required for enrolment. Note: Department permission not required for Bioinformatics students. BIOL5001 corequisite not required for Molecular Biotechnology students or Stream B Bioinformatics students.

Bioinformatics - the application of computers to life sciences, and genomics - the study of biology at the genome-wide scale, are revolutionising basic and applied biological sciences in the 21st century. The unit focuses on the application of bioinformatics to the storage, retrieval and analysis of biological information, principally in the form of nucleotide and amino acid sequences. An extensive practical component emphasises the development of hands-on skills in the use of bioinformatics technologies. Students will gain an appreciation of the significance and potential of bioinformatics and genomics in contemporary life sciences; an awareness of the breadth of bioinformatics resources and applications, including non-sequence-based biological information; skills and experience in the use of a core set of programs and databases for nucleotide and amino acid sequence analysis and phylogenetic reconstruction; a basic understanding of the theoretical foundation and underlying assumptions of the programs, and their relative strengths/limitations; and, competence in the evaluation of output from the programs in appropriate biological context.

COMP5028
Object-Oriented Design
Credit points: 6  Session: Semester 1, Semester 2  Classes: One 2 hour lecture and one 1 hour tutorial per week.  Prohibitions: INFO3220  Assumed knowledge: Intermediate level of object oriented programming such as Java  Assessment: Quizzes (50%), final written exam (50%).  Note: Department permission required for enrolment in the following sessions: Semester 2.

This unit introduces Object-Oriented Analysis and Design especially the principles of modelling through Rational Unified Process and agile
This unit of study provides an overview of hardware and system software infrastructure including: compilers, operating systems, device drivers, network protocols, etc. It also includes user-level Unix skills and network usability. The objectives are to ensure that on completion of this unit students will have developed an understanding of compilers, operating systems, device drivers, network protocols, Unix skills and network usability.

COMP5214 Software Development in Java
Credit points: 6 Session: Semester 1, Semester 2 Classes: One 2 hour lecture and one 1 hour tutorial per week. Assessment: Assignment (75%), Lab Skills (25%)
Note: Department permission required for enrolment in the following sessions: Semester 1.

This unit of study introduces software development methods, where the main emphasis is on careful adherence to a process. It includes design methodology, quality assurance, group work, version control, and documentation. It will suit students who do not come from a programming background, but who want to learn the basics of computer software.

Objectives: This unit of study covers systems analysis, a design methodology, quality assurance, group collaboration, version control, software delivery and system documentation.

COMP5318 Knowledge Discovery and Data Mining
Credit points: 8 Session: Semester 1, Semester 2 Classes: (Lec 2hrs & Prac 1hr) per week. Assumed knowledge: COMP5138 and familiarity with basic statistics Assessment: Quiz (10%), Assignment (15%), Presentation/Seminar (15%), Final Exam (60%)
Note: Department permission required for enrolment in the following sessions: Semester 2.

Knowledge discovery is the process of extracting useful knowledge from data. Data mining is a discipline within knowledge discovery that seeks to facilitate the exploration and analysis of large quantities of data, by automatic or semiautomatic means. This subject provides a practical and technical introduction to knowledge discovery and data mining.

Objectives: Topics to be covered include problems of data analysis in databases, discovering patterns in the data, and knowledge interpretation, extraction and visualisation. Also covered are analysis, comparison and usage of various types of machine learning techniques and statistical techniques: clustering, classification, prediction, estimation, affinity grouping, description and scientific visualisation.

COMP5424 Information Technology in Biomedicine
Credit points: 6 Session: Semester 1 Classes: (Lec 2hrs & Tut 1hr) per week Assumed knowledge: Basic programming skills Assessment: Lab Skills (10%), Assignment (20%), Quiz (20%), Final Exam (50%)

Information technology (IT) has significantly contributed to the research and practice of medicine, biology and health care. The IT field is growing enormously in scope with biomedicine taking a lead role in utilizing the evolving applications to its best advantage. The goal of this unit of study is to provide students with the necessary knowledge to understand the information technology in biomedicine. The major emphasis will be on the principles associated with biomedical digital imaging systems and related biomedicine data processing, analysis, visualization, registration, modelling, compression, management and communication. Specialist areas such as Picture Archiving and Communication Systems (PACS), computer-aided diagnosis (CAD), image-guided surgery (IGS), content-based medical image retrieval (CBMIR), and ubiquitous m-Health, etc. will be addressed. A broad range of practical integrated clinical applications will be also elaborated.
COMP5426
Parallel and Distributed Computing
Credit points: 6  Session: Semester 1  Classes: (Lec 2hrs & Prac 1hr) per week.
Assumed knowledge: Equivalent of COMP5116  Assessment: Assignment (30%), Quiz (10%), Final Exam (60%)

This unit is intended to introduce and motivate the study of high performance computer systems. The student will be presented with the foundational concepts of parallel and distributed computing that are pertaining to the different types and classes of high performance computers. The student will be exposed to the description of the computer systems and will also get an introduction to the principles of cloud computing. Students will gain skills in evaluating, experimenting with, and optimizing the performance of high performance computers. The unit also provides students with the ability to undertake more advanced topics and courses on high performance computing.

COMP5456
Computational Methods for Life Sciences
Credit points: 6  Session: Semester 2  Classes: One 2 hour lecture, one 1 hour tutorial and one 2 hour lab per week.
Prohibitions: COMP3456  Assessment: Quiz (10%), Assignment (20%), Final Exam (70%)

This unit brings together a wide range of skills that are routinely practised in bioinformatics, from the "hard" subjects of mathematics, statistics and computer science, to the "soft" subjects in the biological/health sciences and pharmacology. It covers the essentials of bioinformatics data gathering, manipulation, mining and storage that underpin bioinformatics research, and provides additional practice in the graduate attributes of Research and Inquiry, Information Literacy and Communication through analysis of scientific research, use of large bioinformatics data sets, and writing of reports.

MCAN5104
Image Analysis
Credit points: 6  Teacher/Coordinator: Dr Allan S. Jones  Session: Semester 1, Semester 2  Classes: Ten one hour lectures, 10 two hour practicals over a one week period.
Assessment: Eight practical reports (50%), 1 three part mathematical assignment (20%), 1 in-depth assignment of 2500 word length on a relevant topic (30%).

This unit of study covers the nature and processing of images and the extraction of quantitative data from them. Participants will develop a sound working knowledge of both traditional stereology techniques and modern digital image processing and analysis. Emphasis is placed on an understanding of both the strengths and the limitations that are inherent in image data, and the technology applied to it. Topics in this module include: a general review of image acquisition, filters and transforms, segmentation methods, calibration of hardware for analysis, extraction of simple features from images, advanced feature extraction from images, limitations of measurement and a general overview of stereology, including geometric probability, density estimation and sampling.

MCAN5210
Research Methodology
Credit points: 6  Teacher/Coordinator: Dr Lilian Soon and Dr July Cairney  Session: Semester 2  Classes: Thirteen hours of lectures, one hour student presentation, four hours of tutorials/practicals.
Assessment: Risk assessment (10%), written research proposal (30%), written experimental plan (30%), worked exercises in data analysis (30%).
Note: Core for research path, optional for Masters

This unit covers the principles and practice of research methodology. Topics included: literature and database searches; citing and referencing; research proposals; safety, risk assessment and ethics; experimental design and documentation; statistics, errors and data analysis; and written and oral communication.

MOBT5201
Applied Molecular Biotech A (Theory)
Credit points: 6  Teacher/Coordinator: Dr Neville Firth  Session: Semester 1  Classes: One 2 hour lecture and one 1 hour tutorial per week.
Prohibitions: BCHM5001, BCHM5002, BCHM5003, MOBT5101  Assessment: One 2 hour theory exam (70%) and in semester assessments (30%).

This unit of study comprises the lecture component of MOBT5101.

STAT5001
Applied Statistics for Bioinformatics
Credit points: 6  Session: Semester 1  Classes: Three three hour seminars per week.
Assessment: Computer exam and lab reports (100%)

This is an introduction to statistics and data analysis used in Bioinformatics and many other areas of Biology. It aims to give an understanding of the concepts and the use of a major scientific statistical package, R. In addition to an introduction to ideas of analysis of data and statistical tests the unit will introduce ideas of simulation in resampling and the methods of clustering and classification of particular importance in Bioinformatics.
17. Environmental Science coursework degrees

Master of Environmental Science and Law

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies (including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC040</td>
<td>Master of Environmental Science and Law</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Cross faculty management

The Deans of Science and Law shall jointly exercise authority in any matter concerning the course not otherwise dealt with in these resolutions.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.

(2) Admission to the degree requires a Bachelor of Science or Bachelor of Laws with credit average from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for the course are set out in the Environmental Science and Law postgraduate coursework degree table. With the approval of the Dean and the program coordinator, candidates with special aims or interests may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.

(2) Law background:

(a) To qualify for the award of the Master of Environmental Science and Law coursework pathway a candidate must complete 48 credit points, including:
   (i) 6 credit point Law core unit of study; and
   (ii) 18 credit points of electives from Law units of study; and
   (iii) 24 credit points of electives from Science units of study.

(b) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

(c) To qualify for the award of the Master of Environmental Science and Law research pathway a candidate must complete 48 credit points, including:
   (i) 12 credit points of core unit of study; and
   (ii) 12 credit points of electives from Law units of study; and
   (iii) 24 credit points of electives from Science units of study.

(3) Science background:

(a) To qualify for the award of the Master of Environmental Science and Law coursework pathway a candidate must complete 48 credit points, including:
   (i) 12 credit points of core unit of study; and
   (ii) 12 credit points of electives from Law units of study; and
   (iii) 24 credit points of electives from Science units of study.

(b) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

(c) To qualify for the award of the Master of Environmental Science and Law research pathway a candidate must complete 48 credit points, including:
   (i) 12 credit points of core unit of study; and
   (ii) 12 credit points of electives from Law units of study; and
   (iii) 24 credit points of electives from Science units of study; and
   (iv) 12 credit point project unit of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Master of Environmental Science and Law program is a novel concept of undertaking dual courses in the fields of both Science and Law. The program is unique and is not available elsewhere. It provides science graduates with the opportunity of extending their scientific knowledge into the area of the environment, as well as acquiring new skills in the field of environmental law. For law graduates, the opportunity is to extend their knowledge into environmental aspects of law, as well as to gain an understanding of some of the concepts underpinning environmental science.

Course outcomes

Upon completion of the Master of Environmental Science and Law graduates will possess a practical and theoretical background in aspects of Environmental Science and Environmental Law. This knowledge includes research and practical skills in these areas. The program is designed to integrate disciplines which are normally considered separately and which would be difficult to study outside of the Master of Environmental Science and Law program.
# Master of Environmental Science and Law table

The table lists the units of study available within this degree. Other units are possible with the permission of the Director of Environmental Science. Note: Law units of study are taught in intensive mode. Units offered change from time to time. Contact the Faculty of Law for a complete and up to date list.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td><strong>Core Units</strong></td>
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<tr>
<td>LAWS6044 Environmental Law and Policy</td>
<td>6</td>
<td>A LAWS6252 or law degree from a common law jurisdiction</td>
<td>Environmental law students must complete LAWS6252 and this compulsory unit prior to enrolling in other law elective units</td>
<td></td>
<td></td>
<td>S1 Intensive</td>
</tr>
<tr>
<td>LAWS6252 Legal Reasoning &amp; the Common Law System</td>
<td>6</td>
<td>N LAWS6881</td>
<td>International students who are required to enrol in this unit must undertake classes during the first week of their study. Health Law and Public Health students should enrol in LAWS6252 Introduction to Law for Health Professionals in lieu of LAWS6252, if available.</td>
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<td>Int Sept</td>
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<tr>
<td>Elective Units: Students must enrol in a minimum of 24 credit points offered by each Faculty</td>
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<tr>
<td>Science Elective Units</td>
<td>(ENVI5705, ENVI5708 and ENVI5808 are recommended)</td>
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<tr>
<td>ENVI5501 Environmental Research Project</td>
<td>12</td>
<td>P 24 credit points of study with a credit average or better</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5705 Ecolog Principles for Environ Scientists</td>
<td>6</td>
<td>This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5705 Ecolog Principles for Environ Scientists</td>
<td>6</td>
<td>This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5707 Energy - Sources, Uses and Alternatives</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>ENVI5708 Introduction to Environmental Chemistry</td>
<td>6</td>
<td>This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5801 Social Science of Environment</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5808 App Ecology for Environmental Scientists</td>
<td>6</td>
<td>This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program)</td>
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<td>Semester 2</td>
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<tr>
<td>ENVI5809 Environmental Simulation Modelling</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>GEOG5001 Geographic Information Science A</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>MARS5005 Coastal Management Project</td>
<td>12</td>
<td>P 24 credit points in coastal/marine science/management with a credit average or better. Note: Department permission required for enrolment</td>
<td>Departmental permission is required for enrolment</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MARS5007 Coral Reefs and Climate Change</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
<td>Departmental permission required for enrolment</td>
<td></td>
<td></td>
<td>S1 Intensive</td>
</tr>
<tr>
<td>NTMP5005 Coastal Management</td>
<td>6</td>
<td>N NTMP3005</td>
<td>Departmental permission required for enrolment</td>
<td>Departmental permission required for enrolment</td>
<td></td>
<td>S2 Intensive</td>
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<tr>
<td>RESP5001 Integrated Research Practice</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
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<td>Semester 1</td>
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<tr>
<td>WILD5001 Australasian Wildlife: Introduction</td>
<td>6</td>
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<td>S1 Intensive</td>
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<tr>
<td>WILD5002 Australasian Wildlife: Field Studies</td>
<td>6</td>
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<td>S1 Intensive</td>
</tr>
<tr>
<td>Law Elective Units</td>
<td>(Note: Department permission required for enrolment)</td>
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<tr>
<td>LAWS6011 Administrative Law</td>
<td>6</td>
<td>compulsory for MALP students</td>
<td></td>
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<td></td>
<td>S1 Late IntB</td>
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<tr>
<td>LAWS6041 Environmental Litigation</td>
<td>6</td>
<td>This unit replaced LAWS6041 Environmental Dispute Resolution</td>
<td></td>
<td></td>
<td></td>
<td>S2 Intensive</td>
</tr>
<tr>
<td>LAWS6043 Environmental Impact Assessment Law</td>
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<td>LAWS6045 Environmental Planning Law</td>
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<tr>
<td>LAWS6047 Law of the Sea</td>
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<tr>
<td>LAWS6061 International Environmental Law</td>
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<tr>
<td>LAWS6068 Judicial Review-P'ciple, Pol &amp; Procedure</td>
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<td>S1 Late IntC</td>
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<tr>
<td>LAWS6130 Dispute Resolution in Australia</td>
<td>6</td>
<td>This is not a skills unit and students will not be trained as negotiators or mediators</td>
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<td>S2 Late IntB</td>
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</table>
UNIT OF STUDY DESCRIPTIONS 2011

ENVI5501  Environmental Research Project

Credit points: 12  Session: Semester 1, Semester 2  Classes: Meetings arranged with supervisor  Prerequisites: 24 credit points of study with a credit average or better  Assessment: Written report and continuous assessment (100%)

A valuable opportunity to apply some of the knowledge gained from earlier coursework, ENVI5501 consists of a research project as arranged between you (the student) and an appropriate supervisor. The project topic may contain a field or laboratory component, or may be entirely literature-based. The only requirement is that the topic be of environmental emphasis, meaning that potential topics range from ecotourism to pollution detection and monitoring, erosion to solar power, environmental law to conservation biology. The topic must also be able to be completed within the timeframe of 16 weeks (one semester) of investigation, including the literature survey, sample and data collection, analysis of data and results, and write up of the report. This unit is not conducted by way of a number of contact hours per week for a semester. Instead, the student will work on the project full-time (aside from other study commitments) in a continuous manner for the entire duration (1 semester). This unit of study is only available to students in the Master programs who have completed 24 credit points of study with a credit average or better, and any student interested in taking ENVI5501 should contact the postgraduate advisor for Environmental Science to discuss their project and for help in selecting an appropriate supervisor.

ENVI5705  Ecolog Principles for Environ Scientists

Credit points: 6  Teacher/Coordinator: Dr Charlotte Taylor  Session: Semester 1  Classes: One 3 hour lecture per week  Assessment: Assignment, presentation and report (100%)

Note: This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.

This unit of study introduces fundamental concepts of modern ecology for environmental scientists so as to provide non-biologically trained persons an understanding of the nomenclature of ecology and the physical parameters represented.

ENVI5707  Energy - Sources, Uses and Alternatives

Credit points: 6  Teacher/Coordinator: Dr Chris Dey  Session: Semester 2  Classes: Two 1 hour lectures per week and field trips per semester  Assessment: Major essay, assignments, tutorial paper and presentation and short test. (100%)

Environmental impacts of energy generation and use are addressed in this unit of study. Major topics include discussion of the various energy sources, global energy resources, the economics associated with energy production, the politics and culture that surrounds energy use, and the alternative sources of solar thermal and photovoltaic energy and atmospheric systems. This unit of study includes several field trips to energy utilities and associated energy sites.

ENVI5708  Introduction to Environmental Chemistry

Credit points: 6  Teacher/Coordinator: A/Prof Gavin Birch  Session: Semester 1  Classes: Two 1 hour lectures and one practical per week; one field trip per semester  Assessment: Assignment, presentation and report (100%)

Note: This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.

The aim of the course is to introduce students to the major physical and chemical processes that control the concentration and dispersion of chemical pollutants in natural and impacted coastal environments. The course will demonstrate how to use contaminant data effectively and how to judge the quality of chemical data. This knowledge will be used to design and to assess environmental projects, and to judge the magnitude of impact by human activity on marine environments and the risk posed by sedimentary contaminants to benthic animals. The course aims to provide present and future managers employed in environmental professions with the skills to use data with confidence and to make management decisions knowing the risks inherent in variable data quality.

ENVI5801  Social Science of Environment

Credit points: 6  Teacher/Coordinator: A/Prof P McManus  Session: Semester 1  Classes: 2hrs lectures and 2 hrs tutorials per week plus directed reading. The unit runs for weeks 1-7  Assessment: essay and seminar presentation (100%)

This unit provides both a conceptual and an empirical foundation for the analysis of relationships between society, the environment and natural resources. Contexts for application of social science concepts to the environment include climate change, water resources management, forest issues and urban environmental quality. Students will deal with both broad theoretical approaches to the societal analysis of relationships between people and the environment, for example political ecology, and with specific themes including the sociological basis of collective action, property relations, resource tenure,
decentralisation, participatory approaches to environmental and natural resource management, and systems of knowledge. The unit pays particular attention to the implications of heterogeneous and competing interests for environmental and natural resource management and explores ways of dealing with diverse stakeholder interests. Empirical material is drawn from various countries, with special emphasis on Southeast Asia and Australia. The aim of the unit is to provide conceptual tools that will be used in other units of study within the program and for application in analysis of resource and environmental management issues faced in real world decision-making contexts. The unit will draw on the professional experience and agency roles of participants. The unit is taught through a combination of lectures and reading-based seminars.

ENVIS508
App Ecology for Environmental Scientists
Credit points: 6  
Teacher/Coordinator: Dr Clare McArthur  
Session: Semester 2  
Classes: Three 1 hour lectures per week.  
Assessment: Essays and presentations (100%)  
Note: This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program

This unit of study complements ENVIS507, and covers in depth the concerns of modern ecology pertaining to both terrestrial and marine ecosystems. An understanding of the complex issues of invasive species, conservation of biodiversity and ecological management of the environment is provided.

ENVIS509
Environmental Simulation Modelling
Credit points: 6  
Teacher/Coordinator: Dr David Chapman  
Session: Semester 1  
Classes: Six workshops.  
Assessment: Report (100%)

The concept and use of computer modelling in natural resource management is introduced in this unit of study, which is aimed particularly at non-programmers. The unit involves a combination of lecture and applied modelling skills, with students learning practical techniques that can be applied to different environmental issues.

GEOG5001
Geographic Information Science A
Credit points: 6  
Teacher/Coordinator: Dr David Chapman  
Session: Semester 1, Semester 2  
Classes: Six lectures plus six workshops.  
Assessment: Report (100%)

This unit of study gives an overview of basic spatial data models, and enables students to understand the use of data from a variety of sources within a geographical information system (GIS). The analysis of spatial data, and its manipulation to address questions appropriate to planning or locational applications, will be addressed, as will the development of thematic maps from diverse data layers.

MARS5005
Coastal Management Project
Credit points: 12  
Teacher/Coordinator: Dr Ana Vila-Concejo  
Session: Semester 1, Semester 2  
Classes: Meetings arranged with supervisor  
Prerequisites: 24 credit points in coastal/marine science/management with a credit average or better.  
Assessment: Written report, presentation and continuous assessment (100%)  
Note: Department permission required for enrolment. Note: Departmental permission is required for enrolment

This unit enables students who have completed earlier coursework to design and undertake a research project related to a coastal management topic under the supervision of an appropriate member of staff. The unit is suitable for students who wish to learn how to undertake and complete an original research project, as well as students from industry and government organizations who wish to undertake a project that relates to their professional environment.

MARS5007
Coral Reefs and Climate Change
Credit points: 6  
Teacher/Coordinator: Dr Jody Webster  
Session: S1  
Intensive Classes: 80 hours block mode includes lectures, tutorials and fieldwork  
Assessment: Written assignments: essay and project report; oral presentations; seminar and lecture participation (100%)  
Note: Department permission required for enrolment.

This unit provides an in-depth understanding of the key geological, oceanographic, biological and economic factors affecting climate change, energy generation and needs with specific reference to the Great Barrier Reef. Computer prediction of worst and best case scenarios are used to develop management strategies and policy implications. Learning activities will include a series of background lectures and research seminars, and tutorials on the development of a major research project. A major aspect of this unit is an independent research project conducted under the supervision of the course instructors. The unit concludes with a series of oral presentations based on student research. Assessment tasks will consist of two essays and a research project report and presentation. The curriculum in this unit is based on current research and a course book will be provided. This is a field intensive course held at One Tree Island Research Station. The course is ex-Gladstone Queensland and students are expected to make their own way there. The unit will be run over 8 days and there will be an additional course fee for food and accommodation, expected to be $600.

NTMP5005
Coastal Management
Credit points: 6  
Teacher/Coordinator: Dr Ana Vila-Concejo  
Session: S2  
Intensive Classes: Field school 80 hours intensive, includes field work and field trips.  
Prohibitions: NTMP3005  
Assessment: Assignment, presentation and quiz (100%)  
Note: Department permission required for enrolment.

This course examines the impacts of human activities on coastal and marine environments. It explores the complex relationships among the ecological and social values of these environments and outlines strategies and tools for their management. This is an intensive course that includes lectures on campus and at the Sydney Institute of Marine Science (SIMS) located in Chowder Bay as well as field trips to sites of interest.

RESP5001
Integrated Research Practice
Credit points: 6  
Teacher/Coordinator: A/Prof D Dragovich  
Session: Semester 1, Semester 2  
Assessment: Three 1000 word reports, oral presentation (100%)  
Note: Department permission required for enrolment.

This unit will provide research training for students wishing to undertake research at a Masters or PhD level. Students will revise or develop the necessary skills for commencing a research degree, including critical reading, developing the thesis proposal, developing a research plan with timelines and benchmarks, critical writing, library search techniques, use of referencing systems like EndNote, working with a supervisor, and matters relating to intellectual property and authorship.

WILD5001
Australasian Wildlife: Introduction
Credit points: 6  
Teacher/Coordinator: Dr Crowther  
Session: S1  
Intensive Classes: Intensively taught unit, the remainder of the unit will involve personal study and project activity. See the Wildlife Health and Population Management website for dates.  
Assessment: Assessments for each unit may include practical work, field studies, student presentations and written reports (100%)

This unit of study provides an introduction to the wildlife of Australasia, an overview of the present status of that wildlife, and an understanding of both conservation problems and management solutions. Issues in wildlife management are exemplified using a broad range of vertebrate species occupying different environments. Emphasis is placed on providing students with a coordinated and interdisciplinary approach to wildlife health and management, and on developing expertise in recognising and solving a broad range of problems in field populations. The unit integrates lectures, practical work and supervised study, and offers students the opportunity to work through real-world wildlife conservation problems relevant to their individual backgrounds.
This unit of study provides a first-hand introduction to the wildlife of Australasia, a practical overview of the present status of that wildlife, and an understanding of both conservation problems and management solutions. Issues in wildlife management are exemplified using sampling and diagnostic methods on a broad range of vertebrate species occupying different environments. The unit follows on from WILD5001 and provides practical experience via a five day field trip at the university farm "Arthursleigh" near Marulan NSW.

LAW6011
Administrative Law
Credit points: 6 Teacher/Coordinator: Prof Margaret Allars Session: S1 Late IntA Classes: Aug 19, 20 & 22, 23 (9-5) Assessment: 1x7500wd essay (100%) or 2x3750wd essays (50% each)
Note: compulsory for MALP students

The aim of the unit is to develop a critical perspective upon the accountability of government decision-makers. The unit examines theoretical frameworks for analysis of a range of issues concerning accountability, with reference to relevant principles of administrative law. Part 1 of the unit examines the concept of administrative discretion, alternative theories of the rule of law, human rights, ethics and managerialism. Part 2 of the unit is concerned with the accountability of the executive branch of government. It includes analysis of separation of powers and the doctrine of ministerial responsibility, merits review tribunals, investigative tribunals and tribunal procedure. Part 3 of the unit examines theories of participatory democracy, with reference to relevant legal principles drawn from procedural fairness, rules of standing and consultation requirements in rule making. Part 4 examines theories of open government, with reference to statutory duties to give reasons for decisions and freedom of information legislation. Part 5 examines the proper scope of administrative law by discussion of the issue of its extension to government business enterprises which are corporatised, privatised or contracted out.

LAW6041
Environmental Litigation
Credit points: 6 Teacher/Coordinator: Dr Andrew Edgar, Adj Prof Brian Preston Session: S2 Intensive Classes: Aug 19, 20 & 22, 23 (9-5) Assessment: 1x7500wd essay (100%)
Note: This unit replaced LAW6041 Environmental Dispute Resolution

This unit focuses on litigation as a tool for resolving environmental disputes. The unit examines different types of environmental litigation and issues that can arise in litigation processes. Students will develop an understanding of the characteristics of environmental litigation, the advantages and limitations of different types of proceedings, and the range of outcomes that are possible for environmental litigation. The topics include litigation strategies, procedure and evidence, defensive actions (ie SLAPP litigation), and the outcomes of litigation. Reference will be made to recent cases, such as in the field of climate change, to illustrate the topics.

LAW6043
Environmental Impact Assessment Law
Credit points: 6 Teacher/Coordinator: Mr Bernard Dunne Session: Int Sept Classes: Aug 29, 30 & Sep 5, 6 (9-5) Assessment: 1x4000wd essay (80%), 1xtake-home exam (50%)

This unit has three fundamental aims. The first is to provide a sound analysis of Environmental Impact Assessment (EIA) procedures in NSW and at the Commonwealth level. The second aim is to develop a critical understanding of EIA as a distinctive regulatory device by examining its historical, ethical and political dimensions as well as relevant aspects of legal theory. The third and ultimate aim is to combine these doctrinal and theoretical forms of knowledge so we can suggest possible improvements to the current practice of EIA in Australia.

LAW6045
Environmental Planning Law
Credit points: 6 Teacher/Coordinator: Ms Nicola Franklin, Dr Andrew Edgar Session: S1 Late IntB Classes: Mar 25, 26 & 28, 29 (9-5) Assessment: 1x5000-6000wd essay (70%), 1x3000wd problem based assignment (30%)

This unit examines the legal and institutional structures in New South Wales for land-use regulation and the resolution of land-use conflicts. The focus is on environmental planning, development control and environmental impact assessment under the Environmental Planning and Assessment Act 1979 (NSW) and cognate legislation. The unit provides an opportunity to explore contemporary urban issues, such as urban consolidation and infrastructure funding. Federal interest in the cities is also examined. While an important aim of the unit is to provide students with an understanding of the New South Wales environmental planning system, the unit also aims to develop the capacity to evaluate environmental policies and programs through exploring theoretical perspectives on the function of environmental planning. The unit will critically evaluate the function and design of environmental planning systems and the legal ambit of planning discretion. Significant influences, such as escalating environmental and social concerns about our cities, will be discussed, together with an evaluation of processes and forums for public involvement in land-use policy and decision making. A good grounding in this area will be of assistance to students undertaking other units in the Environmental Law Program.

LAW6047
Law of the Sea
Credit points: 6 Teacher/Coordinator: Dr Tim Stephens Session: S2 Late IntA Classes: Jul 29, 30 & Aug 1, 2 (9-5) Assessment: 1x5000wd essay (60%) and 1xtake-home exam (40%)

The oceans cover two-thirds of the world's surface, and are vital to international commerce, are a store of important living and non-living resources, and provide indispensable environmental services including stabilising the global climate system. This unit reviews the major areas of the law of the sea as it has developed over the centuries. The unit takes as its focus the 'constitution' of the oceans, the 1982 UN Convention on the Law of the Sea and also considers a range of other international conventions and agreements, and current state practice. Each of the major maritime zones is assessed, and there is also a detailed review of several sectoral issues, including the protection of the marine environment, fisheries, navigational rights and freedoms, and military uses of the oceans. Where appropriate, reference will be made throughout the unit to relevant Australian law and practice, and to other state practice in the Asia Pacific Region.

LAW6061
International Environmental Law
Credit points: 6 Teacher/Coordinator: Em Prof Ben Boer Session: S1 Intensive Classes: Mar 11, 12 & 14, 15 (9-5) Assessment: 1x2500wd problem based assignment (30%), 1x5000wd essay (70%)

This unit aims to provide students with an overview of the development of international environmental law throughout the twentieth century. Attention will primarily be devoted to the international law and policy responses to global and regional environmental and resource management issues. Basic principles will be discussed prior to taking a sectoral approach in looking at the application of international environmental law in specific issue areas. The unit includes material on implementation of international environmental law in the Asia Pacific region. Relevant Australian laws and initiatives will be referred to from time to time. The focus is on law and policy that has been applied to deal with environmental problems in an international and transboundary context.
LAWS6068
Judicial Review—Preliminary, Pol & Procedure
Credit points: 6 Teacher/Coordinator: Prof Margaret Allars. Session: S1 Late IntBl Classes: May 13, 14 & 15 (9-5). Assessment: 1x7500wd essay (100%) or 2x3750wd essays (100%)

This unit provides a specialised and thematic approach to judicial review as one means for making the executive branch of government accountable. It aims to develop an understanding of trends reflected in principles relating to justiciability, standing to seek review, excess of power and abuse of power, and procedural fairness. A critical evaluation of the policy choices which account for development of common law principles is encouraged. The procedures and remedial powers available under statutes which reform the procedure for gaining judicial review are examined, with judicial and administrative procedure compared. A consistent theme is the development of a critical appreciation of the proper relationship between the judicial and executive branches of government.

LAWS6130
Dispute Resolution in Australia
Credit points: 6 Teacher/Coordinator: Prof Tania Sourdin. Session: S2 Late IntBl Classes: Oct 7, 8, 14, & 15 (9-5). Assessment: 1x3000wd essay (50%), 1xtake-home exam (50%).

Note: This is not a skills unit and students will not be trained as mediators or mediators

The unit is designed to give students a broad understanding of the theory, policy and practice of ADR. It will enable students to understand various alternative dispute resolution processes, their advantages and limitations; understand the application of ADR in particular areas of practice; understand key theoretical debates about mediation; be able to advise others about ADR processes; be better participants in ADR processes; be better able to evaluate the possible applications of various dispute resolution methods. The use of ADR in employment and health care disputes will be considered.

LAWS6163
International and Australian Climate Law
Credit points: 6 Teacher/Coordinator: Prof Rosemary Lyster. Session: S1 Late IntBl Classes: Apr 1, 2 & 4, 5 (9-5). Prohibitions: LAWS6663 Assessment: class participation (20%) and 1x7000wd essay (80%).

Note: This unit replaced LAWS6163 Energy Law

This unit adopts an inter-disciplinary and integrative approach to understanding the dynamics of one of the most pressing global environmental concerns ecologically sustainable energy use. Working loosely within the framework of the Climate Change Convention, the unit relies on the perspectives of scientists, lawyers and economists to develop an integrated approach to sustainable energy use. The unit identifies current patterns of energy use in Australia and examines Australia’s response to the Climate Change Convention. It also analyses the strengths and weaknesses of various political, legal, and economic mechanisms for influencing the choice of energy use. The initiatives of the Commonwealth and New South Wales governments, as well as local councils, to promote sustainable energy use and to combat global warming are scrutinised.

LAWS6165
Biodiversity Law
Credit points: 6 Teacher/Coordinator: Adj Prof Brian Preston, Ms Susan Shearing. Session: S1 Late IntBl Classes: Apr 7-9 (classes held at Law School) then Apr 11-13 (field trip) Assessment: 1x8000wd essay (100%) Practical field work: field trip

The unit takes an interdisciplinary approach to the conservation of biodiversity. Key concepts in ecology are explained to provide a foundation for the legal framework. This framework is examined at international, national, and state levels, in terms of conventions and legislation, as well as policy and organisations. The legal framework is explored both by analysing the proper purpose, scope and effect of the laws, as well as how they work in practice. The latter is achieved by lectures and field exercises assisted by officers of government agencies, including State Forests, the National Parks and Wildlife Service and the Department of Infrastructure, Planning and Natural Resources. An integral component of the unit is a field trip to areas of relevance to biodiversity conservation, focusing on northern New South Wales. Areas to be studied include habitats of threatened species and ecological communities and World Heritage areas listed under the relevant Commonwealth and State legislation. Field studies provide a unique opportunity to understand how principles of international and domestic law are implemented locally. The field trip component will be arranged in conjunction with the field trip for LAWS6055 Heritage Law (if offered). Students are encouraged to take both units of study; they are designed to complement each other closely.

Textbooks
field trip manual will be prepared and distributed

LAWS6167
International Law II
Credit points: 6 Teacher/Coordinator: Dr Tim Stephens. Session: Int Sept. Semester 1 Classes: S1: (1x2hr lec)/wk and S109: Aug 24, 25 & Aug 31, Sep 1 (9-5). Assessment: 1x3000wd take-home exam (40%), 1x4000wd essay (60%).

Note: Compulsory for MIL and GradDiplIntLaw students. This unit replaced LAWS6167 International Law and Australian Institutions.

This unit of study consolidates and builds upon knowledge gained in International Law I. Whereas International Law I considers the general problems of public international law, and its foundational principles, International Law II examines how international law is created, implemented and enforced by national legal systems and through international organisations. Initial attention is given to understanding different ways in which law’s transboundary impacts can be understood by considering international, transnational, global and comparative perspectives on law-making. The relationship between international law and domestic law is explored in depth, both in a comparative perspective and with particular reference to the impact of international law on Australian law and legal institutions. The unit also considers the ways in which international organisations are established and function to develop and implement international norms, and assesses contemporary concerns relating to the development of global administrative law and anxieties surrounding the potential fragmentation of international law.

LAWS6191
Water Law
Credit points: 6 Teacher/Coordinator: Prof Rosemary Lyster. Session: S2 Late IntBl Classes: Oct 14, 15 & 17, 18 (9-5). Assessment: class participation (20%), 1x7000wd essay (80%).

This unit examines the ecologically sustainable management of water resources incorporating legal, scientific and economic perspectives. The legal analysis incorporates the following: international principles of water law; Commonwealth and state responsibilities for water management; the Water Management Act 2000 (NSW); the legal and constitutional implications of the reallocation of rights to use water; the implications of allocation and use for Indigenous people; the regulation of water pollution; and the corporatisation and privatisation of water utilities. Case studies from a number of jurisdictions are used to explore these themes. Economic perspectives include the impact of National Competition Policy on water law while the principles of sustainable water management are discussed within a scientific paradigm.

LAWS6257
Public Policy
Credit points: 6 Teacher/Coordinator: Prof Patricia Apps. Session: Int Sept Classes: Sep 15, 16 & 29, 30 & Oct 1 (10-5). Prohibitions: LAWS6139, LAWS6042. LAWS6113 Assessment: 1xproblem based assignment and class presentation of a case study (10%), 1xessay (90%).

Note: compulsory for MALP students

The aim of the unit is to provide an understanding of the role of government policy within the analytical framework of welfare economics. Questions of central interest include: What are the conditions that justify government intervention? How can policies be
Environmental Science Applied Science degrees

Graduate Certificate in Applied Science (Environmental Science)

Graduate Diploma in Applied Science (Environmental Science)

Master of Applied Science (Environmental Science)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
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</thead>
<tbody>
<tr>
<td>LG015</td>
<td>Graduate Certificate in Applied Science (Environmental Science)</td>
</tr>
<tr>
<td>LF030</td>
<td>Graduate Diploma in Applied Science (Environmental Science)</td>
</tr>
<tr>
<td>LC042</td>
<td>Master of Applied Science (Environmental Science)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

1. The embedded courses in this sequence are:
   (a) Graduate Certificate in Applied Science (Environmental Science)
   (b) Graduate Diploma in Applied Science (Environmental Science)
   (c) Master of Applied Science (Environmental Science)

2. Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

1. With approval from the Dean available places will be offered to qualified applicants, according to the following admissions criteria.

2. In exceptional circumstances the Dean may admit to the Graduate Certificate or Graduate Diploma, applicants without the following qualifications but whose evidence of experience and achievement is deemed by the Dean to be equivalent.

3. Admission to the Graduate Certificate in Applied Science (Environmental Science) requires a Bachelor of Science from the University of Sydney, or equivalent qualification.

4. Admission to the Graduate Diploma in Applied Science (Environmental Science) requires:
   (a) a Bachelor of Science from the University of Sydney, or equivalent qualification; or
17. Environmental Science coursework degrees

(b) completion of the embedded graduate certificate in this discipline, from the University of Sydney, or equivalent qualification.

(5) Admission to the Master of Applied Science (Environmental Science) requires:
- (a) a Bachelor of Science, with a credit average, from the University of Sydney or equivalent qualification; or
- (b) a Bachelor of Science with Honours from the University of Sydney, or equivalent qualification; or
- (c) completion of the embedded graduate diploma in this discipline, from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Environmental Science postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master’s degree, who have special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.

(2) To qualify for the Graduate Certificate Applied Science (Environmental Science) a candidate must complete 24 credit points, including:
- (a) 6 credit points of core unit of study; and
- (b) 18 credit points of elective units of study.

(3) To qualify for the Graduate Diploma Applied Science (Environmental Science) a candidate must complete 36 credit points, including:
- (a) 18 credit points of core units of study, and
- (b) 18 credit points of elective units of study.

(4) To qualify for the Master of Applied Science (Environmental Science) coursework pathway a candidate must complete 48 credit points, including:
- (a) 24 credit points of core units of study; and
- (b) 24 credit points of elective units of study.

(5) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

(6) To qualify for the Master of Applied Science (Environmental Science) research pathway a candidate must complete 48 credit points, including:
- (a) 30 credit points of core units of study; and
- (b) 18 credit points of elective units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature prior to 1 January, 2011 and persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature after 1 January, 2011 who elect to proceed under these resolutions.

Applied Science (Environmental Science) postgraduate coursework degree table

Not all units of study may be available every semester. The faculty may allow substitution of any unit of study by an approved unit of study, including units of study from other postgraduate coursework programs in the faculty or elsewhere in the University.

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<tbody>
<tr>
<td><strong>All Degrees:</strong></td>
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<tr>
<td>Graduate Certificate students must complete one of either (ENVI5708 or ENVI5808) and an additional 18 credit points (MARS5005 not available to Graduate Certificate students)</td>
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<tr>
<td>Graduate Diploma students must complete ENVI5707, ENVI5808 and one of either (ENVI5708 or ENVI5904) and an additional 18 credit points</td>
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<tr>
<td>Masters students must complete ENVI5705, ENVI5808 and one of either (ENVI5708 or ENVI5904) and an additional 30 credit points</td>
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<tr>
<td><strong>Advanced Water Resources Management</strong></td>
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<td>Semester 2</td>
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<tr>
<td><strong>ENVI5705 Principles for Environmental Scientists</strong></td>
<td>6</td>
<td>This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.</td>
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<td>Semester 1</td>
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<td><strong>ENVI5707 Energy - Sources, Uses and Alternatives</strong></td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>Unit of study</td>
<td>Credit points</td>
<td>A: Assumed knowledge</td>
<td>P: Prerequisites</td>
<td>C: Corequisites</td>
<td>N: Prohibition</td>
<td>Session</td>
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<tr>
<td>ENVI5708 Introduction to Environmental Chemistry</td>
<td>6</td>
<td>This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.</td>
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<td>Semester 1</td>
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<tr>
<td>ENVI5801 Social Science of Environment</td>
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<tr>
<td>ENVI5803 Law and the Environment</td>
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<tr>
<td>ENVI5805 The Urban Environment and Planning</td>
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<tr>
<td>ENVI5808 App Ecology for Environmental Scientists</td>
<td>6</td>
<td>This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program</td>
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<tr>
<td>ENVI5809 Environmental Simulation Modelling</td>
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<tr>
<td>ENVI5903 Sustainable Development</td>
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<td>ENVI5904 Understanding Environmental Uncertainty</td>
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<td>ENVI5905 Management of Parks</td>
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<tr>
<td>GEOG5001 Geographic Information Science A</td>
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<td>GEOG5002 Geographic Information Science B</td>
<td>6</td>
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<td>GEOG5003 Environmental Remote Sensing</td>
<td>6</td>
<td>Knowledge or experience equivalent to GEOG5001 (Introduction to GIS)</td>
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<tr>
<td>GEOG5004 Environmental Mapping and Monitoring</td>
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<tr>
<td>ENGG5601 Greenhouse Gas Mitigation</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
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<td>Semester 2</td>
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<tr>
<td>NTMP5005 Coastal Management</td>
<td>6</td>
<td>N NTMP3005</td>
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<tr>
<td>MARS5001 Coastal Processes and Systems</td>
<td>6</td>
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<tr>
<td>MARS5005 Coastal Management Project</td>
<td>12</td>
<td>P 24 credit points in coastal/marine science/management with a credit average or better.</td>
<td>Departmental permission required for enrolment</td>
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<td>Semester 2</td>
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<tr>
<td>MARS5006 Coral Reefs, Science and Management</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
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<tr>
<td>MARS5007 Coral Reefs and Climate Change</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
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<tr>
<td>PACS5903 Peace and the Environment</td>
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<td>S1 Intensive</td>
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<tr>
<td>PLAN5905 Resource and Environmental Management</td>
<td>6</td>
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<td>S1 Late Int</td>
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<tr>
<td>RESP5001 Integrated Research Practice</td>
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<td>Note: Department permission required for enrolment</td>
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<td>Semester 1</td>
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<tr>
<td>RESP5001 Environmental Research Project</td>
<td>12</td>
<td>P 24 credit points of study with a credit average or better</td>
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<td>Semester 2</td>
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</tbody>
</table>

For Masters students only:

NB: Students may only enrol in ENVI5501 after successfully completing 24 credit points with a credit average or better.
Unit of study descriptions 2011

CIVIL5665
Advanced Water Resources Management

Credit points: 6  Session: Semester 2  Classes: 2 hours of lectures and 1 hour of tutorials per week.  Assumed knowledge: Basic calculation skills and a knowledge of the application of spreadsheets to perform data manipulation and presentation.  Assessment: Quizzes (50%) and final exam (50%).  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

This unit of study aims to provide an understanding of:
- dispersion in rivers and the coastal ocean
- water supply networks and systems
- wastewater reuse and applications
- surface runoff assessment
- design procedures for storage and service reservoirs
- reservoir safe yield
- physical, biological and chemical treatment methods for wastewater
- management principles for water resources
- irrigation demands
- desalination methods and appropriate applications
- stormwater harvesting
- environmental considerations for water catchment areas
- water conservation principles

ENVI5501
Environmental Research Project

Credit points: 12  Session: Semester 1, Semester 2  Classes: Meetings arranged with supervisor.  Prerequisites: 24 credit points of study with a credit average or better.  Assessment: Written report and continuous assessment (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

A valuable opportunity to apply some of the knowledge gained from earlier coursework, ENVI5501 consists of a research project as arranged between you (the student) and an appropriate supervisor. The project topic may contain a field or laboratory component, or may be entirely literature-based. The only requirement is that the topic be of environmental emphasis, meaning that potential topics range from ecotourism to pollution detection and monitoring, erosion to solar power, environmental law to conservation biology. The topic must also be able to be completed within the timeframe of 16 weeks (one semester) of investigation, including the literature survey, sample and data collection, analysis of data and results, and write up of the report.

This unit is not conducted by way of a number of contact hours per week for a semester. Instead, the student will work on the project full-time (aside from other study commitments) in a continuous manner for the entire duration (1 semester). This unit of study is only available to students in the Master programs who have completed 24 credit points of study with a credit average or better, and any student interested in taking ENVI5501 should contact the postgraduate advisor for Environmental Science to discuss their project and for help in selecting an appropriate supervisor.

ENVI5705
Ecolog Principles for Environ Scientists

Credit points: 6  Teacher/Coordinator: Dr Charlotte Taylor  Session: Semester 1  Classes: One 3 hour lecture per week.  Assessment: Assignment, presentation (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

Note: This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.

This unit of study introduces fundamental concepts of modern ecology for environmental scientists so as to provide non-biologically trained persons an understanding of the nomenclature of ecology and the physical parameters represented.

ENVI5707
Energy - Sources, Uses and Alternatives

Credit points: 6  Teacher/Coordinator: Dr Chris Dey  Session: Semester 2  Classes: Two 1 hour lectures per week and field trips per semester.

Assessment: Major essay, assignments, tutorial paper and presentation and short test. (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

Environmental impacts of energy generation and use are addressed in this unit of study. Major topics include discussion of the various energy sources, global energy resources, the economics associated with energy production, the politics and culture that surrounds energy use, and the alternative sources of solar thermal and photovoltaic energy and atmospheric systems. This unit of study includes several field trips to energy utilities and associated energy sites.

ENVI5708
Introduction to Environmental Chemistry

Credit points: 6  Teacher/Coordinator: A/Prof Gavin Birch  Session: Semester 1  Classes: Two 1 hour lectures and one practical per week; one field trip per semester.  Assessment: Assignment, presentation and report (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

Note: This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.

The aim of the course is to introduce students to the major physical and chemical processes that control the concentration and dispersion of chemical pollutants in natural and impacted coastal environments. The course will demonstrate how to use contaminant data effectively and how to judge the quality of chemical data. This knowledge will be used to design and to assess environmental projects, and to judge the magnitude of impact by human activity on marine environments and the risk posed by sedimentary contaminants to benthic animals.

The course aims to provide present and future managers employed in environmental professions with the skills to use data with confidence and to make management decisions knowing the risks inherent in variable data quality.

ENVI5801
Social Science of Environment

Credit points: 6  Teacher/Coordinator: A/Prof P McManus  Session: Semester 1  Classes: 2hrs lectures and 2 hrs tutorials per week plus directed reading.  Assessment: runs for weeks 1-7  Assessment: essay and seminar presentation (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

This unit provides both a conceptual and an empirical foundation for the analysis of relationships between society, the environment and natural resources. Contexts for application of social science concepts to the environment include climate change, water resources management, forest issues and urban environmental quality. Students will deal with both the broad theoretical approaches to the societal analysis of relationships between people and the environment, for example political ecology, and with specific themes including the sociological basis of collective action, property relations, resource tenure, decentralisation, participatory approaches to environmental and natural resource management, and systems of knowledge. The unit pays particular attention to the implications of heterogeneous and competing interests for environmental and natural resource management and explores ways of dealing with diverse stakeholder interests. Empirical material is drawn from various countries, with special emphasis on Southeast Asia and Australia. The aim of the unit is to provide conceptual tools that will be used in other units of study within the program and for application in analysis of resource and environmental management issues faced in real world decision-making contexts.

The unit will draw on the professional experience and agency roles of participants. The unit is taught through a combination of lectures and reading-based seminars.

ENVI5803
Law and the Environment

Credit points: 6  Teacher/Coordinator: Ms Leta Webb  Session: Semester 1  Classes: One 2 hour lecture per week.  Assessment: Essays (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

This unit of study provides an overview of Australian and international law as it pertains to the environment. It looks at a number of environmental issues at the various levels of analysis, policy making,
implementation of policy and dispute resolution. It also provides a broad background to political and economic issues as they related to the legal issues. This unit of study involves lecture material and an essay on policy issues.

ENVIS805
The Urban Environment and Planning
Credit points: 6  Teacher/Coordinator: Dr John Dee  Session: Semester 1 Classes: Eight lectures and eight 2 hour seminars per semester  Assessment: Report and short research paper (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
This unit of study will cover a broad range of topics including the scope of plan making, policy development, and land use control instruments together with principles of sustainable environments, heritage and indigenous development issues. It will endeavour to provide to students with a thorough understanding of how to assess development applications against a range of policy imperatives and conclude by giving students a thorough understanding of the role of the State in urban infrastructure provision (Roads, rail, water, sewers electricity etc.), concepts such as new urbanism, urban consolidation and sustainable urban forms.

ENVIS808
App Ecology for Environmental Scientists
Credit points: 6  Teacher/Coordinator: Dr Clare McArthur  Session: Semester 2 Classes: Three 1 hour lectures per week.  Assessment: Essays and presentations (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
Note: This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program

This unit of study complements ENVIS705, and covers in depth the concerns of modern ecology pertaining to both terrestrial and marine ecosystems. An understanding of the complex issues of invasive species, conservation of biodiversity and ecological management of the environment is provided.

ENVIS809
Environmental Simulation Modelling
Credit points: 6  Teacher/Coordinator: Dr David Chapman  Session: Semester 1 Classes: Six workshops.  Assessment: Report (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
The concept and use of computer modelling in natural resource management is introduced in this unit of study, which is aimed particularly at non-programmers. The unit involves a combination of lecture and applied modelling skills, with students learning practical techniques that can be applied to different environmental issues.

ENVIS903
Sustainable Development
Credit points: 6  Teacher/Coordinator: Dr Alison Gates  Session: Semester 2a Classes: Two 2 hour lectures per week for seven weeks.  Assessment: Essay and presentation (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
This unit of study demonstrates the history and contested understandings of the concept of sustainable development. It applies these concepts to explore important environmental science issues such as population, water management sustainable cities, rural development, industrial ecology, and energy issues. The unit concludes by presenting a range of future scenarios and encouraging students to develop their own vision of sustainability at the global and other scales, and to communicate their means of achieving this sustainability vision.

ENVIS904
Understanding Environmental Uncertainty
Credit points: 6  Teacher/Coordinator: Associate Professor Ross Coleman  Session: Semester 2 Classes: One three hour lecture per week for 8 weeks.  Assessment: Tutorials, oral presentations and written reports (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
No assessment of potential environmental impacts is possible without relevant information about the ecological consequences. This unit is for those without a quantitative ecology background, to explain the need to quantify and what are relevant measures. Describing and understanding uncertainty will be explained in the context of precautionary principles. Issues about measuring biodiversity and the spatial and temporal problems of ecological systems will be introduced. Field experience will also be available (up to two of six hour sessions) subject to weather, tides and available staffing; please note that these sessions are voluntary.

ENVIS905
Management of Parks
Credit points: 6  Teacher/Coordinator: A/Prof Deidre Dragovich  Session: Semester 2 Classes: Lectures 3 hrs for 6 weeks, Practical work 3 hrs for 3 wks, Seminar 2 hrs for 1 wk. Fieldwork 12 hrs (1.5 days), Total / week 7 hrs average  Assessment: One practical report, one assignment (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
This unit of study evaluates the reasons for the existence of parks, including National Parks, recreational spaces and reserves, and examines the applied aspects of their management. Topics covered include conservation, ecotourism, plans of management and their implementation (with particular emphasis on the remediation of the impacts of visitor numbers and erosion), fire control practices and resource management. Students will visit various parks within the Sydney region (local parks and the Royal National Park) that highlight the different issues introduced in lectures and which illustrate the practical measures undertaken to manage the parks in a sustainable fashion.

Textbooks
A Course Handbook will be provided.

GEOG5001
Geographic Information Science A
Credit points: 6  Teacher/Coordinator: Dr David Chapman  Session: Semester 1, Semester 2 Classes: Six lectures plus six workshops.  Assessment: Report (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
This unit of study gives an overview of basic spatial data models, and enables students to understand the use of data from a variety of sources within a geographical information system (GIS). The analysis of spatial data, and its manipulation to address questions appropriate to planning or locational applications, will be addressed, as will the development of thematic maps from diverse data layers.

GEOG5002
Geographic Information Science B
Credit points: 6  Teacher/Coordinator: Dr Eleanor Bruce  Session: Semester 2 Classes: One 2 hour lectures, one 1 hour tutorial, one 3 hour practical per week for 6 weeks.  Assessment: Report, assignment, WebCT quiz (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day
This course will provide the conceptual background to more advanced GIS analysis applications and spatial reasoning methods in the context of contemporary environmental issues. The course is designed to provide an understanding of spatial analysis techniques available within a GIS environment, explore a diversity of both social and physical environmental applications and address emerging issues in GIS research. A range of topics will be introduced including field based capture of spatial information, spatial data structures, surface modelling, visibility analysis, hydrological modeling, network analysis, spatial data uncertainty and social GIS. Conceptual material presented in lectures and tutorial workshops will be placed in an applied context through a series of laboratory and field sessions designed to strengthen practical understanding and awareness of GIS methods.

GEOG5003
Environmental Remote Sensing
Credit points: 6  Teacher/Coordinator: Dr Richard Murphy  Session: Semester 1 Classes: Two one hour lectures and a 4 hour practical per week  Assessment: Assignments, practicals (100%)  Campus: Camperdown/Darlington  Mode of delivery: Normal (lecture/lab/tutorial) Day

The unit of study explores how remote sensing has enabled the science of Earth Observation to become the most valuable and widely-used tool for characterising and quantifying Earth's vegetation, geology and marine ecosystems. The study introduces the physical processes that influence how light interacts with materials of the Earth's surface, which is the basis for Earth Observation. The course uses state-of-the-art, industry-standard software to introduce many different techniques in the analysis and interpretation of remotely sensed data. We will explore different kinds of remotely sensed data, starting from a simple colour photograph to multispectral and hyperspectral data gathered from satellites and aircraft. Earth Observation is becoming an essential skill for anyone interested in the natural environment - skills which are applicable across a wide range of science and environmental disciplines. Starting off simply, you will acquire the skills and knowledge to enable you to map and quantify vegetation and geology using image data acquired in different parts of the world. The objective of this course is to 'demystify' the use of satellite data and to provide the essential theoretical and practical skills to enable students to process data acquired by Earth Observation satellites and aircraft.

**GEOG5004 Environmental Mapping and Monitoring**

**Credit points:** 6  
**Teacher/Coordinator:** A/Prof Peter Cowell  
**Session:** Semester 2  
**Classes:** 2 hours lecture and one three hour practical per week.  
**Assessment:** Assignments (100%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Normal (lecture/lab/tutorial) Day  
**Note:** Department permission required for enrolment.  
**Unit Administration:** WebCT  

The unit introduces methods associated with acquiring data in the field and examines issues associated with application of spatial data to environmental monitoring, terrain mapping and geocomputing. Students will learn both theoretically and practically how environmental data is collected using different remote sensing techniques, (pre)processing methods of integrating data in a GIS environment and the role of spatial data in understanding landscape processes and quantifying environmental change.

**ENGG5001 Greenhouse Gas Mitigation**

**Credit points:** 6  
**Session:** Semester 2  
**Classes:** 2 hour lecture and a tutorial each week.  
**Assessment:** Assignments (50%) and final examination (50%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Normal (lecture/lab/tutorial) Day  
**Note:** Department permission required for enrolment.  
**Unit Administration:** WebCT  

Graduate unit of study designed for environmental engineering students, either M.E. or Grad. Cert. of GHG Mitigation  
**Keywords:** Greenhouse science, energy efficiency, carbon sinks, climate change amelioration  
**Objectives:** To develop an understanding of, the significance of carbon dioxide in climate; the role of increasing fossil fuel energy conversion efficiency; the international framework for carbon sinks; the size, cost, potential and nature of terrestrial and oceanic sinks of carbon; the amelioration of the impacts of climate change.  
**Outcomes:** Students will be able to make recommendations of the most cost effective approach to enterprises meeting carbon dioxide limits expected to be imposed as a result of the Kyoto Protocol.  

**Textbooks:**  

**NTMP5005 Coastal Management**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Ana Villa-Concejo  
**Session:** Semester 2  
**Classes:** Intensive Courses: Fieldschool 80 hours intensive, includes field work and field trips.  
**Prohibitions:** NTMP5005  
**Assessment:** Assignment, presentation and quiz (100%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Block Mode  
**Note:** Department permission required for enrolment.  

This course examines the impacts of human activities on coastal and marine environments. It explores the complex relationships among the ecological and social values of these environments and outlines strategies and tools for their management. This is an intensive course that includes lectures on campus and at the Sydney Institute of Marine Science (SIMS) located in Chowder Bay as well as field trips to sites of interest.

**MARS5001 Coastal Processes and Systems**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Ana Villa-Concejo  
**Session:** Semester 1  
**Classes:** One 2 hour lecture, one 1 hour tutorial, one 3 hour practical per week for 6 weeks  
**Assessment:** Assignment, presentation and quiz (100%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Normal (lecture/lab/tutorial) Day  
**Note:** Department permission required for enrolment.  

This unit of study explains the major coastal processes and systems of relevance to coastal zone management. These include rocky coasts and cliffs; beaches, barriers and dunes; and estuaries and inlets. The interactions between these processes and systems that are of most relevance to coastal management are highlighted, including coastal hazards such as beach erosion, dune migration, bluff retreat, coastal flooding and inlet closure/opening. Anthropogenic impacts are also analysed. The unit is presented in lectures and field excursions, the latter enabling each system to be examined first hand.

**MARS5005 Coastal Management Project**

**Credit points:** 12  
**Teacher/Coordinator:** Dr Ana Villa-Concejo  
**Session:** Semester 1, Semester 2  
**Classes:** Meetings arranged with supervisor  
**Prerequisites:** 24 credit points in coastal/marine science/management with a credit average or better.  
**Assessment:** Written report, presentation and continuous assessment (100%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Normal (lecture/lab/tutorial) Day  
**Note:** Department permission required for enrolment.  

This unit enables students who have completed earlier coursework to design and undertake a research project related to a coastal management topic under the supervision of an appropriate member of staff. The unit is suitable for students who wish to learn how to undertake and complete an original research project, as well as students from industry and government organizations who wish to undertake a project that relates to their professional environment.

**MARS5006 Coral Reefs, Science and Management**

**Credit points:** 6  
**Teacher/Coordinator:** Professor Maria Byrne  
**Session:** Semester 1, Semester 2  
**Classes:** University base delivery: Pre-field trip Tutorial (1 hr), On-line exercises (2 hr) Field based delivery: Lectures (11 x 1 hr), Seminars (4 x 1 hr), Tutorials - individual consultations to develop concepts in research (2 x 1 hr), Independent Research and Oral Presentation (40 hrs)  
**Assessment:** Written assignments: essay and project report; oral presentations; seminar and lecture participation (100%)  
**Campus:** Camperdown/Darlington  
**Mode of delivery:** Field Experience  
**Note:** Department permission required for enrolment.  

This unit provides an in - depth overview of the key biological and non-biological processes that make up coral reef ecosystems. There is a focus on the biogeographic, oceanographic and physiological processes underlying the integrity of global tropical reef systems. The Great Barrier Reef is used as a case study to explore emerging concepts on the influence of natural and anthropogenic processes on the integrity of global reef and lagoon systems. Learning activities will include a series of background lectures and research seminars and tutorials in the development of a major research project. A major aspect of this unit is an independent research project conducted under the supervision of the course instructors. The unit concludes with a series of oral presentations based on student research. Assessment tasks will consist of two essays and a research project report and presentation. The curriculum in this unit is based on current research and a course book will be provided. This is a field intensive course held at One Tree Island Research Station or Heron Island Research Station. The course is ex-Gladstone Queensland and students are expected to make their own way there. This unit will run over 8 days and there will be an additional course fee for food and accommodation, expected to be $600.
This unit provides an in-depth understanding of the key geological, oceanographic, biological and economic factors effecting climate change, energy generation and needs with specific reference to the Great Barrier Reef. Computer prediction of worst and best case scenarios are used to develop management strategies and policy implications. Learning activities will include a series of background lectures and research seminars, and tutorials on the development of a major research project. A major aspect of this unit is an independent research project conducted under the supervision of the course instructors. The unit concludes with a series of oral presentations based on student research. Assessment tasks will consist of two essays and a research project report and presentation. The curriculum in this unit is based on current research and a course book will be provided. This is a field intensive course held at One Tree Island Research Station. The course is ex-Gladstone Queensland and students are expected to make their own way there. The unit will be run over 8 days and there will be an additional course fee for food and accommodation, expected to be $600.

Peace and the Environment

This unit considers the relationship between environmental degradation and human conflict in a range of geographical and cultural settings. Students investigate their personal relationship with 'nature' before exploring the reasons why the environment is being degraded. The unit traces the reasons why individuals in Western industrialised nations have come to see nature as 'other', 'separate' or 'removed' and explores the links between environmental degradation and conflict using the impacts of the anthropogenic greenhouse effect as a case study. We will also highlight some of the contradictions in the concept of "sustainability", and examine new approaches to environmental security, focusing on the issue of peace building through environmental protection at local, regional and internal levels.
17. Environmental Science coursework degrees
18. History and Philosophy of Science coursework degrees

Graduate Certificate in Science (History and Philosophy of Science)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
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<tbody>
<tr>
<td>LG012</td>
<td>Graduate Certificate in Science (History and Philosophy of Science)</td>
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</table>

2 Attendance pattern

The attendance pattern for this course is full time or part time according to candidate choice.

3 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria:

(2) Admission to the Graduate Certificate in Science (History and Philosophy of Science) requires a Bachelor of Science or Bachelor of Medical Science or Bachelor of Arts or Bachelor of Liberal Studies, or any bachelor’s degree from the University of Sydney, or equivalent qualification.

4 Requirements for award

(1) The units of study that may be taken for the course are set out in the table for the History and Philosophy of Science postgraduate coursework table.

5 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Admission to the Graduate Certificate in Science (History and Philosophy of Science) requires a Bachelor of Science or Bachelor of Medical Science or Bachelor of Arts or Bachelor of Liberal Studies, or any bachelor's degree from the University of Sydney, or equivalent qualification.

(3) Candidates who did not complete a major in their undergraduate degree in History and Philosophy of Science, or equivalent at another institution, must complete HSPC4105 as part of their course requirements.

Course overview

The Graduate Certificate in Science (HPS) provides an introduction to the historical, philosophical, and sociological analysis of science. Candidates will be introduced to the main accounts of the nature of science and the methodologies underlying those interpretations.

Course outcomes

Upon completion of the graduate certificate candidates will understand the nature of the discipline of History and Philosophy of Science and will have acquired either basic research skills in history of science or basic skills in the sociological study of science or the basic skills of philosophical argument or some combination of the above, depending on their choice of options.

Students who wish to write a thesis in addition to completing the requirements for the Grad Certificate in Science (HPS) can undertake a Graduate Diploma in Science.

History and Philosophy of Science postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students must complete 24 credit points from the following:</td>
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<tr>
<td>NB: HSPSC4108 is compulsory for and available only to those students who have not completed a major in HPS or equivalent</td>
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<tr>
<td>HSPSC4101 Philosophy of Science</td>
<td>6</td>
<td>P Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
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</tr>
<tr>
<td>HSPSC4102 History of Science</td>
<td>6</td>
<td>P Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
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<tr>
<td>HSPSC4103 Sociology of Science</td>
<td>6</td>
<td>P Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 2</td>
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</tr>
<tr>
<td>HSPSC4104 Recent Topics in HPS</td>
<td>6</td>
<td>P Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.</td>
<td>Note: Department permission required for enrolment</td>
<td>Semester 1</td>
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</tbody>
</table>

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Unit of study descriptions 2011

**HPSC4101**

**Philosophy of Science**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Dean Rickles  
**Session:** Semester 1, Semester 2  
**Classes:** One 2 hour seminar per week, individual consultation.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 500 wd essay (50%) Seminar presentation (50%)  
**Note:** Department permission required for enrolment.

This course explores a range of issues from within the philosophy of physics. We focus on the interpretation of the theories physics provides, examining how these theories might describe our world. The course will cover some basic mathematical literacy, but most technical matters will be introduced in class.

**Textbooks**

Course reader.

**HPSC4102**

**History of Science**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Ofer Gal Taught by HPS staff and guest lecturers.  
**Session:** Semester 1, Semester 2  
**Classes:** One 2 hour seminar per week.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 10xquestions (50%) and 1x5000 wd essay (50%)  
**Note:** Department permission required for enrolment.

This unit explores major episodes in the history of science from the 18th century until the present as well as introducing students to sociological methodology. Special attention is paid to developing practical skills in the history and philosophy of science.

**Textbooks**

Course reader.

**HPSC4103**

**Sociology of Science**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Hans Pols  
**Session:** Semester 2  
**Classes:** One 2 hour seminar per week, individual consultation.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 5000wd essay (50%) Seminar presentation (50%)  
**Note:** Department permission required for enrolment.

This unit explores recent approaches in the social studies of scientific knowledge. Students evaluate various sociological approaches by conducting their own research on topics relevant to their own major thesis. The unit starts with an overview of the development of history and philosophy of science since 1945, to put the emergence of the sociology of science into perspective, before moving on to a selection of readings from the field. Topics will include: the strong program critique of traditional philosophy of science, the sociology of technology, the impact of feminism on the study of science, and the actor-network approach developed by Bruno Latour and Michel Callon.

**Textbooks**

Course reader.

**HPSC4104**

**Recent Topics in HPS**

**Credit points:** 6  
**Teacher/Coordinator:** HPS Staff  
**Session:** Semester 1, Semester 2  
**Classes:** One 2 hour seminar per week, individual consultation.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 5000wd essay (50%) Seminar presentation (50%)  
**Note:** Department permission required for enrolment.

An examination of one area of the contemporary literature in the history and philosophy of science. Special attention will be paid to development of research skills in the history and philosophy of science.

**Textbooks**

Course reader.

**HPSC4105**

**HPS Research Methods**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Hans Pols  
**Session:** Semester 1, Semester 2  
**Classes:** One 2 hour seminar per week.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 10xquestions (50%) and 1x5000 wd essay (50%)  
**Note:** Department permission required for enrolment.

Adopting a seminar style, this unit provides students with an advanced knowledge of the skills necessarily to conduct their own original research in the sociology, history and philosophy of science. Participants will be given a weekly set of core readings, and specialists both from within the Unit and from outside will present their views on the topic in question. This presentation will form the basis for a discussion involving the students, the academic members of the Unit, and invited speakers.

Topics will include: the use of case studies in the philosophy of science, how to conduct oral history projects, institutional history, and sociological methodology.

**Textbooks**

Course reader.

**HPSC4108**

**Core topics: History & Philosophy of Sci**

**Credit points:** 6  
**Teacher/Coordinator:** HPS staff  
**Session:** Semester 1, Semester 2  
**Classes:** One 2 hour seminar per week.  
**Prerequisites:** Available only to students admitted to HPS Honours, Graduate Diploma in Science (History and Philosophy of Science) and Graduate Certificate in Science (History and Philosophy of Science), or by special permission.  
**Assessment:** 10xquestions (50%) and 1x5000 wd essay (50%)  
**Note:** Department permission required for enrolment. Note: Not available to students who have completed a major in History and Philosophy of Science or an equivalent program of study at another institution.

An intensive reading course, supported by discussion seminars, into core topics in HPS.
HPSC4201
HPS Research Project 1

Credit points: 6  Teacher/Coordinator: HPS Staff  Session: Semester 1, Semester 2  Classes: Weekly individual supervision, fortnightly 90-minute research seminars. Prerequisites: Available only to students admitted to HPS Honours and Graduate Diploma or Certificate in Science (History and Philosophy of Science). Prohibitions: HPSC4108, HPSC4107  Assumed knowledge: (HPSC2001 and HPSC2002) or (HPSC2100 and HPSC2101)  Assessment: HPSC4201, HPSC4202, HPSC4203 and HPSC4204 are jointly assessed by a research thesis of up to 15,000 words.

Note: Department permission required for enrolment.

Research into a topic in history, philosophy or sociology of science under the supervision of one or more members of the HPS staff.
19. Microscopy and Microanalysis coursework degrees

Graduate Certificate in Applied Science (Microscopy and Microanalysis)

Graduate Diploma in Applied Science (Microscopy and Microanalysis)

Master of Applied Science (Microscopy and Microanalysis)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG014</td>
<td>Graduate Certificate in Applied Science (Microscopy and Microanalysis)</td>
</tr>
<tr>
<td>LF029</td>
<td>Graduate Diploma in Applied Science (Microscopy and Microanalysis)</td>
</tr>
<tr>
<td>LC041</td>
<td>Master of Applied Science (Microscopy and Microanalysis)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master’s type

The master’s degree in these resolutions is an advanced learning master’s course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Applied Science (Microscopy and Microanalysis)
   (b) Graduate Diploma in Applied Science (Microscopy and Microanalysis)
   (c) Master of Applied Science (Microscopy and Microanalysis)

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.
(2) In exceptional circumstances the Dean may admit applicants to the Graduate Certificate or Graduate Diploma without the following qualifications but whose evidence of experience and achievement is deemed by the Dean to be equivalent.
(3) Admission to the Graduate Certificate in Applied Science (Microscopy and Microanalysis) requires a Bachelor of Science from the University of Sydney, or equivalent qualification.

(4) Admission to the Graduate Diploma in Applied Science (Microscopy and Microanalysis) requires:
   (a) a Bachelor of Science from the University of Sydney, or equivalent qualification; or
   (b) completion of the embedded graduate certificate, from the University of Sydney, or equivalent qualification.

(5) Admission to the Master of Applied Science (Microscopy and Microanalysis) requires:
   (a) a Bachelor of Science, with a credit average, from the University of Sydney or equivalent qualification; or
   (b) a Bachelor of Science with Honours from the University of Sydney, or equivalent qualification; or
   (c) completion of the embedded graduate diploma, from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Microscopy and Microanalysis postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master’s degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.

(2) To qualify for the Graduate Certificate in Applied Science (Microscopy and Microanalysis) a candidate must complete 24 credit points, including:
   (a) 12 credit points of core units of study; and
   (b) 12 credit points of elective units of study.

(3) To qualify for the Graduate Diploma in Applied Science (Microscopy and Microanalysis) a candidate must complete 36 credit points including:
   (a) 12 credit points of core units of study; and
   (b) 24 credit points of elective units of study.

(4) To qualify for the Master of Applied Science (Microscopy and Microanalysis) a candidate must complete 48 credit points, including:
   (a) 24 credit points of core units of study; and
   (b) 24 credit points of elective units of study.

(5) To qualify for the Master of Applied Science (Microscopy and Microanalysis) (Materials Science) a candidate must complete 48 credit points, including:
   (a) 30 credit points of core units of study; and
   (b) 18 credit points of elective units of study.

(6) To qualify for the Master of Applied Science (Microscopy and Microanalysis) (Biomolecular Science) a candidate must complete 48 credit points, including:
   (a) 30 credit points of core units of study; and
   (b) 18 credit points of elective units of study.

7 Specialisations

(1) Candidates have the option of completing a specialisation, however specialisation is not a requirement of this course.
(2) A specialisation requires the completion of 18 credit points chosen from units of study listed in the table for that specialisation. The specialisations available are:
   (a) Biomolecular Science
   (b) Materials Science.
(3) Specialisations will be recorded on the testamur.

8 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after January, 2011 and persons who...
commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Graduate Certificate in Applied Science (Microscopy and Microanalysis), Graduate Diploma in Applied Science (Microscopy and Microanalysis) and Master of Applied Science (Microscopy and Microanalysis) are articulated award courses that provide a professional qualification to microscopists for industry, research, medical science and education. The course develops and enhances skills in specimen preparation, operation of microscopes and analytical equipment, interpretation of microscopical images and microanalysis.

Course outcomes

The aim of this articulated coursework program is to provide students with a coordinated and interdisciplinary approach to microscopy and microanalysis, thus developing expertise to recognise and solve a broad range of problems in life and material sciences. Upon the completion of the graduate certificate, graduates will possess practical and theoretical background in a wide variety of microscopy, microanalysis and specimen preparation techniques for the materials or life sciences. The graduate diploma will add more specialist knowledge in particular areas of interest or relevance. In addition, the Masters will provide experience in designing, carrying out and completing an independent project and report.

Microscopy and Microanalysis coursework degrees

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Degrees: Core Units</td>
<td></td>
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</tr>
<tr>
<td>MCAN5005 Introductory Microscopy &amp; Microanalysis</td>
<td>6</td>
<td></td>
<td></td>
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<td></td>
<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5006 Electron Microscopy</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
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<tr>
<td>Optional Units</td>
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<tr>
<td>Graduate Certificate students must complete 12 credit points from the following</td>
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<tr>
<td>Graduate Diploma and Masters students must complete 24 credit points from the following</td>
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<tr>
<td>MCAN5101 Confocal and Fluorescence Microscopy</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5103 Materials Preparation and Microscopy</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5104 Image Analysis</td>
<td>6</td>
<td></td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5110 Nanostructural Analysis of Materials</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>MCAN5111 Microscopy of Biomolecular Processes</td>
<td>6</td>
<td>A MCAN5101 or MCAN5102 or equivalent</td>
<td></td>
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<td></td>
<td>Semester 2</td>
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<tr>
<td>MCAN5210 Research Methodology</td>
<td>6</td>
<td></td>
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<td>Core for research path, optional for Masters Semester 2</td>
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<tr>
<td>Masters: Additional Core Units (students must enrol in 12 credit points from the following)</td>
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<tr>
<td>NB: Masters students must have successfully completed 24 credit points of units of study before they can enrol in MCAN5201, MCAN5202 or MCAN5203 Masters non-Research Path students may choose from MCAN5201 MCAN5202 MCAN5210 Masters Research Path students must take MCAN5203 MCAN5210</td>
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<tr>
<td>MCAN5201 Project and Report A</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5202 Project and Report B</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>MCAN5203 Project and Report Part C</td>
<td>6</td>
<td>C MCAN5201 Project and Report A MCAN5202 Project and Report B MCAN5210 Research Methodology Research path only</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5210 Research Methodology</td>
<td>6</td>
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<td>Core for research path, optional for Masters Semester 2</td>
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<tr>
<td>Qualifying for the Master of Applied Science (Microscopy and Microanalysis)(Materials Science)</td>
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<tr>
<td>a candidate must complete: 30 credit points of core units of study:</td>
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<tr>
<td>MCAN5005 Introductory Microscopy &amp; Microanalysis</td>
<td>6</td>
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<td>MCAN5006 Electron Microscopy</td>
<td>6</td>
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<td></td>
<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>MCAN5202 Project and Report B</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>MCAN5110 Nanostructural Analysis of Materials</td>
<td>6</td>
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<td>Semester 1 Semester 2</td>
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</tbody>
</table>
Unit of study descriptions 2011

**MCAN5005**
Introduction to Microscopy & Microanalysis

- Credit points: 6
- Teacher/Coordinator: Dr Lilian Soon, Prof Simon Ringer, Dr Zongwen Liu
- Session: Semester 1, Semester 2

This unit provides an introduction to the fundamental principles of optics and the principles of spectroscopy that are commonly used in microscopy and microanalysis. Students are introduced to a variety of imaging and analysis techniques and their role in both biotechnology and the technology of materials, as relevant to laboratory-professionals and researchers. An emphasis on light-optical microscopy and related imaging modes is developed.

**MCAN5006**
Electron Microscopy

- Credit points: 6
- Teacher/Coordinator: Prof. Simon Ringer and (non-academic) Dr Tim Petersen, Assoc. Prof. Filip Braqet
- Session: Semester 1, Semester 2

This unit prepares students, with no prior knowledge of electron microscopy, to become operators of scanning and transmission electron microscopes. Participants are given theoretical and practical understanding of the operation and construction of the microscope and how to obtain the optimum performance from it in routine operation.

**MCAN5010**
Introductory Microscopy & Microanalysis

- Credit points: 6
- Teacher/Coordinator: Dr Tim Petersen
- Session: Semester 1, Semester 2

This unit provides a half hour laboratory practicals, 1 three and a half hour demonstrations. **Assessment:** Flat polished SEM specimen brass (20%), TEM specimen of Si or steel using electropolishing (20%), TEM cross-sectional specimen of a Si based devices using tripod polishing (30%), Quiz (20%), Materials preparation log (10%).

MCAN5104
Image Analysis

- Credit points: 6
- Teacher/Coordinator: Dr Allan S. Jones
- Session: Semester 1, Semester 2

This unit covers the nature and processing of images and the extraction of quantitative data from them. Participants will develop a sound working knowledge of both traditional stereology techniques and modern digital image processing and analysis. Emphasis is placed on an understanding of both the strengths and the limitations that are inherent in image data, and the technology applied to it. Topics in this module include: a general review of image acquisition, filters and transforms, segmentation methods, calibration of hardware for analysis, extraction of simple features from images, advanced feature extraction from images, limitations of measurement and a general overview of stereology, including geometric probability, density estimation and sampling.

**MCAN5103**
Materials Preparation and Microscopy

- Credit points: 6
- Teacher/Coordinator: Prof Simon Ringer, Dr Tim Petersen
- Session: Semester 1, Semester 2

This unit provides students with knowledge and training so that they may explore the relationships between the structure and properties of materials. The unit covers the principles and practice of materials characterisation with an emphasis on techniques for the quantitative determination of the nanoscale structure and chemistry of materials. Topics include diffraction, contrast theory in transmission electron microscopy, analytical electron microscopy, other X-ray, ion beam and scanned probe methodologies.
MCAN5111
Microscopy of Biomolecular Processes
Credit points: 6  Teacher/Coordinator: A/Prof Filip Braet and Dr Lilian Soon
Session: Semester 2  Classes: 10 1hr lectures, 11 hours of tutorials and 12 hours of demonstrations
Assumed knowledge: MCAN5101 or MCAN5102 or equivalent
Assessment: Written research paper (40%) and multiple choice question exam (60%).

This unit covers the principles and practice of advanced microscopy techniques for probing cellular and biomolecular processes. It introduces cloning techniques, GFP-protein transfection into cells, uptake and metabolism of drugs/carcinogens/exogenous material, and localisation of enzymes/proteins associated with cells. Topics may include: FRET, FLIM, TIRFM, super-resolution, immunogoldlabelling and associated cryo-procedures for EM, micro and nano-analytical procedures for biological applications.

MCAN5201
Project and Report A
Credit points: 6  Teacher/Coordinator: A/Prof Filip Braet, Dr Allan Jones, Dr Lilian Soon
Session: Semester 1, Semester 2  Classes: At least forty five hours devoted to a research project.
Assessment: Continuing unit (see MCAN 5202 for assessment details).

Gives students the opportunity to extend the practical work encountered in other modules, and gain skills in carrying out and writing up a research project. Students will choose topics in consultation with members of academic staff and complete project work under supervision. Students also need to enrol in MCAN5202.

MCAN5202
Project and Report B
Credit points: 6  Teacher/Coordinator: A/Prof Filip Braet, Dr Allan Jones, Dr Lilian Soon
Session: Semester 1, Semester 2  Classes: At least forty five hours devoted to a research project.
Assessment: Written report (70%) and an oral presentation (30%).

See MCAN5201.

MCAN5203
Project and Report Part C
Credit points: 6  Teacher/Coordinator: A/Prof Filip Braet, Dr Allan Jones, Dr Lilian Soon
Session: Semester 1, Semester 2  Classes: Research project.
Corequisites: MCAN5201 Project and Report A, MCAN5202 Project and Report B, MCAN5210 Research Methodology
Assessment: Oral presentation (20%), problem solving task (20%), written report in the form of a journal publication (60%).

Note: Research path only

This unit of study is an extension of Project and Report A and B and is only for those students approved for the Research path. Students will further extend their research, as well as formulating a literature review and a research plan and incorporating referee’s comments into the final report. Students also need to enrol in or have completed MCAN5201, MCAN5202 and MCAN5210.

MCAN5210
Research Methodology
Credit points: 6  Teacher/Coordinator: Dr Lilian Soon and Dr July Cairney
Session: Semester 2  Classes: Thirteen hours of lectures, one hour student presentation, four hours of tutorials/practicals.
Assessment: Risk assessment (10%), written research proposal (30%), written experimental plan (30%), worked exercises in data analysis (30%).

Note: Core for research path, optional for Masters

This unit covers the principles and practice of research methodology. Topics included: literature and database searches; citing and referencing; research proposals; safety, risk assessment and ethics; experimental design and documentation; statistics, errors and data analysis; and written and oral communication.
20. Molecular Biotechnology coursework degrees

Graduate Certificate in Applied Science (Molecular Biotechnology)

Graduate Diploma in Applied Science (Molecular Biotechnology)

Master of Applied Science (Molecular Biotechnology)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG015</td>
<td>Graduate Certificate in Applied Science (Molecular Biotech-</td>
</tr>
<tr>
<td></td>
<td>nology)</td>
</tr>
<tr>
<td>LF030</td>
<td>Graduate Diploma in Applied Science (Molecular Biotech-</td>
</tr>
<tr>
<td></td>
<td>nology)</td>
</tr>
<tr>
<td>LC042</td>
<td>Master of Applied Science (Molecular Biotechnology)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice, except the Graduate Certificate in Applied Science (Molecular Biotechnology) which is available part time only.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Applied Science (Molecular Biotechnology)
   (b) Graduate Diploma in Applied Science (Molecular Biotechnology)
   (c) Master of Applied Science (Molecular Biotechnology)

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.
(2) In exceptional circumstances the Dean may admit applicants to the Graduate certificate or Graduate Diploma without the following qualifications, but whose evidence of experience and achievement is deemed to be equivalent.
(3) Admission to the Graduate Certificate in Applied Science (Molecular Biotechnology) requires a bachelor’s degree with credit average results in areas of relevance to Molecular Biotechnology, such as Biochemistry, Biology, Chemistry, Genetics or Molecular Biology from the University of Sydney, or equivalent institution.
(4) Admission to the Graduate Diploma in Applied Science (Molecular Biotechnology) requires:
   (a) a bachelor's degree with credit average results in areas of relevance to Molecular Biotechnology, such as Biochemistry, Biology, Chemistry, Genetics or Molecular Biology from the University of Sydney, or equivalent institution; or
   (b) completion of the embedded graduate certificate in this stream from the University of Sydney without failing any units of study.
(5) Admission to the Master of Applied Science (Molecular Biotechnology) requires:
   (a) a bachelor's degree with credit average results in areas of relevance to Molecular Biotechnology, such as Biochemistry, Biology, Chemistry, Genetics or Molecular Biology from the University of Sydney, or equivalent institution.
   (b) a bachelor’s degree with Honours in a relevant discipline, from the University of Sydney, or equivalent qualification; or
   (c) completion of the embedded graduate diploma in this stream from the University of Sydney with a credit average in either MOBT5101 or MOBT5102.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Molecular Biotechnology postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master's degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.
(2) To qualify for the Graduate Certificate in Applied Science (Molecular Biotechnology) a candidate must complete 24 credit points of core units of study.
(3) To qualify for the Graduate Diploma in Applied Science (Molecular Biotechnology) a candidate must complete 36 credit points of core units of study.
(4) To qualify for the Master of Applied Science (Molecular Biotechnology) coursework pathway a candidate must complete 48 credit points, including:
   (a) 30 credit points of core units of study; and
   (b) 6 credit point elective unit of study.
(5) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.
(6) To qualify for the Master of Applied Science (Molecular Biotechnology) research pathway a candidate must complete 48 credit points, including:
   (a) 42 credit points of core units of study; and
   (b) 6 credit point elective unit of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
Course overview and outcomes
The Graduate Certificate in Applied Science (Molecular Biotechnology), Graduate Diploma in Applied Science (Molecular Biotechnology) and Master of Applied Science (Molecular Biotechnology) are articulated programs intended for industry employees and those experienced in related fields to obtain relevant knowledge in molecular biotechnology. They include teaching in current and innovative areas and provide specialisations with attractive prospects for retraining and employment and for further education.

Molecular Biotechnology postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Degrees: Core Units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOBT5101 Applied Molecular Biotechnology A</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MOBT5102 Applied Molecular Biotechnology B</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

**Masters: Additional Core Units**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETH5201 Ethics and Biotech: Genes and Stem Cells</td>
<td>6</td>
<td>A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BIOL5002 Bioinformatics: Sequences and Genomes</td>
<td>6</td>
<td>C BIOL5001</td>
<td>N BIOL3027, BIOL3927</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MOBT5303 Applied Molecular Biotech C (Project)</td>
<td>6</td>
<td>P MOBT5101 or 5102.</td>
<td>N MOBT5103</td>
<td>This unit of study is only available to students enrolled in the Master of Applied Science (Molecular Biotechnology).</td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
</tbody>
</table>

**Masters: Optional Unit - alternative to MOBT5303**

Enrolment in MOBT5304 requires permission of the Director of the Molecular Biotechnology Program

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOBT5304 Applied Molecular Biotech D (Project)</td>
<td>12</td>
<td>P MOBT5101 or MOBT5102 at Distinction or High Distinction level, with further permission required for enrolment by Director of the Molecular Biotechnology Program.</td>
<td>N MOBT5303</td>
<td>Note: Department permission required for enrolment</td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
</tbody>
</table>

**Graduate Diploma and Masters students must also complete 12 credit points of optional units of study**

These must have the permission of the program coordinator. Most postgraduate units offered by the Faculty of Science are allowable, subject to timetabling, availability and prerequisites. MOBT5303 is, however, only available to Masters Students.

**Optional units of study**

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFRN5107 Analytical Chemistry A</td>
<td>6</td>
<td></td>
<td>N AGCH4007</td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BETH5000 Core Concepts in Bioethics</td>
<td>6</td>
<td>A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BETH5101 Introduction to Ethical Reasoning</td>
<td>6</td>
<td>A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BETH5102 Philosophy of Medicine</td>
<td>6</td>
<td>A three-year degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field - or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>BETH5103 Biomedicine and Society</td>
<td>6</td>
<td>A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BETH5104 Bioethics, Law and Society</td>
<td>6</td>
<td>A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>
Unit of study descriptions 2011

BETHS202 Human and Animal Research Ethics
Credit points: 6 Session: Semester 2
A: Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.
A limited number of students may be granted permission to take this unit during their honours year.

BETHS203 Ethics and Public Health
Credit points: 6 Session: Semester 2
A: Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.
A limited number of students may be granted permission to take this unit during their honours year.

BETHS204 Clinical Ethics
Credit points: 6 Session: Semester 1
A: Assumed knowledge: A Honours or equivalent degree, or other appropriate terminal undergraduate degree (such as a three-year nursing degree) in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.
A limited number of students may be granted permission to take this unit during their honours year.

BETHS205 Ethics and Mental Health
Credit points: 6 Session: Semester 2

BIOL5001 Molecular Genetics and Inheritance
Credit points: 6 Session: Semester 1
Assumed knowledge: Department permission required for enrolment.
Department permission not required for Stream A Bioinformatics students.

COMP5318 Knowledge Discovery and Data Mining
Credit points: 6 Session: Semester 1
A: COMP5138 and familiarity with basic statistics
Note: Department permission required for enrolment in the following sessions: Semester 2

COMP5347 E-Commerce Technology
Credit points: 6 Session: Semester 2
A: COMP5028 Object Oriented Analysis and Design

ENVI5708 Introduction to Environmental Chemistry
Credit points: 6 Session: Semester 1
This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.

MCAN5005 Introductory Microscopy & Microanalysis
Credit points: 6 Session: Semester 1 Semester 2

MCAN5006 Electron Microscopy
Credit points: 6 Session: Semester 1 Semester 2

MCAN5101 Confocal and Fluorescence Microscopy
Credit points: 6 Session: Semester 1 Semester 2

MCAN5103 Materials Preparation and Microscopy
Credit points: 6 Session: Semester 1 Semester 2

MCAN5104 Image Analysis
Credit points: 6 Session: Semester 1 Semester 2

MCAN5110 Nanostructural Analysis of Materials
Credit points: 6 Session: Semester 1 Semester 2

MCAN5210 Research Methodology
Credit points: 6 Session: Semester 2
Core for research path, optional for Masters

STAT5001 Applied Statistics for Bioinformatics
Credit points: 6 Session: Semester 1

VETS8005 Advanced Animal Biotechnology
Credit points: 6 Session: Semester 2
Assumed knowledge: ANSC3005, ANSC3105
This unit is core in the Animal Genetics and Reproduction streams of the Postgraduate Program in Animal Science. It is an elective in the Animal Breeding Management stream.

20. Molecular Biotechnology coursework degrees

BETHS201 Ethics and Biotech: Genes and Stem Cells
Credit points: 6 Session: Semester 1 Classes: 6 x 2hr seminars 1 x 8 hr intensive Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission.
Assessment: 3 Tutorial assessments - 400 wds each (3x 10%); 1 x 1200-1500 wd essay (30%); 1 x 2200 - 2500 wd essay (40%)
Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit introduces students to the broader social/political, ethical/philosophical and legal/regulatory issues that underlie genetics, stem cell research and the emerging biotechnologies. The unit will provide a brief overview of the relevant science before considering scientific, cultural and religious understandings of life and human identity. The second part of the unit will review the political, regulatory and commercial context of biotechnology and the control of information. Students will then review the history of genetics and eugenics and the ethical issues that arise in clinical and population genetics, stem cell research and cloning. The final part of the unit will explore the boundaries of research and knowledge and the issues raised by emerging biotechnologies, such as nanotechnology and proteomics. Learning activities will include an intensive seminar program, small group sessions and reading. Students will be able to concentrate on stem cell research, clinical or molecular genetics or other biotechnologies according to their clinical and scientific interests and experience.

BIOL5002 Bioinformatics: Sequences and Genomes
Credit points: 6 Teacher/Coordinator: Dr Neville Firth Session: Semester 2 Classes: 1 lecture or tutorial per week. 1 three hour practical per fortnight.
Corequisites: BIOL5001 Prohibitions: BIOL3027, BIOL3927 Assessment: Formal exam, projects (100%)
Note: Department permission required for enrolment. Note: Department permission not required for Bioinformatics students. BIOL5001 corequisite not required for Molecular Biotechnology students or Stream B Bioinformatics students.

Bioinformatics - the application of computers to life sciences, and genomics - the study of biology at the genome-wide scale, are revolutionising basic and applied biological sciences in the 21st century. The unit focuses on the application of bioinformatics to the storage, retrieval and analysis of biological information, principally in the form of nucleotide and amino acid sequences. An extensive practical component emphasises the development of hands-on skills in the use of bioinformatics technologies. Students will gain an appreciation of the significance and potential of bioinformatics and genomics in contemporary life sciences; an awareness of the breadth
of bioinformatics resources and applications, including non-sequence-based biological information; skills and experience in the use of a core set of programs and databases for nucleotide and amino acid sequence analysis and phylogenetic reconstruction; a basic understanding of the theoretical foundation and underlying assumptions of the programs, and their relative strengths/limitations; and, competence in the evaluation of output from the programs in appropriate biological context.

MOBT5101
Applied Molecular Biotechnology A
Credit points: 12 Teacher/Coordinator: Dr Neville Firth Session: Semester 1 Classes: 1 two hour lecture and 1 one hour tutorial per week Assessment: Continuous assessment throughout semester, end of semester examination (100%)

This unit of study provides a solid foundation for education and training in applied molecular biotechnology. Classes emphasise molecular biology and genetics combined with essential aspects underscoring modern molecular biotechnology.

Textbooks

MOBT5102
Applied Molecular Biotechnology B
Credit points: 12 Teacher/Coordinator: Dr Stuart Thickett Session: Semester 2 Classes: 1 two-hour lecture and 1 one-hour tutorial per week Assessment: Continuous assessment throughout semester, end of semester examination (100%)

Applied molecular biotechnology B broadens knowledge of and training in applications of the field. Key areas of molecular biology and genetics are combined with studies embracing major issues in modern molecular biotechnology, and are illustrated by examples and case studies.

Textbooks

MOBT5303
Applied Molecular Biotech C (Project)
Credit points: 6 Teacher/Coordinator: A/Prof Kevin Doward Session: Semester 1, Semester 2 Prerequisites: MOBT 5101 or 5102, MOBT 5101 Assessment: Report (60%) and individual/group poster and presentation (40%)

Note: This unit of study is only available to students enrolled in the Master of Applied Science (Molecular Biotechnology).

This unit of study provides students with the opportunity to undertake hands-on experience in the biotechnology industry. This will typically involve placement in an approved industry partner's facility on a part-time basis or a case study project conducted in association with an industry affiliate. Entry to an industry placement is limited by a quota and the availability of facilities and projects. Results obtained in MOBT units of study undertaken in the preceding semester (in theory and practical components) will decide whether students are assigned to placements or case study projects. All students enrolled in this unit are required to complete an industry placement suitability survey which will also be taken into consideration. Assessment is based on a student’s performance in their placement or project, a report, poster and presentation.

MOBT5304
Applied Molecular Biotech D (Project)
Credit points: 12 Teacher/Coordinator: A/Prof. Kevin Doward Session: Semester 1, Semester 2 Classes: 150 hours of research Prerequisites: MOBT5101 or MOBT5102 at Distinction or High Distinction level, with further permission required for enrolment by Director of the Molecular Biotechnology Program. Prohibitions: MOBT5303 Assessment: Report of some 7,000 words
This unit introduces students to research ethics in its social context. Students will first analyse the philosophical underpinnings of the research endeavour, including the justifications for engaging in research, research priorities and research integrity. The unit will then review the history of research and research abuses; the evolution of research ethics and the regulation of research in Australia. The second part of the unit will focus on issues arising in the conduct of research including; the protection of research subjects (both human and animal), consent, confidentiality and risk/benefit analysis.

**BETH5203 Ethics and Public Health**

Credit points: 6 Session: Semester 2 Classes: 3 x 8hr Intensives Assumed knowledge: A three-year undergraduate degree in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1 x exercise 1200 wds (30%); 1 x 1000 wd essay (30%); 1 x 2500 wd essay (50%) Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit will provide students with an overview of the broader philosophical, ethical, sociopolitical and cultural issues that underlie public health and public health research. Students will first review the history of public health and examine the values that underpin health promotion and disease prevention. The second part of the unit will critique the place of facts and values in public health and the construction and use of information, with particular reference to evidence-based-medicine. The third part of the unit will examine cultural, moral and social context of public health including the social determinants of health, the construction of health services, the determination of research priorities and issues relating to human rights and global health. Learning activities will include 2-hour weekly seminars and readings. Assessment tasks will consist of essays and a presentation/project.

**BETH5204 Clinical Ethics**

Credit points: 6 Session: Semester 2 Classes: 3 x 8hr Intensives Assumed knowledge: Honours or equivalent degree, or other appropriate terminal undergraduate degree (such as a three-year nursing degree) in science, medicine, nursing, allied health sciences, philosophy/ethics, sociology/anthropology, history, or other relevant field, or by special permission. Assessment: 1 x 1500 wd case study (30%); 1 x 3000 wd essay (50%); 10 x online tasks 25-400 wd (20%) Note: A limited number of students may be granted permission to take this unit during their honours year.

This unit will provide students with an overview of the broader philosophical, ethical, sociopolitical, and cultural issues that underlie the delivery of healthcare. Students will first explore major conceptual models for ethical reasoning in the clinical context; the design and delivery of clinical ethics consultation; and issues relating to the role of the professions. The second part of the unit will examine the foundations of clinical practice, including consent, competence, veracity, confidentiality, and decision-making. The third part of the unit will consider specific issues and populations within clinical practice, such as the care of vulnerable populations, mental health, and chronic illness. The next part of the unit will focus on skills associated with clinical ethics including analytic and mediation skills. The unit will conclude with reflections on current debates in the Australian healthcare context, particularly issues associated with healthcare rationing. Learning activities will include lectures (in an intensive format), facilitated discussion, case study presentations, and readings. Assessment tasks will consist of essays, a portfolio/journal, and a presentation/project.
Mental health and mental illness are unique in the field of health care and biethics. The very nature of psychiatric disorder and its relationship with prevailing social and cultural factors, in addition to the unique status of the mental health patient, necessitates a specific discourse in biomedical ethics in the area of mental health. This course will provide participants with a broad perspective of issues in biethics applied to mental health and mental illness. Students will examine the history of the psychiatric profession and consider the adequacy of current safeguards against the abuses of power seen in the history of the profession of psychiatry. Other areas considered in the course include the current ethical dilemmas in mental health care, the implications of technological advances in the neurosciences, the philosophical basis of the concept of mental disorder, the relationship between power and the psychiatric profession and the complex relationship between morality, mental health and the law. The course aspires to inform future decision makers in health, public policy, clinical settings and academia in the unique aspects of biomedical ethics in the field of mental health.

BIOL5001  
Molecular Genetics and Inheritance  
Credit points: 6  
Teacher/Coordinator: Dr Jenny Saleeba  
Session: Semester 1, Semester 2  
Classes: 2-3 tutorials per week.  
Assessment: Formal exam, quizzes (100%)  
Note: Department permission required for enrolment.  
Note: Department permission not required for stream A Bioinformatics students.

The fundamentals of inheritance and applications of molecular genetics will be covered. At the completion of the Unit, students will be able to recognize the most common modes of inheritance, understand the fundamentals of linkage analysis, be familiar with common genome structures, be familiar with modes of transmission and mechanisms of change in genetic material, be familiar with the genetic mechanisms behind complex biological systems, understand basic methods in recombinant DNA technology, be adept at applying genetics to solving problems in biology and understand the fundamentals of quantitative and population genetics.

COMP5318  
Knowledge Discovery and Data Mining  
Credit points: 6  
Session: Semester 1, Semester 2  
Classes: (Lec 2hrs & Prac 1hr) per week.  
Assumed knowledge: COMP5318 and familiarity with basic statistics  
Assessment: Quiz (10%), Assignment (15%), Presentation/Seminar (15%), Final Exam (60%)  
Note: Department permission required for enrolment in the following sessions:  
Semester 2.

Knowledge discovery is the process of extracting useful knowledge from data. Data mining is a discipline within knowledge discovery that seeks to facilitate the exploration and analysis of large quantities of data, by automatic or semiautomatic means. This subject provides a practical and technical introduction to knowledge discovery and data mining. Objectives: Topics to be covered include problems of data analysis in databases, discovering patterns in the data, and knowledge interpretation, extraction and visualisation. Also covered are analysis, comparison and usage of various types of machine learning techniques and statistical techniques: clustering, classification, prediction, estimation, affinity grouping, description and scientific visualisation.

COMP5347  
e-Commerce Technology  
Credit points: 6  
Session: Semester 1 Classes: One 2 hour lecture and one 1 hour tutorial per week.  
Assumed knowledge: COMP5028 Object Oriented Analysis and Design  
Assessment: in quizzes(50%), written exam(50%).

This unit will focus on technological advances supporting the development of e-commerce applications and systems. This includes client and server side development of e-commerce applications. AJAX is the core client side technology covered in this course. Both server scripting and server page technology are covered as key server side technology. It will also examine the emerging trend of web services and its role in E-commerce systems. This unit aims at providing both conceptual understanding and hand-on experiences for the technologies covered.

ENVI5708  
Introduction to Environmental Chemistry  
Credit points: 6  
Teacher/Coordinator: A/Prof Gavin Birch  
Session: Semester 1  
Classes: Two 1 hour lectures and one practical per week; one field trip per semester.  
Assessment: Assignment, presentation and report (100%)  
Note: This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.

The aim of the course is to introduce students to the major physical and chemical processes that control the concentration and dispersion of chemical pollutants in marine and impacted coastal environments. The course will demonstrate how to use contaminant data effectively and how to judge the quality of chemical data. This knowledge will be used to design and to assess environmental projects, and to judge the magnitude of impact by human activity on marine environments and the risk posed by sedimentary contaminants to benthic animals. The course aims to provide present and future managers employed in environmental professions with the skills to use data with confidence and to make management decisions knowing the risks inherent in variable data quality.

MCAN5005  
Introductory Microscopy & Microanalysis  
Credit points: 6  
Teacher/Coordinator: Dr Lilian Soon  
Session: Semester 1, Semester 2  
Classes: Nine hour lectures, nine hour practicals, three hour tutorials (3 sessions).  
Assessment: Practical assessment: two reports/portfolios of images from light microscopy and demonstrations (80%). Practical exercises (10%), attendance and participation (10%).

The unit provides an introduction to the fundamental principles of optics and the related principles of spectroscopy that are commonly used in microscopy and microanalysis. Students are introduced to a variety of imaging and analysis techniques and their role in both biotechnology and the technology of materials, as relevant to laboratory-professionals and researchers. An emphasis on light-optical microscopy and related imaging modes is developed.

MCAN5006  
Electron Microscopy  
Credit points: 6  
Teacher/Coordinator: Prof. Simon Ringer and (non-academic) Dr Tim Petersen  
Session: Semester 1, Semester 2  
Classes: Eight groups/two people per group; can vary of 4 one hour, 25 minutes lectures, 4 one hour lectures, 4 two hour practicals (TEMs), 4 one hour practical (SEM), forty minute tutorial, forty five minute practical demonstration.  
Assessment: Practical, analytical exercises in a written report including an annotated image portfolio (30-40 pages with ½ page sized images) (100%)

Trains participants, with no prior knowledge of electron microscopy, to become operators of scanning and transmission electron microscopes. Participants are given theoretical and practical understanding of the operation and construction of the microscope and how to obtain the optimum performance from it in routine operation.

MCAN5101  
Confocal and Fluorescence Microscopy  
Credit points: 6  
Teacher/Coordinator: Assoc. Prof. Filip Braet  
Session: Semester 1, Semester 2  
Classes: Six one hour lectures, thirty hour practicals (5 sessions).  
Assessment: portfolio (60%), exercises (30%), attendance (10%) and participation.

Introduces the general principles of confocal microscopy and training in the use of the confocal microscope. It covers the theory behind confocal microscopy, the instrumentation and its applications. Develops knowledge and skills in specimen preparation for biological and medical applications of optical and confocal microscopes - immunochemistry, cell loading, GFP.

MCAN5103  
Materials Preparation and Microscopy  
Credit points: 6  
Teacher/Coordinator: Prof Simon Ringer, Dr Tim Petersen  
Session: Semester 1, Semester 2  
Classes: Thirty minute lectures, 3 five and a half hour laboratory practicals, 1 three and a half hour demonstrations.
Assessment: Flat polished SEM specimen brass (20%), TEM specimen of Al or steel using electropolishing (20%), TEM cross-sectional specimen of a Si based devices using tripod polishing (30%), Quiz (20%), Materials preparation log (10%).

Gives practical training in the preparation of specimens for electron microscopy from a wide range of materials, including: metals, semiconductors, powders, ceramics and polymers. A comprehensive range of preparation techniques will be covered, including: electropolishing, tripod polishing, ion milling, dimple grinding, ultramicrotomy, cleavage and focused ion beam (FIB). Aspects of transmission electron microscopy specific to inorganic materials, such as crystallography, diffraction patterns and diffraction contrast will be introduced.

MCAN5104
Image Analysis
Credit points: 6 Teacher/Coordinator: Dr Allan S. Jones Session: Semester 1, Semester 2 Classes: 10 one hour lectures, 10 two hour practicals over a one week period. Assessment: Eight practical reports (50%), 1 three part mathematical assignment (20%), 1 in-depth assignment of 2500 word length on a relevant topic (30%).

This unit of study covers the nature and processing of images and the extraction of quantitative data from them. Participants will develop a sound working knowledge of both traditional stereology techniques and modern digital image processing and analysis. Emphasis is placed on an understanding of both the strengths and the limitations that are inherent in image data, and the technology applied to it. Topics in this module include: a general review of image acquisition, filters and transforms, segmentation methods, calibration of hardware for analysis, extraction of simple features from images, advanced feature extraction from images, limitations of measurement and a general overview of stereology, including geometric probability, density estimation and sampling.

MCAN5110
Nanostructural Analysis of Materials
Credit points: 6 Teacher/Coordinator: Prof Simon Ringer, Dr Zongwen Liu Session: Semester 1, Semester 2 Classes: 8 one hour lectures, twenty hours of practicals, two hours of tutorials. Assessment: Written report including portfolio of images, at least 3000 words (100%).

This unit provides students with knowledge and training so that they may explore the relationships between the structure and properties of materials. The unit covers the principles and practice of materials characterisation with an emphasis on techniques for the quantitative determination of the nanoscale structure and chemistry of materials. Topics include diffraction, contrast theory in transmission electron microscopy, analytical electron microscopy, other X-ray, ion beam and scanned probe methodologies.

MCAN5210
Research Methodology
Credit points: 6 Teacher/Coordinator: Dr Lilian Soon and Dr July Cairney Session: Semester 2 Classes: Thirteen hours of lectures, one hour student presentation, four hours of tutorials/practicals. Assessment: Risk assessment (10%), written research proposal (30%), written experimental plan (30%), worked exercises in data analysis (30%).

Note: Core for research path, optional for Masters

This unit covers the principles and practice of research methodology. Topics included: literature and database searches; citing and referencing; research proposals; safety, risk assessment and ethics; experimental design and documentation; statistics, errors and data analysis; and written and oral communication.

STAT5001
Applied Statistics for Bioinformatics
Credit points: 6 Session: Semester 1 Classes: one three hour seminar per week. Assessment: computer exam and lab reports (100%)

This is an introduction to statistics and data analysis used in Bioinformatics and many other areas of Biology. It aims to give an understanding of the concepts and the use of a major scientific statistical package, R. In addition to an introduction to ideas of analysis of data and statistical tests the unit will introduce ideas of simulation in resampling and the methods of clustering and classification of particular importance in Bioinformatics.

VETS8005
Advanced Animal Biotechnology
Credit points: 6 Teacher/Coordinator: Program Academic Supervisor: Prof Chris Moran Instructor: Prof Chris Moran, Dr Imke Tammen, Dr Chris Grupen, Prof Herman Raadsma, A/Prof Peter Williamson Session: Semester 2 Classes: Mode: On-campus or online. On-campus Classes: Lectures, practical classes. Online classes: Online learning activities. Prohibitions: ANSC3005, ANSC3105 Assessment: Online: online participation (15%), quiz (15%), Written assignments (70%)

Note: This unit is core in the Animal Genetics and Reproduction streams of the Postgraduate Program in Animal Science. It is an elective in the Animal Breeding Management stream.

At the end of this unit of study, students will demonstrate an understanding of: the application of biotechnology to animal productivity, disease control, the development of new products from animals and the impact of altered micro-organisms and plants on animals; molecular biology and recombinant DNA technology, with an emphasis on relevance in animals; regulation of gene expression in vivo and in expression systems; monitoring of gene expression including microarrays and proteomics, gene mapping, genomics and gene discovery in contexts relevant to domestic animals; genetic modifications of animals including transgenesis and gene knockout, and methods for achieving these modifications including cloning by nuclear transfer; basic skills in bioinformatics; legal methods of protecting intellectual property; ethics & animal biotechnology.
20. Molecular Biotechnology coursework degrees
Master of Nutrition and Dietetics

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC005</td>
<td>Master of Nutrition and Dietetics</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is full time only.

3 Master's type

The master's degree in these resolutions is a professional master's course.

4 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants based on merit, according to the following admissions criteria:

(2) Admission to the degree requires a bachelor's degree from the University of Sydney, or equivalent qualification, and completion of two semesters of units of study acceptable to the Faculty in each of Biochemistry and Human Physiology.

5 Requirements for award

(1) The units of study that may be taken for the course are set out in the table for the Master of Nutrition and Dietetics.

(2) To qualify for the Master of Nutrition and Dietetics a candidate must complete a prescribed program of 96 credit points, including:

(a) 48 credit points of first year units of study; and

(b) 24 credit points being the dietetics training placement; and

(c) 24 credit points being the Nutrition Research Project.

6 Satisfactory progress

Successful completion of the training placement is a requirement of this course. Candidates who fail the training placement once will be identified as not meeting academic progression requirements and become subject to the Progression provisions of the Coursework Rule. Candidates who fail the training placement a second time will be permanently excluded from the course if they cannot show cause. Any further failures in the training placement will result in automatic and permanent exclusion from the course.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The MNutrDiet is a course designed to survey all aspects of human nutrition, with special emphasis on the needs of dietitians who will be working in Australia. It provides the basic training for hospital and community dietitians and nutritionists and is one of the recognised professional courses for dietitians in Australia. The MNutrDiet provides training in nutrition and dietetics for science graduates who have not completed the accredited degree of Bachelor of Science (Nutrition) or equivalent. The course requires two years of full-time work and study. The first year consists of coursework, lectures, tutorials and practicals. In the second year, one semester is devoted to clinical training and the other semester is spent on a small research project. The dates for this course do not follow the undergraduate academic year. The second year commences in late January.

Course outcomes

Upon completion of the course, the graduate will have a sound knowledge base in nutrition and dietetics, possess the skills to improve nutritional status of individuals, families, and the community at large and to modulate the course of illness with dietetics. The graduate will be skilled in basic research and have a lifelong commitment to the pursuit of excellence in professional conduct. Graduates of the Master of Nutrition and Dietetics are eligible to apply for admission to a research degree (Doctor of Philosophy).

Admission requirements

Applicants must have a degree from a recognised tertiary institution and have completed two semesters of study in Biochemistry and two semesters in Human Physiology. This preparation is required by the Dietitians Association of Australia. Applicants who meet the minimum entry requirements are then ranked according to their academic record and performance in Biochemistry and Human Physiology. Offers of places are dependent upon the ranking of applicants and competition for places.

Course Structure

First year: This is an integrated academic year of teaching, practicals and study. All students take the units of study listed below.

Second year: In the first semester of second year (Jan to June), students undertake a clinical and community and food service training placement, while in the second semester of second year (July to Nov) students carry out a research project.

During the second year all students are required to attend formal lectures at the University on several days. Lectures are compulsory.

The units of study are supervised by a Program Committee in Nutrition and Dietetics, chaired by the Head of School.
Master of Nutrition and Dietetics Table of Units of Study

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTD5601 Nutritional and Food Science</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>NTD5603 Dietary Intake &amp; Nutritional Assessment</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>NTD5604 Dietetics Professional Studies</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>NTD5602 Methods in Nutrition Research</td>
<td>6</td>
<td>Semester 1</td>
</tr>
<tr>
<td>NTD5305 Food Service Management</td>
<td>6</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NTD5307 Medical Nutrition</td>
<td>12</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NTD5608 Public Health and Community Nutrition</td>
<td>6</td>
<td>Semester 2</td>
</tr>
<tr>
<td>NTD5612 Dietetics Training Placement</td>
<td>24</td>
<td>S1 Intensive</td>
</tr>
<tr>
<td>NTD5310 Nutrition Research Project</td>
<td>24</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

Unit of study descriptions 2011

**NTD5601 Nutritional and Food Science**

Credit points: 6 Teacher/Coordinator: Professor Jennie Brand Miller and Associate Professor Samir Samman. Session: Semester 1. Classes: 5 lectures and 1 tutorial per week. Corequisites: NTD5602, NTD5603 and NTD5604. Assessment: One 1 hour quiz (25%); one 3 hour exam (75%).

This unit of study introduces students to different nutrients and the ways in which they are metabolized. The focus in this unit of study is the factors that drive metabolism and the relationship between nutrients and health and/or disease. This unit of study also involves the study of different types of food, the ways they are processed and consumed, their cultural context and nutritional attributes. Aspects of food microbiology and food safety are included.

**Textbooks**

**NTD5503 Dietary Intake & Nutritional Assessment**

Credit points: 6 Teacher/Coordinator: Katherine Jukic. Session: Semester 1. Classes: 3 lectures, 2 workshops per week. Corequisites: NTD5602, NTD5601 and NTD5604. Assessment: Assignment, reports (100%).

Basic concepts in nutritional status; four methods of dietary assessment in individuals, advantages and limitations; validation of dietary methods; nutritional guidelines, targets and recommended dietary intakes; computerized nutrient analysis; limitations of food composition analysis. Behavioural influences on food intake. Nutritional assessment of individuals through clinical examination and commonly used laboratory biochemical tests for nutritional status; methods used to diagnose nutritional deficiencies; specificity, reliability of biochemical tests. Anthropometry and body composition; soft tissue measurement; percent body fat; reference standards; growth standards and percentiles.

**Textbooks**

**NTD5604 Dietetics Professional Studies**

Credit points: 6 Teacher/Coordinator: Dr Janelle Clifford. Session: Semester 1. Classes: 3 lectures and 3 practicals per week. Corequisites: NTD5601, NTD5602 and NTD5603. Assessment: Assignments (100%).

This course is designed to facilitate students to develop professional communication and organization/management skills that will enable them to work effectively as dietitians. Dietitians work in varied environments - within private and government organizations, industry and in private practice; within teams and solitely. Interpersonal, individual and group communication as well as professional, management, organization and general business skills are required in all of these areas. This unit of study introduces communication management and organization theory and skills to dietetics students. Students will have the opportunity to apply these through practical examples in class and by assessment tasks.

**Textbooks**

**NTD5602 Methods in Nutrition Research**

Credit points: 6 Teacher/Coordinator: Associate Professor Margaret Allman-Farinelli. Session: Semester 1. Classes: 3 lectures and 3 hours of tutorial or practical work per week. Corequisites: NTD5601, NTD5503 and NTD5604. Assessment: 2 hour exam (60%); 2 assignments (2x20%).

This unit of study introduces students to both qualitative and quantitative research methods that are essential tools for dietitians. Qualitative methods include the development of questionnaires and conduct of focus groups. Students will learn about study design and methods used in epidemiology to be able to critically analyse the scientific literature of nutrition and dietetics. An introduction to statistical tests with practical computer classes will also be included.

**Textbooks**

**NTD5305 Food Service Management**

Credit points: 6 Teacher/Coordinator: Ms Tara Diversi. Session: Semester 2. Classes: 10 hours practical classes per semester, 4 hours lectures per week. Corequisites: NTD5601, NTD5603, NTD5604 and NTD5602. Assessment: Major Project, Minor Projects and Practical Assessments (100%).

The course introduces students to the principles of Food Service Management ranging from food safety and hygiene to the development of menus for therapeutic diets. The course introduces students to commercial cookery equipment and food preparation principles for both domestic and commerical clinical and community nutrition application.

**NTD5307 Medical Nutrition**

Credit points: 12 Teacher/Coordinator: Ms Natasha Davis. Session: Semester 2. Classes: Lectures average nine hours per week, tutorials average three hours per week, and group case study (approximately 15 hours at university during semester and additional time in group). Corequisites: NTD5503, NTD5601, NTD5602, NTD5604. Assessment: Case study (25%) and formal examination at end of semester (75%).

The broad objectives involve learning the role of nutrition in all aspects of disease from aetiology to medical nutrition therapy. The importance of client focused factors in dietary modification; education and
interpretation of theory for client understanding are key discussion points. This unit of study involves the study of medicine as it relates to nutrition, and the modification of diet and nutrition support of patients with different illnesses and it includes a paediatric program at the Children's Hospital Westmead.

**NTDT5608**

**Public Health and Community Nutrition**

**Credit points:** 6  
**Teacher/Coordinator:** Ms Sue Amanatidis  
**Session:** Semester 2  
**Classes:** 4 hrs lectures and 2 tutorials or prac per week  
**Prerequisites:** NTDT5601, NTDT5503, NTDT5604 and NTDT5602  
**Corequisites:** NTDT5305 and NTDT5307  
**Assessment:** 2 hr exam (50%); 2 assignments (50%)

This unit of study covers several topics, which include: Introduction to health promotion, which introduces students to planning, implementing and evaluating nutrition health promotion programs for various population groups in the community. It covers principles of health promotion, conducting needs assessments, effective nutrition promotion strategies, and program evaluation; Nutrition and chronic disease, which examines the relationship and evidence for the role and etiology of chronic diseases such as cancer, heart disease, hypertension and diabetes. It also investigates the current nutrition policies and guidelines aimed at preventing these diseases; Food habits which covers theories of food habits and examines food habits of various population groups such as children, adolescents, older people and vulnerable groups.

**Textbooks**


**NTDT5612**

**Dietetics Training Placement**

**Credit points:** 24  
**Teacher/Coordinator:** Ms Margaret Nicholson  
**Session:** S1 Intensive  
**Classes:** 20 weeks full-time placement  
**Prerequisites:** NTDT5601, NTDT5503, NTDT5604, NTDT5602, NTDT5305, NTDT5307, NTDT5608  
**Assessment:** Pass or fail at completion  
**Note:** Placements commence in January

During twenty weeks students develop further practice-based skills in each of three setting of work; hospital, community/public health and food service management. The semester runs for 20 weeks as prescribed in the requirements of the professional accrediting body. This means semester starts in January.

**Textbooks**

Placement manual provided by the University.

**NTDT5310**

**Nutrition Research Project**

**Credit points:** 24  
**Teacher/Coordinator:** A/Prof Samir Samman  
**Session:** Semester 2  
**Classes:** Tutorials two hours per week, supervised research experience  
**Assessment:** Two assignments, presentation, report (100%)

During the research semester each student has a research supervisor. Research projects can include small surveys, simple bench work, supervised hospital assignments or library searches, and are carried out in the University or with an external supervisor. Students also attend nutrition seminars.
21. Nutrition and Dietetics coursework degree
This chapter sets out the requirements for postgraduate degrees offered in the Faculty of Science in the area of Physics. Degrees offered in the area of Physics are listed in the following order:

- Medical Physics
- Nuclear Science
- Photonics and Optical Science

Graduate Diploma in Medical Physics

Master of Medical Physics

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
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<tr>
<th>Code</th>
<th>Course title</th>
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<tr>
<td>LF034</td>
<td>Graduate Diploma in Medical Physics</td>
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<tr>
<td>LC046</td>
<td>Master of Medical Physics</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is a professional master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
(a) Graduate Diploma in Medical Physics
(b) Master of Medical Physics

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.

(2) Admission to the Graduate Diploma in Medical Physics requires a bachelor's degree in Science or Engineering from the University of Sydney, or equivalent qualification, provided the applicant has a major in physics or equivalent.

(3) Admission to the Master of Medical Physics requires:
(a) a bachelor's degree in Science or Engineering with a minimum credit average from the University of Sydney, or equivalent qualification, provided the applicant has a major in physics or equivalent or
(b) completion of the requirements for the Graduate Diploma in Medical Physics from the University of Sydney or equivalent qualification with a grade point average of 3.25/5 or better.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the Medical Physics postgraduate coursework degrees table.

(2) To qualify for the Graduate Diploma in Medical Physics a candidate must complete 48 credit points of core units of study.

(3) To qualify for the Master of Medical Physics a candidate must complete 72 credit points of core units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Master of Medical Physics (MMedPhys) and the Graduate Diploma in Medical Physics (GradDipMedPhys) are the entry level qualifications for trainee medical physicists. Physical scientists apply their knowledge and training in many different areas of medicine including the treatment of cancer, medical imaging, physiological monitoring and medical electronics.

Course outcomes

The MMedPhys and GradDipMedPhys provide the entry level qualification for trainee medical physicists working in a hospital medical physics department. Both courses are accredited by the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM). Graduates of these courses will qualify to apply for trainee medical physicist positions in hospitals in Australia and New Zealand. Medical physicists employed in hospitals often undertake research studies part-time for the higher Doctor of Philosophy (PhD) research degree.
Medical Physics postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Degrees: Core Units</td>
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<tr>
<td>PHYS5002 Anatomy &amp; Biol Essentials for Physicists</td>
<td>6</td>
<td></td>
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<td>Semester 1</td>
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<tr>
<td>PHYS5029 Nuclear Medicine Physics</td>
<td>6</td>
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<tr>
<td>PHYS5011 Nuclear Physics</td>
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<td>Semester 1</td>
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<tr>
<td>PHYS5012 Radiation Physics and Dosimetry</td>
<td>6</td>
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<td></td>
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<td>Semester 1</td>
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<tr>
<td>PHYS5005 Radiotherapy Physics</td>
<td>6</td>
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<tr>
<td>PHYS5006 Medical Imaging Physics</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>PHYS5018 Health Physics and Radiation Protection</td>
<td>6</td>
<td></td>
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<td>Semester 2</td>
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<tr>
<td>PHYS5020 Computation and Image Processing</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>Masters: Additional Core Unit</td>
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</tr>
<tr>
<td>PHYS5019 Research Methodology and Project</td>
<td>24</td>
<td>P Successful completion of the eight coursework units of the postgraduate coursework Masters degree for which the student is enrolled, equivalent to completion of the requirements for award of the Graduate Diploma.</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
</tbody>
</table>

Unit of study descriptions 2010

PHYS5002 Anatomy & Biol Essentials for Physicists
Credit points: 6  Session: Semester 1  Classes: One 2 hour lecture and one 1 hour practical per week. Assessment: Assignments, written exam (100%)

In this unit normally undertaken as part of the Masters of Medical Physics degree or the Graduate Diploma in Medical Physics, the concepts of the structure of the human cell and tissues are introduced. The organisation and function of each of the major organ systems that constitute the human body are covered. Examples of pathology of diseases commonly encountered in the practice of medical physics will be included. Basic concepts in physiological modeling are introduced.

PHYS5029 Nuclear Medicine Physics
Credit points: 6  Session: Semester 1  Classes: One 2-hour lecture and one 1-hour practical per week. Assessment: Assignments, written exam (100%)

This unit of study will introduce the student to the physics associated with diagnostic and therapeutic applications in Nuclear Medicine. This will cover the use of radionuclides for imaging in single photon (SPECT) and positron emission tomography (PET), radiation and the patient, tomographic image reconstruction and kinetic analysis of imaging data. Internal radionuclide dosimetry will be addressed using standard (MIRD) models as well as by voxel-based estimators.

PHYS5005 Radiotherapy Physics
Credit points: 6  Session: Semester 2  Classes: One 2-hour lecture and one 1-hour practical per week. Assessment: Assignments, written exam (100%)

In this unit normally undertaken as part of the Masters of Medical Physics degree or the Graduate Diploma in Medical Physics, both theoretical and practical aspects of the major topics in radiotherapy physics are covered. These topics include radiation beam production and modification, calibration and characterisation, principles of treatment planning, dose calculation and reporting, and the physics of brachytherapy.

PHYS5006 Medical Imaging Physics
Credit points: 6  Session: Semester 2  Classes: One 2-hour lecture and one 1-hour practical per week. Assessment: Assignments, written exam (100%)

In this unit normally undertaken as part of the Masters of Medical Physics degree or the Graduate Diploma in Medical Physics, the physical principles underlying the science of imaging in diagnostic radiology, ultrasound, magnetic resonance imaging and functional imaging modalities are covered.

PHYS5011 Nuclear Physics
Credit points: 6  Session: Semester 1  Classes: One 3-hour lecture per week. Assessment: Assignments, written exam (100%)

This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science or the Master of Medical Physics or the Graduate Diploma in Medical Physics. Nuclear properties, nuclear models, nuclear decays (gamma, beta, alpha and heavy ion decay), natural radioactivity and radioactive decay series, artificial radioactivity, nuclear reactions (including high energy nuclear particle induced spallation reactions), nuclear fission (spontaneous and induced fission) and nuclear fusion are covered.

PHYS5012 Radiation Physics and Dosimetry
Credit points: 6  Session: Semester 2  Classes: One 2-hour lecture and one 1-hour practical per week. Assessment: Assignments, written exam (100%)

This unit is normally undertaken as part of the Master of Medical Physics degree or the Graduate Diploma in Medical Physics or the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. Sources of radiation, interaction of radiation with matter, physical, chemical and biological effects of radiation in human tissue, physical principles of dosimetry, internal and external dosimetry, radiation units and measurement are covered.

PHYS5018 Health Physics and Radiation Protection
Credit points: 6  Session: Semester 2  Classes: One 2-hour lecture and one 1-hour practical per week. Assessment: Assignments, written exam (100%)
This unit is normally undertaken as part of the Master of Medical Physics degree or in the Graduate Diploma in Medical Physics or the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. Physical and biological aspects of the safe use of ionising radiation, physical principles and underlying shielding design instrumentation, international and legislative requirements for radiation protection are covered. Factors affecting dose response of tissue are considered along with models describing characteristic behaviour.

PHYS5019
Research Methodology and Project
Credit points: 24  Session: Semester 1, Semester 2  Prerequisites: Successful completion of the eight coursework units of the postgraduate coursework Masters degree for which the student is enrolled, equivalent to completion of the requirements for award of the Graduate Diploma.  Assessment: Report, research seminar (100%)
Note: Department permission required for enrolment.

In this unit a research project is undertaken. The topic of the project will be determined in consultation with the course coordinator. In addition, the processes involved in conducting various forms of research, basic data analysis and interpretation, research writing and presentation skills are covered.

PHYS5020
Computation and Image Processing
Credit points: 6  Session: Semester 2  Classes: One 2 hour lecture and one 1 hour practical per week.  Assessment: Assignments, written exam (100%)

In this unit normally undertaken as part of the Masters of Medical Physics degree or the Graduate Diploma in Medical Physics, Monte Carlo modelling of radiation transport is covered, along with the theory of image formation, concepts of computing, numerical methods and image processing, including techniques such as enhancement, registration, fusion and 3D reconstruction.

Graduate Diploma in Applied Nuclear Science

Master of Applied Nuclear Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

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<td>LF039</td>
<td>Graduate Diploma in Applied Nuclear Science</td>
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<tr>
<td>LC051</td>
<td>Master of Applied Nuclear Science</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master’s type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Diploma in Applied Nuclear Science
   (b) Master of Applied Nuclear Science

5 Admission to candidature

(1) With approval from the Dean available places will be offered to qualified applicants according to the following admissions criteria:

(2) Admission to the Graduate Diploma in Applied Nuclear Science requires:
   (a) a bachelor's degree in Science or Engineering from the University of Sydney or equivalent qualification, provided the applicant has achieved a major in Physics, or equivalent.
   (b) In exceptional circumstances the Dean may admit applicants to the Graduate Diploma without the listed qualifications but whose evidence of experience and achievement is deemed by the Dean to be equivalent.

(3) Admission to the Master of Applied Nuclear Science requires:
   (a) a bachelor's degree in Science with a physics major or a bachelor's degree in Engineering, with a credit average or
   (b) a bachelor's degree with honours in Science or Engineering from the University of Sydney or equivalent qualification, provided the applicant has achieved a major in Physics, or equivalent; or
   (c) completion of the requirements of an embedded graduate diploma or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the Applied Nuclear Science postgraduate coursework degree table.

(2) To qualify for the award of the Graduate Diploma in Applied Nuclear Science, a candidate must complete 48 credit points of core units of study.
7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Master of Applied Nuclear Science (MAppNucSci) and the Graduate Diploma in Applied Nuclear Science (GradDipApplNucSci) are designed to meet the growing needs both within Australia and globally for individuals with a postgraduate education and training in nuclear science and technology. Both award courses build upon a Physics major and provide a level and type of specialisation that is not available at the undergraduate level.

Candidates will normally commence their study in Semester 1, except with the permission of the Dean.

Course outcomes

Graduates of the MAppNucSci and GradDipApplNucSci degrees will have gained a comprehensive understanding of nuclear science and its applications. Graduates of the Master’s program will have gained, in addition, research experience. Both courses will enable students to gain entry into the specialist field of nuclear science or into occupations where knowledge of this field is desirable. It will also provide an opportunity for those already working in the field of nuclear science to gain further experience in this field of science and technology.

Graduates of the Master of Applied Nuclear Science are eligible to apply for admission to a research degree (PhD).

Nuclear Science postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
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<tr>
<td>PHYS5011 Nuclear Physics</td>
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<tr>
<td>PHYS5012 Radiation Physics and Dosimetry</td>
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<tr>
<td>PHYS5013 Nuclear Instrumentation</td>
<td>6</td>
<td></td>
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<td>Semester 1</td>
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<tr>
<td>PHYS5014 Applications of Nuclear Physics</td>
<td>6</td>
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<td>Semester 1</td>
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<tr>
<td>PHYS5015 Reactor Physics and Systems</td>
<td>6 P PHYS5011 and PHYS5013</td>
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<td>Semester 2</td>
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<tr>
<td>PHYS5016 Nuclear Chemistry and Nuclear Fuel Cycle</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>PHYS5017 Energy Options and Environment</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>PHYS5018 Health Physics and Radiation Protection</td>
<td>6</td>
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<td>Semester 2</td>
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<tr>
<td>Masters: Additional Core Unit</td>
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<tr>
<td>PHYS5019 Research Methodology and Project</td>
<td>24</td>
<td>P Successful completion of the eight coursework units of the postgraduate coursework Masters degree for which the student is enrolled, equivalent to completion of the requirements for award of the Graduate Diploma.</td>
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<td>Semester 1</td>
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<td>Note: Department permission required for enrolment</td>
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<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

Unit of study descriptions 2011

PHYS5011 Nuclear Physics
Credit points: 6  Session: Semester 1  Classes: One 3 hour lecture per week  Assessment: Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science or the Master of Medical Physics or the Graduate Diploma in Medical Physics. Nuclear properties, nuclear models, nuclear decays (gamma, beta, alpha and heavy ion decay), natural radioactivity and radioactive decay series, artificial radioactivity, nuclear reactions (including high energy nuclear particle induced spallation reactions), nuclear fission (spontaneous and induced fission) and nuclear fusion are covered.

PHYS5012 Radiation Physics and Dosimetry
Credit points: 6  Session: Semester 1  Classes: One 2 hour lecture and one 1 hour practical per week  Assessment: Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Medical Physics degree or the Graduate Diploma in Medical Physics or the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. Sources of radiation, interaction of radiation with matter, physical, chemical and biological effects of radiation in human tissue, physical principles of dosimetry, internal and external dosimetry, radiation units and measurement are covered.

PHYS5013 Nuclear Instrumentation
Credit points: 6  Session: Semester 1  Classes: One 2 hour lecture and one 1 hour practical per week  Assessment: Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. It covers principles and operation of nuclear particle detectors, gas-filled detectors (ionisation chambers, Geiger counter, proportional counter), scintillation detectors (organic and inorganic scintillators), solid state detectors (Surface barrier detectors, GeLi detectors, Pin diodes), nuclear track detectors, neutron detectors (BF3, He-3, He-4...
detectors, fission counters), nuclear data acquisition methods and data analysis (counting statistics and error prediction).

**PHYS5014 Applications of Nuclear Physics**

**Credit points:** 6  **Session:** Semester 1  **Classes:** One 2 hour lecture and one 1 hour practical per week.  **Assessment:** Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. It presents the diverse range of applications of nuclear physics, such as nuclear medicine (including hadron therapy), environmental science, geochronology and radiocarbon dating, biogeochemistry, Hydrology, and applications of radioisotopes in agriculture and industry. Neutron activation analysis and applications of neutron scattering in material space, accelerator technology in research (e.g., accelerator mass spectrometry, ion beam analysis) and issues related to nuclear safeguards are also covered.

**PHYS5015 Reactor Physics and Systems**

**Credit points:** 6  **Session:** Semester 2  **Classes:** One 2 hour lecture and one 1 hour practical per week.  **Prerequisites:** PHYS5011 and PHYS5013  **Assessment:** Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. It presents the following: physical properties of neutrons, interaction of neutrons with matter, neutron cross-sections, nuclear fission, diffusion of neutrons, neutron moderation, neutron chain reacting systems, thermal and fast reactors, nuclear reactor dynamics, production and transmutation of radionuclides.

**PHYS5016 Nuclear Chemistry and Nuclear Fuel Cycle**

**Credit points:** 6  **Session:** Semester 2  **Classes:** One 2 hour lecture and one 1 hour practical per week.  **Assessment:** Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. It covers nuclear fuel materials, reactor fuel production, properties of fuel element materials, processing of spent fuel, nuclear waste disposal and transmutation methods, liquid waste, gaseous waste and solid waste.

**PHYS5017 Energy Options and Environment**

**Credit points:** 6  **Session:** Semester 2  **Classes:** One 2 hour lecture and one 1 hour tutorial per week.  **Assessment:** Major essay, assignments, tutorial paper and presentation, and short test (100%)  
This unit is normally undertaken as part of the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. It covers the following: fossil fuels (coal, oil, gas); renewable energies (solar, wind, wave, biomass, geothermal); nuclear electricity (fission); relative advantages; environmental impact and economical viability.

**PHYS5018 Health Physics and Radiation Protection**

**Credit points:** 6  **Session:** Semester 2  **Classes:** One 2 hour lecture and one 1 hour practical per week.  **Assessment:** Assignments, written exam (100%)  
This unit is normally undertaken as part of the Master of Medical Physics degree or in the Graduate Diploma in Medical Physics or the Master of Applied Nuclear Science or the Graduate Diploma in Applied Nuclear Science. Physical and biological aspects of the safe use of ionising radiation, physical principles and underlying shielding design instrumentation, international and legislative requirements for radiation protection are covered. Factors affecting dose response of tissue are considered along with models describing characteristic behaviour.
Graduate Diploma in Photonics and Optical Science

Master of Photonics and Optical Science

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF041</td>
<td>Graduate Diploma in Photonics and Optical Science</td>
</tr>
<tr>
<td>LC053</td>
<td>Master of Photonics and Optical Science</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master’s type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Diploma in Photonics and Optical Science
   (b) Master of Photonics and Optical Science

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidacy

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria:

(2) Admission to the Graduate Diploma in Photonics and Optical Science requires:
   (a) a bachelor's degree in Science or Engineering from the University of Sydney or equivalent qualification, provided the applicant has achieved a major in Physics, or equivalent.
   (b) In exceptional circumstances the Dean may admit applicants to the Graduate Diploma without the listed qualifications but whose evidence of experience and achievement is deemed by the Dean to be equivalent.

(3) Admission to the Master of Photonics and Optical Science requires:
   (a) a bachelor's degree in Science or Engineering, with a credit average; or
   (b) a bachelor's degree with honours in Science or Engineering from the University of Sydney or equivalent qualification, provided the applicant has achieved a major in Physics or equivalent; or
   (c) completion of the requirements of an embedded graduate diploma or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the Photonics and Optical Science postgraduate coursework degree table.

(2) To qualify for the Graduate Diploma in Photonics and Optical Science a candidate must complete 48 credit points of core units of study.

(3) To qualify for the Master of Photonics and Optical Science a candidate must complete 72 credit points of core units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

The Graduate Diploma in Photonics and Optical Science and the Master of Photonics and Optical Science are articulated coursework programs that allow a degree of flexibility in the depth at which studies are undertaken and the choice of subjects studied.

This section sets out the requirements for coursework postgraduate degrees offered in the Faculty of Science in the area of Photonics and Optical Science. A comprehensive guide to the requirements and units of study of the coursework degrees is listed.

The information in this section is in summary form and is subordinate to the provisions of the relevant degree Resolutions, collected variously in at the end of this chapter, following the unit of study descriptions, or in the University of Sydney Calendar. The Calendar is available for sale at the Student Centre, for viewing at the faculty office or the Library, or on the Web at: www.usyd.edu.au/publications/calendar.

Course overview

The Master of Photonics and Optical Science is taken over three semesters of full-time study with two of those semesters comprised of coursework and one semester of study towards a research project carried out under the supervision of academic staff in the School of Physics. Each semester of coursework comprises four 6 unit courses in the following subject areas:

- Optical Instrumentation and Imaging
- Guided wave optics and communications applications
- Lasers and optical devices
- Optical materials and methods
- Physical and nonlinear optics
- Quantum optics and nanophotonics
- Biophotonics and microscopy
- Optics in industry

Course outcomes

This course provides a professional level of education in optics and photonics with training applicable to employment in communications, optical and scientific instruments and optical techniques in biology and medical applications. The course is suitable both for those training for senior positions in optical industries or as preparation for a PhD.
Photonics and Optical Science postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma and Masters: Core Units</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>PHYS5021 Optical Instrumentation and Imaging</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics.</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS5022 Optical Materials and Methods</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS5024 Optical Sources and Detectors</td>
<td>6</td>
<td>P Bachelor’s degree in Science or Engineering, with a major in Physics, or equivalent.</td>
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<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS5025 Biophotonics and Microscopy</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.</td>
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<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PHYS5026 Physical and Nonlinear Optics</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PHYS5027 Quantum Optics and Nanophotonics</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.</td>
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<td>Semester 2</td>
</tr>
<tr>
<td>PHYS5028 Optics in Industry</td>
<td>6</td>
<td>A Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.</td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>Masters: Additional Core Unit</td>
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<td></td>
</tr>
<tr>
<td>PHYS5019 Research Methodology and Project</td>
<td>24</td>
<td>P Successful completion of the eight coursework units of the postgraduate coursework Masters degree for which the student is enrolled, equivalent to completion of the requirements for award of the Graduate Diploma.</td>
<td>Assessment: Report, research seminar (100%)</td>
<td></td>
<td></td>
<td>Semester 1, Semester 2</td>
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</tbody>
</table>

Note: Department permission required for enrolment.

In this unit a research project is undertaken. The topic of the project will be determined in consultation with the course coordinator. In addition, the processes involved in conducting various forms of research, basic data analysis and interpretation, research writing and presentation skills are covered.

**PHYS5021 Optical Instrumentation and Imaging**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Gordon Robertson  
**Session:** Semester 2  
**Classes:** Two of lectures, 10 two hour practicals.  
**Assumed knowledge:** Bachelor’s degree in Science or Engineering, with a major in physics.  
**Assessment:** One 2-hour exam, tutorial papers, practical reports (100%)  

Optical instrumentation covers the basics of geometrical optics before moving on to a detailed overview of the principles and practice of optical design principles of image formation, lenses and mirrors, aberrations and tolerancing. The course will cover different design examples - collimators, cameras, objective lenses. Students will gain experience in working with optical design software. The Imaging component of the course provides training in the mathematical techniques used to analyse an image recorded by an electronic camera to recover information of interest. Students will be given an overview of image processing principles, and learn about processing in the spatial and frequency domains. The course covers noise removal, tomography and image restoration techniques. This section of the course will be complemented by laboratory sessions in which students manipulate images using one of the data processing packages (IDL, Matlab).

**PHYS5022 Optical Materials and Methods**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Maryanne Large  
**Session:** Semester 1  
**Classes:** Two hours of lectures and a one hour practical per week.  
**Assumed knowledge:** Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent.  
**Assessment:** One 2-hour examination, practical reports, and assignments (100%)  

This unit of study introduces students to the properties and use of modern optical materials such as glasses, semiconductors, polymers and liquid crystals. We analyse the effect of electronic and crystallographic properties on the generation and propagation of light in these materials. We study fundamental methods for producing modern optical materials, which includes techniques to fabricate optically active glasses, to grow bulk semiconductor crystals and compound semiconductor heterostructures, and to deposit organic semiconducting polymers.

We will discuss advanced concepts such as generating abrupt interfaces, p-i-n junctions and doping profiles that are important concepts in the context of band gap engineering and low-dimensional semiconductor heterostructures, such as Quantum Wells or Quantum Dots. Students are then introduced to methods of micro-fabricating optical devices from these materials, including patterning by conventional optical lithography and novel Nanoimprint lithography, structuring by wet and dry etching and deposition of electrical contacts. The properties and fabrication techniques for optical thin films will also be covered.

Students will receive training in the use of modern microfabrication tools (e.g. electron beam lithography, reactive ion etching, thin film deposition).

**PHYS5024 Optical Sources and Detectors**

**Credit points:** 6  
**Teacher/Coordinator:** Dr David Moss  
**Session:** Semester 1  
**Classes:** Two hours of lectures and a one hour tutorial/practical per week averaged over the semester.  
**Prerequisites:** Bachelor’s degree in Science or Engineering, with a major in Physics, or equivalent.  
**Assessment:** One 2-hour examination, and two assignments (100%)  

This unit of study provides a detailed overview of sources and detectors of optical radiation as well as optical amplifiers. Lasers, light emitting diodes, optical amplifiers and other sources of radiation are covered. Students will study the principles of operation and application of a range of different lasers including diode lasers, fibre lasers and solid state diode-pumped lasers; modeling and short pulse lasers and high power gas lasers. The properties of semiconductor lasers, amplifiers and detectors will be explained in terms of the materials properties of semiconductors.

**PHYS5025 Biophotonics and Microscopy**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Boris Kuhlmey  
**Session:** Semester 2  
**Classes:** One 1-hour lecture per week and an average of 0.5 hour tutorials
and 1.5 practical hours per week over the semester. **Assumed knowledge:** Bachelor's degree in Science or Engineering, with a major in physics, or equivalent. **Assessment:** One 2-hour examination, three assignments, and practical assessment (100%) 

Biophotonics is the use of optical techniques to probe living tissue either via imaging or spectral analysis. In this course we cover the basics of imaging in tissue and cover the principles of the main microscopy techniques: fluorescence imaging, confocal microscopy, two-photon microscopy, optical coherence tomography and endoscopic imaging. Using EMU facilities, students will be provided with practical training in these techniques. Approaches to biochemical detection, Raman spectroscopy, surface plasmon sensors will be covered. The course will also include lectures on laser tweezers and microfluidics, both of which are used for analyzing small biological samples.

**PHYS5026**  
**Physical and Nonlinear Optics**  
**Credit points:** 6  
**Teacher/Coordinator:** Professor Martijn de Sterke  
**Session:** Semester 1  
**Classes:** Two hours of lectures and one hour tutorial, alternated with 3-5 hours laboratory work per week. **Assumed knowledge:** Bachelor’s degree in Science or Engineering, with a major in physics, or equivalent. **Assessment:** One 3-hour examination, assignments, and laboratory work (100%)  

This unit of study provides a rigorous introduction to physical optics and to nonlinear optics. Physical optics includes polarization, coherence, diffraction, Fourier properties of lenses and optical systems, spatial filtering and holography. Nonlinear optics starts with nonlinear polarization and covers Chi-2 effects (electro optic effect, second harmonic generation) and Chi-3 effects (self and cross phase modulation). Nonlinear wave propagation is examined by solving the nonlinear Schrodinger equation, which elucidates a range of physical phenomena including four wave mixing and soliton generation and their impact on communications systems.  

Textbooks  
"Light and Matter" by Yehuda Band (Wiley, 2006)

**PHYS5027**  
**Quantum Optics and Nanophotonics**  
**Credit points:** 6  
**Teacher/Coordinator:** A/Prof. Stephen Bartlett  
**Session:** Semester 2  
**Classes:** One 1-hour lecture per week, and two hours of tutorials per week. **Assumed knowledge:** Bachelor's degree in Science or Engineering, with a major in physics, or equivalent. **Assessment:** One 2-hour examination and assignments (100%)  

Quantum optics will introduce the quantization of light and photon statistics, and cover a range of topics of current interest including intensity interferometry, quantum cryptography, optical quantum computing and atom optics including Bose Einstein condensates and atom lasers. Emphasis will be on qualitative understanding rather than rigorous mathematical descriptions.  

Nanophotonics covers light propagation through materials with sub-wavelength structuring so light is guided not only by refraction but also diffraction. This leads to the study of photonic crystals including photonic crystal fibres, plasmonics, photonic 'nanowires' and metamaterials. The course also provides opportunities for students to use powerful finite difference time domain (FDTD) simulation packages to design devices like high Q nano-resonators using these materials, and discusses how such devices are actually made.

**PHYS5028**  
**Optics in Industry**  
**Credit points:** 6  
**Teacher/Coordinator:** Dr Chris Walsh  
**Session:** Semester 2  
**Classes:** Two one-hour lectures per week, and two hours of tutorials per week. **Assumed knowledge:** Bachelor's degree in Science or Engineering, with a major in physics, or equivalent. **Assessment:** One 2000-word essay and practical assessments (100%)  

This unit of study will first provide students with a detailed optical analysis of a consumer or industry product whose operation embodies many of the principles discussed in this course. Examples include a phone camera or a DVD player.  

Next, students will study the factors that become increasingly important when working as a professional in an industry/commercial environment.
23. Psychology coursework degrees

This chapter sets out the requirements for psychology degrees offered by the Faculty of Science.

- The Graduate Diploma in Psychology for graduates in other disciplines to obtain a Psychology major.
- The Graduate Certificate in Applied Science (Applied Positive Psychology) for students interested in the study of positive psychology.
- The Graduate Certificate, Graduate Diploma and Master of Applied Science (Health Psychology) – an articulated postgraduate program for students interested in the theory and practical applications of health psychology.
- The Graduate Certificate, Graduate Diploma and Master of Applied Science (Psychology of Coaching) – an articulated postgraduate program for students interested in the applied science of human performance enhancement and coaching.

Graduate Diploma in Psychology

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF017</td>
<td>Graduate Diploma in Psychology</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is part-time only but full-time enrolment may be permitted after the first semester of candidature.

3 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants based on merit according to the following admissions criteria:

(2) Admission to the course requires:

(a) a Bachelor of Science, Bachelor of Arts, Bachelor of Economic & Social Sciences, Bachelor of Arts and Sciences, or Bachelor of Liberal Studies from the University of Sydney or equivalent qualification, provided the applicant has not previously completed a major in Psychology; and

(b) completion of 12 credit points of junior units of study in Psychology or equivalent within the last ten years.

4 Requirements for award

(1) The units of study that may be taken for these awards are set out in the Graduate Diploma in Psychology table.

(2) To qualify for the Graduate Diploma in Psychology a candidate must complete 48 credit points, including:

(a) 24 credit points of intermediate units of study in Psychology; and

(b) 24 credit points of senior units of study in Psychology which must include PSYC3010 and PSYC3018 and one of PSYC (3011, 3012, 3013 and 3014).

5 Credit for previous study

Credit for up to 24 credit points may be granted for units of study deemed to be equivalent to units in the Graduate Diploma in Psychology offered by the Faculty of Science.

6 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course outcomes

Upon completion of the course, the graduate will have a Psychology major, accredited by the Australian Psychological Society, equivalent to that available in the Bachelor of Arts, Bachelor of Science, Bachelor of Economics (Social Science), Bachelor of Liberal Studies or the Bachelor of Arts and Sciences. They will have studied all basic areas of experimental Psychology, statistical methods in Psychology, and a range of optional topics. They will be eligible to apply to continue to a fourth year in Psychology (Honours) and from there to a higher degree in Psychology.

Eligibility for admission

Applicants holding relevant degrees

The Faculty of Science may admit to candidature applicants who hold the award course of Bachelor of Science, Bachelor of Arts, Bachelor of Economic & Social Sciences, Bachelor of Liberal Studies or Bachelor of Arts and Sciences from the University of Sydney, or equivalent degree as deemed by the faculty, who have not previously completed a major in Psychology. Applicants must have already successfully completed 12 credit points of Junior Psychology (currently PSYC1001 and 1002) or equivalent within the last 10 years. When assessing an applicant, both undergraduate record and UAI (or equivalent) may be taken into account.

Method of progression

Students are required to study a minimum of 48 credit points of intermediate and senior level Psychology. This shall consist of 24 credit points of Intermediate Psychology (currently PSYC 2011, 2012, 2013 and 2014) and a minimum of 24 credit points of Senior Psychology including PSYC3010, PSYC3018 and one of PSYC (3011, 3012, 3013 or 3014). Students must complete the necessary qualifying units of study for entry into later units of study. Normally, progression will be over a minimum of four semesters. Students may study additional senior Psychology if they wish.

Study in Psychology beyond the Graduate Diploma

To be eligible for study in Psychology beyond the graduate diploma at the University of Sydney, students must, except with School approval, include PSYC3010 Advanced Statistics for Psychology for entry to Psychology 4 (Honours). Successful completion of HPSC3023 History and Philosophy of Psychology and Psychiatry is essential for
students intending to take the Theoretical Thesis option in Psychology honours.

**Exemptions and Advanced Standing**

Students may apply for exemptions if they have already completed studies which the faculty deems equivalent to those in the program. Such units of study must have been completed within the previous 10 years. The number of exemptions allowed will not exceed Faculty of Science regulations or will not exceed 24 credit points, whichever is the lower.

### Graduate Diploma in Psychology table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intermediate Units (students must complete 24 credit points from:)</strong></td>
<td></td>
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<tr>
<td>PSYC2011 Brain and Behaviour</td>
<td>6</td>
<td>P PSYC (1001 and 1002).</td>
<td>N PSYC2111</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC2013 Cognitive and Social Psychology</td>
<td>6</td>
<td>P PSYC (1001 and 1002).</td>
<td>N PSYC2113</td>
<td></td>
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<td>Semester 2</td>
</tr>
<tr>
<td>PSYC2014 Personality and Intelligence 1</td>
<td>6</td>
<td>P PSYC (1001 and 1002).</td>
<td>N PSYC2114</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>Senior Units (students must complete 24 credit points from:)</strong></td>
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<tr>
<td>NB: These 24 credit points must include PSYC3010, PSYC3018 and one of PSYC(3011, 3012, 3013 or 3014)</td>
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<tr>
<td>PSYC3010 Advanced Statistics for Psychology</td>
<td>6</td>
<td>P PSYC (2012 or 2112) plus at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2013 or 2113), PSYC (2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PSYC3011 Learning and Behaviour</td>
<td>6</td>
<td>A PSYC (2012 or 2112).</td>
<td>P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC3012 Cognition, Language and Thought</td>
<td>6</td>
<td>A PSYC (2012 or 2112).</td>
<td>P PSYC (2013 or 2113) and at least one other Intermediate Psychology unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC3013 Perceptual Systems</td>
<td>6</td>
<td>A PSYC2012.</td>
<td>P PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114) or ANAT2010.</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PSYC3014 Behavioural and Cognitive Neuroscience</td>
<td>6</td>
<td>A PSYC (2113 or 2013).</td>
<td>P (PSYC (2011 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114)) OR (ANAT2010 plus PCOL2011).</td>
<td>N PSYC3020, PSYC3021</td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PSYC3015 Personality and Intelligence 2</td>
<td>6</td>
<td>A PSYC(2012 or 2112), PSYC(2013 or 2113).</td>
<td>P PSYC(2014 or 2114) and PSYC2011 or 2111 or 2012 or 2112 or 2013 or 2113.</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC3016 Developmental Psychology</td>
<td>6</td>
<td>P PSYC (2013 or 2113) and at least one other Intermediate Psychology unit from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PSYC3017 Social Psychology</td>
<td>6</td>
<td>A PSYC (2012 or 2112).</td>
<td>P PSYC (2013 or 2113) and at least one other Intermediate Psychology Unit of Study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC3018 Abnormal Psychology</td>
<td>6</td>
<td>A PSYC(2012 or 2112) and PSYC2014 or 2114.</td>
<td>P At least two Intermediate Psychology units of study from PSYC (2011 or 2111), PSYC (2012 or 2112), PSYC (2013 or 2113) and PSYC(2014 or 2114).</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC3020 Applications of Psychological Science</td>
<td>6</td>
<td>P 12 credit points of junior psychology and 12 credit points in Intermediate Psychology</td>
<td>N PSYC3019</td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>HPSC3023 Psychology &amp; Psychiatry: History &amp; Phil</td>
<td>6</td>
<td>A Basic knowledge about the history of modern science as taught in HPSC2100 AND the principles of philosophy of science as taught in HPSC2101 OR knowledge of the various sub-disciplines within Psychology.</td>
<td>P (at least 12 credit points of intermediate HPSC Units of study) OR (a CR or above in one HPSC intermediate Unit of Study) OR (12 intermediate credit points in psychology).</td>
<td>N PSYC3020</td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

**Graduate Diploma in Psychology unit of study descriptions 2011**

See the earlier chapter with Undergraduate unit of study descriptions under Psychology.
Applied Positive Psychology degrees

Graduate Certificate in Applied Science (Applied Positive Psychology)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG024</td>
<td>Graduate Certificate in Applied Science (Applied Positive Psychology)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for this course is part time only.

3 Admission to candidature

(1) With approval from the Dean available places will be offered to qualified applicants, according to the following admissions criteria.

(2) Admission to the Graduate Certificate in Applied Science (Applied Positive Psychology) requires:

(a) a three-year Psychology degree or a three-year degree in a cognate discipline; and
(b) a minimum of two years relevant employment experience.

(3) Relevant work experience may include counselling, experience in organisational learning and development, management experience, employment in applied psychology settings, professional coaching or other areas directly related to coaching.

4 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Applied Positive Psychology postgraduate courses.

(2) To qualify for the Graduate Certificate Applied Science (Applied Positive Psychology) a candidate must complete 24 credit points, including:

(a) 12 credit points of core units of study; and
(b) 12 credit points of elective units of study.

5 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

Positive psychology is the scientific study of the factors that enable individuals, organisations and communities to flourish and thrive. There is considerable interest worldwide in positive psychology and its application in work, professional and personal settings. This degree program teaches history and development of positive psychology, an understanding of the key theoretical constructs of positive psychology, the core research methods used in positive psychology, and the application of positive psychology principles in a wide range of settings.

Course outcomes

The aim of the program is to equip graduates with the skills, knowledge and ability to be effective change agents in the area of applied positive psychology. Topics covered in the program include goals, meaning and self-concordance; subjective and psychological well-being; the languishing vs. flourishing dichotomy; positive psychology in organisations, broaden and build theory; the psychology of peak performance; resilience flow, mental toughness, and the philosophy and psychology of happiness. There is emphasis on both theoretical understanding and applied skills, and students will be expected to engage in experiential learning, to participate in group discussion and to relate the taught material to their own personal life experience.

Applied Positive Psychology postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Units</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC4727 Positive Organisational Coaching</td>
<td>6</td>
<td>P PSYC4721, PSYC4722</td>
<td></td>
<td></td>
<td></td>
<td>S2 Intensive</td>
</tr>
<tr>
<td>PSYC4730 Applied Positive Psychology</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>Elective Units</td>
<td></td>
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<tr>
<td>Students must complete 12 credit points from the following:</td>
<td></td>
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<tr>
<td>PSYC4721 Theories &amp; Techniques of Coaching</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC4722 Psych</td>
<td></td>
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<td>Semester 2</td>
</tr>
<tr>
<td>PHIL7840 Philosophy and the Science of Happiness</td>
<td>6</td>
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<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
</tbody>
</table>
Unit of study descriptions 2011

PSYC4721
Theories & Techniques of Coaching Psych
Credit points: 6  Session: Semester 1, Semester 2  Classes: One 3 hour lecture per week.  Assessment: Written papers (essay, journal or case study) and exam (100%)  
This unit details the core theories and techniques of coaching psychology and evidence-based coaching, and the use of coaching as an applied positive psychology. Theories and techniques will be evaluated by reference to empirical research and conceptual analysis. An integrated goal-focused approach to coaching draws on a broad base of established Behavioural Science. Within this framework, primary attention will be paid to cognitive-behavioural and solution-focused theories and techniques of behaviour change and self-regulation, and their application to coaching clients. Each weekly seminar has a lecture component and an experiential learning component. The experiential learning component requires students to evaluate each week's topic in relation to their own personal life experience and to participate in group discussion and coaching practice.

PSYC4727
Positive Organisational Coaching
Credit points: 6  Session: S2 Intensive  Classes: Five Day Seminars: Block Teaching.  Prerequisites: PSYC4721, PSYC4722  Assessment: A written coaching proposal (3,000 words) (50%), take home exam and written assignment (1,000 words) (35%), in-class exam (short answer and multiple choice) (15%).  
How can psychology help create 'healthy' workplaces? Executive and management coaching have emerged as important factors in the enhancement of performance, engagement and well-being in the workplace. This unit examines key issues in contemporary executive and workplace coaching and equips students with the knowledge and skills to provide world-class executive and management coaching. The emphasis is on critical evaluation of theory and application to practice. Although primarily focused on positive psychology, solution-focused and cognitive-behavioural approaches to coaching in organisations, the application of psychodynamic (eg Kilburg) and systems (eg O’Neill) approaches to the enhancement of performance and well-being are also considered. The unit covers issues in senior executive coaching, coaching middle management, establishing manager-as-coach programs, and the use of positive psychology in the workplace.

PSYC4730
Applied Positive Psychology
Credit points: 6  Session: Semester 1  Classes: 5 day-long seminars  Assessment: Written papers (Essays or case studies) and exam (100%)  
This unit of study teaches the application of positive psychology to coaching in work and personal life contexts. We consider the core principles of positive psychology and how these can be applied in coaching interventions. Topics covered in this unit include; coaching as an applied positive psychology; goals, meaning and well-being; subjective and psychological well-being; happiness; gratitude; the languishing vs. flourishing dichotomy; broaden and build theory; self-concordance; well-being in the workplace; career coaching through the life span; and the use of positive psychology in health coaching. There is emphasis on both theoretical understanding and personal practice. The experiential learning component requires students to evaluate each week’s topic in relation to their own personal life experience and to participate in group discussion and coaching practice.

PHIL7840
Philosophy and the Science of Happiness
Credit points: 6  Teacher/Coordinator: Dr Caroline West  Session: Semester 2  Classes: 1x2-hr seminar/week  Assessment: 1x1500wd short essay (25%) and 1x3500wd long essay (75%)  
This unit deals with the philosophy and psychology of happiness and wellbeing. It covers classical and contemporary philosophical work on the nature of happiness. It discusses the kind of goal happiness or wellbeing is - is it something that we want only insofar as we desire it, or is there some rational requirement to make a richer conception of wellbeing the goal of life? The unit will also engage with aspects of positive psychology.
Health Psychology degrees

Graduate Certificate in Applied Science (Health Psychology)

Graduate Diploma in Applied Science (Health Psychology)

Master of Applied Science (Health Psychology)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG015</td>
<td>Graduate Certificate in Applied Science (Health Psychology)</td>
</tr>
<tr>
<td>LF030</td>
<td>Graduate Diploma in Applied Science (Health Psychology)</td>
</tr>
<tr>
<td>LC042</td>
<td>Master of Applied Science (Health Psychology)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice, except the Graduate Certificate in Applied Science (Health Psychology) which is available part time only:

3 Master’s type

The master’s degree in these resolutions is an advanced learning master’s course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:

(a) Graduate Certificate in Applied Science (Health Psychology)

(b) Graduate Diploma in Applied Science (Health Psychology)

(c) Master of Applied Science (Health Psychology)

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.

(2) Admission to the Graduate Certificate in Applied Science (Health Psychology) requires:

(a) a four-year Psychology degree from the University of Sydney or equivalent qualification; or

(b) a three-year degree in a cognate discipline from the University of Sydney or equivalent qualification, with a minimum of two years relevant employment experience;

(c) completion of the embedded graduate certificate in this discipline, from the University of Sydney, or equivalent qualification.

(3) Admission to the Graduate Diploma in Applied Science (Health Psychology) requires:

(a) a four-year Psychology degree from the University of Sydney or equivalent qualification; or

(b) a three-year degree with credit average in a cognate discipline from the University of Sydney or equivalent qualification, with a minimum of two years relevant employment experience; or

(c) completion of the embedded graduate diploma in this discipline, from the University of Sydney, or equivalent qualification; or

(d) completion of the embedded graduate certificate in this discipline with a distinction average, from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Health Psychology postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master’s degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.

(2) To qualify for the Graduate Certificate in Applied Science (Health Psychology) a candidate must complete 24 credit points, including:

(a) 18 credit points of core units of study; and

(b) 6 credit points of elective units of study.

(3) To qualify for the Graduate Diploma in Applied Science (Health Psychology) a candidate must complete 36 credit points, including:

(a) 24 credit points of core units of study; and

(b) 12 credit points of elective units of study.

(4) To qualify for the Master of Applied Science (Health Psychology) coursework pathway a candidate must complete 48 credit points, including:

(a) 24 credit points of core units of study; and

(b) 24 credit points of elective units of study.

(5) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.

(6) To qualify for the Master of Applied Science (Health Psychology) research pathway a candidate must complete 48 credit points, including:

(a) 24 credit points of core units of study; and

(b) 12 credit points of elective units of study; and

(c) 12 credit points of core research units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.

(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Master of Applied Science (Health Psychology) is an articulated postgraduate program which teaches the theory and practical applications of Health Psychology. Health psychology is the field of psychology devoted to the study of the promotion and maintenance of health; the causes and detection of illness; the prevention and treatment of illness; and the improvement of health care systems and...
health care policy. The Master of Applied Science (Health Psychology) is designed to provide students with an understanding of the theoretical, methodological and practical aspects of health psychology.

A research stream is also available to Master of Applied Science (Health Psychology) students in their second semester of enrolment, upon completion of at least 24 credit points with a distinction average in their first full-time semester (or equivalent).

Course outcomes
This program is designed to meet the needs of a wide variety of health professionals interested in the growing area of health psychology; for example, people working within the Department of Health and other organisations, charities and research groups, allied health professionals, psychology students, geneticists and genetic counsellors. These programs will allow these individuals to pursue health psychology careers within the health service, academia and government.

Health Psychology postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Degrees: Core Units</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PSYC5010 Applying Psychology to Health</td>
<td>6</td>
<td></td>
<td></td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>PSYC5011 Applying Models of Health Behaviour</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>PUBH5018 Introductory Biostatistics</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
</tbody>
</table>

| Diploma, Masters: Additional Core Unit          |               |                      |                  |                |                |               |
| BACH5341 Research & Inquiry in Health Professions | 6     | N BACH3126, BACH4047, BACH5268, DHSC7002, DHSC7005 | |                | | Semester 1   |

| All Degrees: Elective Units                     |               |                      |                  |                |                |               |
| Graduate Certificate students must complete one of the following units | | | | | | |
| Graduate Diploma students must complete two of following units | | | | | | |
| Masters students must complete two of the following and two additional elective units | | | | | | |
| PSYC5013 Coping and Adjustment to Illness       | 6             |                      |                  |                |                | Semester 1    |
| PSYC5012 Health and Risk Communication          | 6             |                      |                  |                | S2 Intensive   |               |
| PSYC5014 Developments in Health Psychology      | 6             |                      |                  |                |                | Semester 1    |

| Masters Only: Additional Elective Units          |               |                      |                  |                |                |               |
| PUBH5010 Epidemiology Methods and Uses           | 6             | N BSTA5011           |                  |                |                | Semester 1    |
| BACH5011 Survey Research Methods                | 6             | Note: Department permission required for enrolment | |                | | Semester 1   |
| BACH5255 Qualitative Research Methods           | 6             |                      |                  |                |                | Semester 2    |
| BIOS5041 Ageing, Biology and Health             | 6             |                      |                  |                |                | Semester 2    |
| BIOS5069 Introduction to Sexual Health          | 6             |                      |                  |                |                | Semester 1    |
| BIOS5070 Communication Skills in Sexual Health  | 6             |                      |                  |                |                | Semester 1    |
| BIOS5075 Managing Sexual Dysfunctions           | 6             |                      |                  |                |                | Semester 1    |
| BIOS5077 Advanced Reproductive Health           | 6             |                      |                  |                |                | Semester 1    |
| BIOS5077 Advanced Reproductive Health           | 6             |                      |                  |                |                | Semester 1    |
| BIOS5079 Sexuality and Ageing                   | 6             |                      |                  |                |                | Semester 2    |
| BIOS5083 Sex, Gender and Sexuality              | 6             |                      |                  |                |                | Semester 2    |
| BIOS5088 Sexuality in Illness and Disability    | 6             |                      |                  |                |                | Semester 1    |
| PSYC5016 Research Project in Health Psychology A| 6             | P All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units. | | | | Semester 1   |
| PSYC5017 Research Project in Health Psychology B| 6             | P All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units. | | | | Semester 1   |

Master Research Stream Only: Additional Core Units
This stream is available to students in their second semester who have completed 24 credit points at distinction average or better. Research stream students must complete the following in lieu of the two additional elective units
Unit of study descriptions 2011

BACH5011 Survey Research Methods
Credit points: 6  Teacher/Coordinator: Dr Kate O'Loughlin  Session: Semester 1, Semester 2  Classes: Individual supervision; night classes and distance education  Assessment: Three written assignments (3x33.3%)  Campus: Cumberland

This unit examines survey research design principles and considers conceptualisation, sampling, questionnaire construction and pilot testing of data collection instruments. Techniques for the collection, coding and keypunching of survey data will be covered and students will gain experience with computer analysis of survey data. The strengths and limitations of survey data will be discussed.

BACH5255 Qualitative Research Methods
Credit points: 6  Teacher/Coordinator: Dr Russell Shuttleworth  Session: Semester 2  Classes: Either on-campus, 3hrs lecture, lab, tutorial/week or by distance education  Assessment: 2x1500 word essays (journal entries) (2x25%), 1x3,000 word essay (draft research proposal) (50%)  Practical field work: 2hrs fieldwork  Campus: Cumberland

In this unit students will learn about qualitative research techniques such as in-depth interviewing and participant observation which focus on the investigation of people's experiences and their interpretation of events. This unit examines the types of research questions for which these methods are best suited, and provides training in data collection methods and analysis. The unit is conducted as a seminar in which students actively participate; students also work on a research project of their choice throughout the semester.

Textbooks
Silverman D, Doing Qualitative Research (2nd ed), Sage (2005)

BACH5341 Research & Inquiry in Health Professions
Credit points: 6  Teacher/Coordinator: Dr Kaye Brock and Dr Rob Heard (Sem 1), Dr Tatjana Seizova-Cajic (Sem 2)  Session: Semester 1, Semester 2  Classes: Distance mode (students must have access to the internet); 3hr group on-campus consultations (optional)  Prohibitions: BACH3126, BACH4047, BACH5268, DHSC7002, DHSC7005  Assessment: Three Online quiz’s (40%), Literature review (10%), Draft proposal (10%), Final Proposal (40%)  Campus: Cumberland

This unit provides an overview of the research process and focuses on the formulation of a proposal for a small research project. It provides students with an opportunity to learn about (or update their knowledge of) research methods at the introductory level and acts as an introduction to the research electives which concentrate on a particular methodology or aspect of the research process. Students explore quantitative and qualitative approaches to research with their own specific research question in mind. Basic research designs are considered (including interview, observation, longitudinal and cross-sectional designs, experiment, single case study, survey) together with their suitability for investigating different types of research questions. Students also learn about ethics in research, sampling, validity and reliability of measures and descriptive statistics.

Textbooks
years and the ways in which community knowledge, attitudes, values and beliefs developed over time.

Textbooks:

BIOS5070 Communication Skills in Sexual Health
Credit points: 6 Teacher/Coordinator: Dr Gomathi Sitharthan
Session: Semester 1 Classes: Offered in off-campus online learning mode in Semester 1
Assessment: Group task (5%), on line MCQ (30%,20% and 10%) and an assignment (35%). Campus: Cumberland

This introductory unit will provide the students with an overview of the models of sexual health counselling and professional ethics in a multicultural and global context. The students will explore ways of discussing and communicating with clients of varying socio-cultural groups on sexual health issues in the context of their own professional situation. The students will be sensitised to their attitudes and beliefs in the area of sexual and reproductive health, and consider the range of attitudes, beliefs and values in the context of the clients' religious and socio-cultural background. The students will also explore ways of discussing and communicating with clients on sexual health issues in the context of the clients' comfort and context and their own professional situation.

At the end of the unit, the student will be able to: have an understanding of the terminology of sexual health and be aware of professional communication patterns, demonstrate an understanding of the principles of communication and assessment of clients presenting with a sexual concern, demonstrate the ability to take a sexual history and be able to apply the PLUSSIT management model in the students' professional context, understand the range of personal and community agenda individuals bring to sexuality and sexual health, and how these affect professional communication, demonstrate an ability to perceive sexual health issues within local and global context.

Assessment will include online quizzes, small group work assignments and individual activity reports. The on-campus delivery mode will replace online discussions and activities with small group tutorials, presentations and seminars.

Textbooks:

BIOS5075 Managing Sexual Dysfunctions
Credit points: 6 Teacher/Coordinator: Dr Patricia Weerakoon
Session: Semester 1 Classes: No on-campus attendance required. Offered in a distance mode, using the WebCT (internet based) delivery platform Assessment: Online reflective quizzes, 2 debates on current issues (30%), individual activity reports (50%) and a reflective report on professional practice (20%) Campus: Cumberland

This unit will provide the student with an understanding of the biological and psychosocial factors that influence the sexual response in males and females and the changes that take place through the lifecycle. The students will explore the concept of normality of sexual function and behaviour and the psychosocial factors that determine them. The students will critically evaluate the current models of the sexual response in males and females through the lifecycle and the range of sexual dysfunctions. The student will gain the competency to evaluate available management options from biological and psychosocial perspectives and select those appropriate for specific clients. At the end of the unit, the student will be able to: critically discuss the concept of "normality" and the range of values and behaviours in a socio-cultural context, demonstrating the ability to explore this from their personal context; discuss and critically evaluate the models used to explain the adult sexual response in males and females, based on current research; critique current classifications of sexual dysfunction and demonstrate the ability to evaluate common sexual concerns and dysfunctions based on current evidence and research; critically discuss the range of possible psychological, social and physical reasons for specific sexual dysfunctions, and place these in the context of clients' socio-cultural and religious background and beliefs; list and critically evaluate the management options available for the management of sexual concerns, as well as reflect on how these impact on their own professional practice.

Textbooks:

BIOS5077 Advanced Reproductive Health
Credit points: 6 Teacher/Coordinator: Dr Patricia Weerakoon
Session: Semester 1 Classes: Distance online Web CT/Blackboard. Equivalent to 2 one hour lectures per week Plus 2 hours tutorials per week. Assessment: 1X group work contribution mark (20%), 4X essays 1000 words (80%) Campus: Cumberland

The students will explore current information on common issues that arise in reproductive health from adolescence to old age including the biological and psychological aspects of pregnancy, infertility, termination of pregnancy and genetic counselling as they relate to sexuality and sexual health. This unit will provide the students with the skills to detect and manage issues in clients who present with reproductive concerns related to sexual health. They will have the opportunity to critically review and evaluate the current state of reproductive health in specific areas of personal and professional interest to the student. At the conclusion of this module students will be able to: critically evaluate the resources available to assist clients with reproductive health issues particularly related to sexual health from adolescence to old age; explore the options available for clients seeking contraceptive advice with special reference to their own cultural and socio-religious background; discuss the options available for clients presenting with an unplanned pregnancy and the problems with access in specific client situations; discuss the issues regarding sexuality that may arise during and after pregnancy; critically review the current literature on the intimacy and relationship issues that may arise for a couple with such an issue; demonstrate the ability to critically evaluate the evidence and research base to specific reproductive issues such as reproduction in older ages and genetic counselling.

BIOS5079 Sexuality and Ageing
Credit points: 6 Teacher/Coordinator: Dr Russell Shuttleworth
Session: Semester 2 Classes: Distance education delivery- no on-campus attendance
Sexual health is comprised of biological, psychological, social and cultural aspects. This unit will provide students with a holistic understanding of the sexual health issues of disabled and chronically ill people. The prevailing Western cultural perceptions of the sexuality of disabled people and their move to be included in the sexual rights movement will be outlined. An overview of the various models of disability will be presented and their usefulness in understanding different kinds of sexual health issues for this population will be discussed. Students will be provided with an understanding of the sexual health concerns for people with a diverse range of impairments derived from the research literature. The impact of culture, gender and sexual orientation on disabled people's sexual opportunities will be discussed. Current theoretical perspectives, treatment interventions and policy contexts as these relate to sexuality and disability will also be presented. At the end of this unit of study the student will be able to: 1) discuss how differences in sexual and other bodily functions affect the sexual expression of people with a range of impairments and chronic illnesses; 2) describe the range of intervention and treatment options available for this population; 3) discuss the body image, sexual self-esteem, and interpersonal concerns of disabled and chronically ill people; 4) discuss the ways in which a range of backgrounds and identity categories including gender, sexual, and ethnic/cultural interact with disabled people's sexuality; 5) demonstrate an understanding of various disciplinary and theoretical perspectives as they relate to sexuality and disability; and 6) apply these perspectives to disabled people's sexual issues and evaluate their social policy implications.

PSYC5010 Applying Psychology to Health
Credit points: 6 Session: Semester 1 Classes: 1 one hour lecture, two hours of tutorials per week Assessment: Tutorial attendance and presentation, major assignment - 2500 word essay (100%) Campus: Camperdown/Darlington

The work of health psychologists relies on a broad range of professional skills and attributes. The aim of this unit of study is to conceptually define health within a biopsychosocial framework and to present some of the psychological reactions to hospitalisation, illness and pain. This unit of study provides students with an introduction to key areas of health psychology, and demonstrates how they relate to other disciplines. It also considers the context within which treatment takes place. This unit of study will explore mental and physical diseases. This unit of study examines the application of psychology in clinical settings. The unit of study considers the application of psychological theory to illness and preparation for hospitalisation; the management of adverse psychological sequelae arising from hospitalisation; and rehabilitation.

PSYC5011 Applying Models of Health Behaviour
Credit points: 6 Session: Semester 2 Classes: 1 one hour lecture and two hours of tutorials per week Assessment: Presentation of intervention, write up of intervention (100%) Campus: Camperdown/Darlington

The student will be given the opportunity to develop an intervention based on social cognitions models. The process can be followed from start to finish allowing the individual to utilise knowledge and skills gained in other units of study. It is an intended outcome for students embarking in the MAPsCe (Health Psych) that students can demonstrate an understanding of the key models and theories in Health Psychology which are seen by many to be the foundations of the subject area. The aim of this unit of study is to allow students to identify an area of Health Psychology where an intervention would be appropriate, review existing literature on the topic, formulate the intervention, and evaluate the intervention on a pilot level.

PSYC5012 Health and Risk Communication
Credit points: 6 Session: S2 Intensive Classes: lectures, videos, interactive exercises, case study discussions and small group-work. This unit will be taught in a block intensive mode over five days Assessment: Major or two minor essays (100%) Campus: Camperdown/Darlington
In this unit of study students will consider health communication in the context of the health professional-patient relationship and in the public sphere. This unit of study seeks to develop a critical awareness of the determinants of effective communication, particularly in relation to health risks to the individual and society. The unit of study will investigate: theories of health communication, including patient-centred care and shared decision making; evidence regarding the impact of good and poor communication on patient and health professional outcomes; research paradigms in this area including interaction analysis; cross-cultural communication issues in health care; risk communication in the context of informed consent to clinical trials, discussing prognosis and responding to public health risk events; and theories of risk perception and communication. The aim of this unit of study is to provide students with a comprehensive understanding of the key issues related to communication in health care and health policy settings.

PSYC5013
Coping and Adjustment to Illness
Credit points: 6  Session: Semester 1  Classes: one hour lecture and two hour tutorials per week  Assessment: Formal examination (100%)  Campus: Camperdown/Darlington

The unit of study aims to apply a psychosocial perspective to the study of disability and chronic disease. In this unit, students will consider the impact of acute and chronic illness states (including physical and mental illness) on the patient and their family. Aspects of quality of life affected will be considered, including sexuality, body image, fatigue, existential crisis, social and intimate relationships, physical reactions and spirituality. The impact of formal and informally systems of social support on illness and outcomes will be explored. The unit will incorporate evaluation of research methods used in such studies together with the application of health psychology theory and a critical examination of research findings. Relationships between health cognitions, health behaviour and psychological adjustment will be an important theme of the unit of study, as will be a consideration of interventions to improve patient well being. Broad social, cultural, and political aspects of disability and acute and chronic disease will also be examined. The rise in number of people suffering from or caring for someone who has a chronic condition has proved to be a major challenge facing health psychologists. The aim on and needs of carers and family members will also be considered in this unit of study.

PSYC5014
Developments in Health Psychology
Credit points: 6  Session: Semester 1, Semester 2  Classes: three hours of tutorials per week  Assessment: one major assignment - 5000 word essay (100%)  Campus: Camperdown/Darlington

The purpose of this unit of study is to allow the student to choose a topic of particular relevance to their areas of expertise. It will allow the student to examine new developments within Health Psychology which may impact on their clinical or work practice.

PSYC5016
Research Project in Health Psychology A
Credit points: 6  Teacher/Coordinator: Dr Barbara Mullan  Session: Semester 1, Semester 2  Classes: Contact will be mainly tutorials with students arranging the appropriate level of supervision needed. Some lectures will also be provided.  Prerequisites: All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units.  Corequisites: PSYC5017  Assessment: Combined with PSYC5017. Project assignment 7000 to 9000 words (100%). In this unit of study the student will use as many of the identified sessions as s/he wishes for collection of data; preparation of the project etc. under the supervision of his/her research supervisor. Lectures are voluntary and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the students’ supervisors. Students will prepare the ethics application (if applicable), the literature review, collect the data and write up the project with supervision.  Campus: Camperdown/Darlington

In combination with PSYC5017 in this unit of study the student will be given the opportunity to carry out a substantial piece of research in the field of health psychology. The research process can be followed from start to finish allowing the individual to utilise knowledge and skills gained in the other unit of study. It is an intended outcome for students enrolled in the MApplSc (HealthPsych research stream) that they present evidence of their capacity to conduct a substantial piece of independent research that builds clearly upon their prior learning and which draws upon appropriate methodologies. The aim of this unit of study is to allow students to identify a research issue, review existing literature on the topic, formulate novel research questions, and test these questions through the application of contemporary psychological methodologies and appropriate data-analytic procedures. Lectures are voluntary, and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the student’s supervisor.

PSYC5017
Research Project in Health Psychology B
Credit points: 6  Teacher/Coordinator: Dr Barbara Mullan  Session: Semester 1, Semester 2  Classes: Contact will be mainly tutorials with students arranging the appropriate level of supervision needed. Some lectures will also be provided.  Prerequisites: All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units.  Corequisites: PSYC5016  Assessment: Combined with PSYC5016. Project assignment 7000 to 9000 words (100%). In this unit of study the student will use as many of the identified sessions as s/he wishes for collection of data; preparation of the project etc. under the supervision of his/her research supervisor. Lectures are voluntary and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the students’ supervisors. Students will prepare the ethics application (if applicable), the literature review, collect the data and write up the project with supervision.  Campus: Camperdown/Darlington

In combination with PSYC5016 in this unit of study the student will be given the opportunity to carry out a substantial piece of research in the field of health psychology. The research process can be followed from start to finish allowing the individual to utilise knowledge and skills gained in the other unit of study. It is an intended outcome for students enrolled in the MApplSc (HealthPsych research stream) that they present evidence of their capacity to conduct a substantial piece of independent research that builds clearly upon their prior learning and which draws upon appropriate methodologies. The aim of this unit of study is to allow students to identify a research issue, review existing literature on the topic, formulate novel research questions, and test these questions through the application of contemporary psychological methodologies and appropriate data-analytic procedures. Lectures are voluntary, and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the student’s supervisor.

PUBH5018
Introductory Biostatistics
Credit points: 6  Teacher/Coordinator: Mr Kevin McGeethan and Associate Professor Petra Macaskill  Session: Semester 1  Classes: 2 x 2hr lecture, 10 x 1hr tutorials, 11 x 2hr tutorials, 2 x 1hr and 8 x 0.5hr statistical computing self directed learning tasks over 12 weeks - lectures and tutorials may be completed online  Assessment: 1x4 page assignment (30%) and 1x2.5hr open-book exam (70%)  Campus: Camperdown/Darlington

This unit aims to provide students with an introduction to statistical concepts, their use and relevance in public health. This unit covers descriptive analyses to summarise and display data; concepts underlying statistical inference; basic statistical methods for the analysis of continuous and binary data; and statistical aspects of study design. Specific topics include: sampling; probability distributions; sampling distribution of the mean; confidence interval and significance tests for one-sample, two paired samples and two independent samples for continuous data and also binary data; correlation and simple linear regression; distribution-free methods for two paired samples, two independent samples and correlation; power and sample size estimation for simple studies; statistical aspects of study design and analysis. Students will be required to perform analyses using a calculator and will also be required to conduct analyses using statistical software (SPSS). It is expected that students spend an additional 2 hours per week preparing for their tutorials. Computing tasks are self-directed.

Textbooks
Course notes are provided.
PUBH5010
Epidemiology Methods and Uses
Credit points: 6  Teacher/Coordinator: Associate Professor Tim Driscoll
Session: Semester 1  Classes: 1x1hr lecture and 1x2hr tutorial per week for
13 weeks - lectures and tutorials may be completed online  Prohibitions:
BSTA5011  Assessment: 1x4page assignment (30%) and 1x2.5hr open-book
exam (70%)  Campus: Camperdown/Darlington

This unit provides students with core skills in epidemiology, particularly
the ability to critically appraise public health and clinical epidemiological
research literature. This unit covers: study types; measures of
frequency and association; measurement bias; confounding/effect
modification; randomized trials; systematic reviews; screening and
test evaluation; infectious disease outbreaks; measuring public health
impact and use and interpretation of population health data. It is
expected that students spend an additional 2-3 hours preparing for
their tutorials.

Textbooks
Webb, PW. Bain, CJ. and Pirozzo, SL. Essential Epidemiology: An Introduction
for Students and Health Professionals: Cambridge University Press 2005.
Psychology of Coaching

Graduate Certificate in Applied Science (Psychology of Coaching)

Graduate Diploma in Applied Science (Psychology of Coaching)

Master of Applied Science (Psychology of Coaching)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course and stream title</th>
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<tbody>
<tr>
<td>LG005</td>
<td>Graduate Certificate in Applied Science (Psychology of Coaching)</td>
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<tr>
<td>LF028</td>
<td>Graduate Diploma in Applied Science (Psychology of Coaching)</td>
</tr>
<tr>
<td>LC044</td>
<td>Master of Applied Science (Psychology of Coaching)</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice, except the graduate certificate which is available part time only:

3 Master's type

The master’s degree in these resolutions is an advanced learning master’s course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
(a) Graduate Certificate in Applied Science (Psychology of Coaching)
(b) Graduate Diploma in Applied Science (Psychology of Coaching)
(c) Master of Applied Science (Psychology of Coaching)

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria:
(2) Admission to the Graduate Certificate in Applied Science (Psychology of Coaching) requires:
(a) a three-year Psychology degree or a three-year degree in a cognate discipline from the University of Sydney or equivalent institution; and
(b) a minimum of two years relevant employment experience.
(3) Admission to the Graduate Diploma in Applied Science (Psychology of Coaching) requires:
(a) a three-year Psychology degree or a three-year degree in a cognate discipline from the University of Sydney or equivalent institution; and
(b) a minimum of two years relevant employment experience; or
(c) completion of the embedded graduate certificate in this discipline, from the University of Sydney, or equivalent qualification.
(4) Admission to the Master of Applied Science (Psychology of Coaching) requires:
(a) a three-year Psychology degree with a credit average or a three-year degree in a cognate discipline from the University of Sydney or equivalent institution; and
(b) a minimum of two years relevant employment experience; or
(c) completion of the embedded graduate diploma in this discipline, completion of the Graduate Certificate in Applied Science (Applied Positive Psychology), or equivalent qualification.
(5) Relevant work experience may include counselling, experience in organisational learning and development, management experience, employment in applied psychology settings, professional coaching or other areas directly related to coaching.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Psychology of Coaching postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master's degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.
(2) To qualify for the Graduate Certificate in Applied Science (Psychology of Coaching) a candidate must complete 24 credit points, including:
(a) 18 credit points of core units of study; and
(b) 6 credit point elective unit of study.
(3) To qualify for the Graduate Diploma in Applied Science (Psychology of Coaching) a candidate must complete 36 credit points, including:
(a) 18 credit points of core units of study; and
(b) 18 credit points of elective units of study.
(4) To qualify for the Master of Applied Science (Psychology of Coaching) coursework pathway a candidate must complete 48 credit points, including:
(a) 18 credit points of core units of study;
(b) 30 credit points of elective units of study.
(5) Candidates for the Master of Applied Science (Psychology of Coaching) Executive and Workplace Coaching coursework pathway must complete 48 credit points including:
(a) 36 credit points of core units of study; and
(b) 12 credit points from elective units of study.
(6) Candidates for the Master of Applied Science (Psychology of Coaching) Health Coaching coursework pathway must complete 48 credit points including:
(a) 36 credit points of core units of study; and
(b) 12 credit points from elective units of study.
(7) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.
(8) To qualify for the Master of Applied Science (Psychology of Coaching) research pathway a candidate must complete 48 credit points, including:
(a) 30 credit points of core units of study; and
(b) 18 credit points of elective units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.
Course overview

The Master of Applied Science (Psychology of Coaching) is an articulated postgraduate program which teaches the applied science of human performance enhancement and coaching. Coaching psychology sits at the intersection of counselling, clinical and organisational psychology and focuses on working with non-clinical populations. This program provides students with a sound grounding in the theoretical and methodological aspects of coaching and coaching psychology and teaches fundamental applied coaching skills.

Study for the Graduate Diploma in Applied Science (Psychology of Coaching) and the Master of Applied Science (Psychology of Coaching) may be undertaken in either part-time or full-time mode.

Students enrolled in the Graduate Certificate in Applied Science (Psychology of Coaching) may only enrol part-time.

Masters students take one of three streams:

- the specialist Executive and Workplace Coaching stream
- the Specialist Health Coaching stream
- the non-specialist Coaching stream

Eligibility for admission

An applicant for admission will satisfy the admission requirements for the Graduate Certificate in Applied Science or the Graduate Diploma in Applied Science or the Master of Applied Science and:

Students must have either a 3 year Psychology degree or a 3 year degree in a cognate discipline. At least 2 years relevant employment experience is required.

To obtain entry into the Research Masters stream, students will need to have a 4 year Psychology degree on entry. Students without a 4 year Psychology degree will need to hold a three year degree in Psychology or in a cognate discipline and obtain distinction or better at the Certificate level and complete PUBH5018 Introductory Biostatistics or an equivalent statistical course (with approval).

Eligibility for admission

An applicant for admission will satisfy the admission requirements for the Graduate Certificate in Applied Science or the Graduate Diploma in Applied Science or the Master of Applied Science and:

Students must have either a 3 year Psychology degree or a 3 year degree in a cognate discipline. At least 2 years relevant employment experience is required.

Masters students take one of three streams:

- the specialist Executive and Workplace Coaching stream
- the Specialist Health Coaching stream
- the non-specialist Coaching stream

Eligibility for admission

An applicant for admission will satisfy the admission requirements for the Graduate Certificate in Applied Science or the Graduate Diploma in Applied Science or the Master of Applied Science and:

Students must have either a 3 year Psychology degree or a 3 year degree in a cognate discipline. At least 2 years relevant employment experience is required.

To obtain entry into the Research Masters stream, students will need to have a 4 year Psychology degree on entry. Students without a 4 year Psychology degree will need to hold a three year degree in Psychology or in a cognate discipline and obtain distinction or better at the Certificate level and complete PUBH5018 Introductory Biostatistics or an equivalent statistical course (with approval).

Course outcomes

This program is designed to provide graduates with the key theoretical understandings and the core skills necessary to work as a coach in a wide range of settings. Graduates of this course will be equipped to work in the scientist-practitioner or scholar-practitioner model, and can expect to find employment as human performance consultants and personal, workplace of executive coaches in industry, in the human resources field or in private practice.

Graduates of the MAppSci (Coach Psych) who have completed the 12 credit point unit PSYC5016 or PSYC5017 Research Project in Health Psychology are eligible to apply for admission to a research degree (Master of Science or Doctor of Philosophy).

Masters Streams

These streams are only available to Masters students

Executive and Workplace Coaching Stream

The Executive and Workplace Coaching stream comprises:

PSYC4721, PSYC4722, PSYC4724, PSYC4727, PSYC4729 and PSYC4730; and two elective units from PSYC4723, PSYC4725 or PSYC4731. With permission PHIL7840, Philosophy and Science of Happiness, may be taken as one of the elective units.

Health Coaching Stream

The Health Coaching stream comprises:

PSYC4721, PSYC4722, PSYC4724, PSYC5010, PSYC5011, PSYC5012; and two electives from PSYC4723, PSYC4729, PSYC4730 or PSYC5014.

Non-specialist Coaching Stream

The non-specialist or generalist coaching stream comprises:

PSYC4721, PSYC4722, PSYC4724; and 30 credit points from the elective units of study in the Psychology of Coaching postgraduate coursework degree table.

Students in any stream who wish to do a research project may substitute 12 credit points of elective units for PSYC5015 if they meet the prerequisites.

Full- and Part-time Progression

Part-time students: the progression sequence is: first semester of enrolment, PSYC4721 and PSYC4722; second semester of enrolment and following semesters, PSYC4724 and remaining elective units to suit individual students' needs and interests and to meet degree requirements.

Part-time students: the progression sequence is: first semester of enrolment, PSYC4721, PSYC4722 and other elective units; second semester of enrolment, PSYC4724 and remaining elective units to suit the individual students' needs and interests and to meet degree requirements. PSYC4721 and PSYC4722 must be completed before enrolling in PSYC4724. If PSYC4741 and PSYC4722 are taken in separate semesters, students should enrol in PSYC4721 before PSYC4722.

NB: full-time enrolment is not available in the Graduate Certificate.

Psychology of Coaching postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
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<td>Core Units</td>
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<td>PSYC4721, Theories &amp; Techniques of Coaching Psych</td>
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<td>Semester 2</td>
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<td>PSYC4723, Socio-cognitive Issues in Coaching Psych</td>
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<tr>
<td>PSYC4727, Positive Organisational Coaching</td>
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<td>S2 Intensive</td>
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</table>
Unit of study descriptions 2011

PSYC4721
Theories & Techniques of Coaching Psych

Credit points: 6
Session: Semester 1, Semester 2
Classes: One 3 hour lecture per week.
Assessment: Written papers (essay, journal or case study) and exam (100%) for Semester 1.

This unit details the core theories and techniques of coaching psychology and evidence-based coaching, and the use of coaching as an applied positive psychology. Theories and techniques will be evaluated by reference to empirical research and conceptual analysis. An integrated goal-focused approach to coaching draws on a broad base of established Behavioural Science. Within this framework, primary attention will be paid to cognitive-behavioural and solution-focused theories and techniques of behaviour change and self-regulation, and the application to coaching clients. Each weekly seminar has a lecture component and an experiential learning component. The experiential learning component requires students to evaluate each week’s topic in relation to their own personal life experience and to participate in group discussion and coaching practice.

PSYC4722
Fundamentals of Coaching Practice

Credit points: 6
Session: Semester 1, Semester 2
Classes: Block teaching.
Assessment: Written papers (essay, journal or case study) and exam (100%) for Semester 1.

This unit teaches the fundamentals of coaching, and lays the foundations for sound contemporary practice. This unit outlines the emergence of contemporary coaching from its roots in the Human Potential Movement, sports coaching, management consulting, clinical and counseling psychology, through to the establishment of the positive psychology movement. Drawing on established approaches students will be trained in the core micro skills of coaching. Core issues relating to mental illness and mental health and ethical professional coaching practice are addressed. Each seminar has a lecture component and an experiential learning component. The experiential learning component requires students to evaluate each topic in relation to their own personal life/work experience and to participate in group discussion. Practical experience of self-coaching and co-coaching are central aspects of this unit. This unit will be taught in block intensive mode over five days.

PSYC4723
Socio-cognitive Issues in Coaching Psych

Credit points: 6
Session: Semester 1
Classes: Block teaching with some evening tutorials.
Assessment: Written papers (major and minor essay) and exam (100%) for Semester 1.

The aim of this unit is to give students an understanding of key socio-cognitive issues related to coaching and behaviour change. The focus of the unit is on critical appraisal of theory and the relation of theory to practice and research. Topics covered in this unit include models of self-regulated behaviour, personality type, the relationships between emotion, cognition and behaviour, and the roles of learnt resourcefulness, learned optimism, psychological mindedness, self-reflection and insight in behaviour change. The unit also critically evaluates contemporary understandings and assessments of emotional intelligence. Current topics and research methods in coaching psychology are also examined. Each weekly seminar has a lecture component and an experiential learning component. The experiential learning component requires students to evaluate each topic in relation to their own personal life/work experience and to participate in group discussion. This unit is run in a block teaching format.

PSYC4724
Coaching Practice

Credit points: 6
Session: Semester 1, Semester 2
Classes: One 3 hour lecture per week.
Prerequisites: PSYC 4721 and 4722.
Assessment: Written papers (case study and learning journal) and exam (100%) for Semester 1.

Students will consolidate the theory and skills acquired in PSYC4721 and PSYC4722 through a semester-long coaching practice. Using real-life issues in a supportive and confidential environment, students will coach each other in a structured solution-focused personal coaching program based on the material taught in previous units of study. This unit gives students experience in being both a coach and a client. A key component of this course will be feedback from the lecturer on students’ coaching styles, skills and other relevant issues. As such this unit provides students with the opportunity to embed and develop their coaching skills. Case studies and case presentations will form part of the unit.

PSYC4727
Positive Organisational Coaching

Credit points: 6
Session: S2 Intensive Classes
Classes: Five Day Seminars: Block Teaching.
Prerequisites: PSYC4721, PSYC4722.
Assessment: A written coaching proposal (3,000 words) (50%), take home exam and written assignment (1,000 words) (35%), in-class exam (short answer and multiple choice) (15%).

How can psychology help create ‘healthy’ workplaces? Executive and management coaching have emerged as important factors in the enhancement of performance, engagement and well-being in the workplace. This unit examines key issues in contemporary executive and workplace coaching and equips students with the knowledge and skills to provide world-class executive and management coaching. The emphasis is on a critical evaluation of theory and application to practice. Although primarily focused on positive psychology, solution-focused and cognitive-behavioural approaches to coaching in organisations, the application of psychodynamic (eg Kilburg) and systems (eg O’Neill) approaches to the enhancement of performance and well-being are also considered. The unit covers issues in senior executive coaching, coaching middle management, establishing manager-as-coach programs, and the use of positive psychology in the workplace.

PSYC4729
Groups, Teams and Systems

Credit points: 6
Session: Semester 2
Classes: One 3 hour lecture per week.
Prerequisites: PSYC 4721 and 4722 and either 4724 or 4728.
Assessment: Written papers (major essay, minor essay) and exam (100%) for Semester 2.

The aim of this unit is to give students an understanding of key socio-cognitive issues related to coaching and behaviour change. The focus of the unit is on critical appraisal of theory and the relation of theory to practice and research. Topics covered in this unit include models of self-regulated behaviour, personality type, the relationships between emotion, cognition and behaviour, and the roles of learnt resourcefulness, learned optimism, psychological mindedness, self-reflection and insight in behaviour change. The unit also critically evaluates contemporary understandings and assessments of emotional intelligence. Current topics and research methods in coaching psychology are also examined. Each weekly seminar has a lecture component and an experiential learning component. The experiential learning component requires students to evaluate each topic in relation to their own personal life/work experience and to participate in group discussion. This unit is run in a block teaching format.
Coaching always takes place within the context of human systems, be they family, social networks, or workplace organisations. This unit of study considers both the theory and practice of working in human systems. At the theoretical level, students undertaking this unit will consider the major theoretical advances which aid our understanding of groups and complex human systems. These will include systems theory and complexity theory as well as major research findings in group and team dynamics. Students will also consider the practical implications of these theoretical approaches to coaching within organisations. Issues surrounding self-organisation, leadership and control, and the management of change in complex adaptive systems will also be discussed. Students will design and facilitate a small group coaching program. This unit is run in a block teaching format.

**PSYC4730**

**Applied Positive Psychology**

**Credit points:** 6  
**Session:** Semester 1  
**Classes:** 5 day-long seminars  
**Assessment:** Written papers (Essays or case studies) and exam (100%)  

This unit of study teaches the application of positive psychology to coaching in work and personal life contexts. We consider the core principles of positive psychology and how these can be applied in coaching interventions. Topics covered in this unit include: coaching as an applied positive psychology; goals, meaning and well-being; subjective and psychological well-being: happiness; gratitude; the languishing vs. flourishing dichotomy; broaden and build theory; self-concordance; well-being in the workplace; career coaching through the life span; and the use of positive psychology in health coaching. There is emphasis on both theoretical understanding and personal practice. The experiential learning component requires students to evaluate each week's topic in relation to their own personal life experience and to participate in group discussion and coaching practice.

**PSYC4731**

**Psychology of Peak Performance**

**Credit points:** 6  
**Session:** Semester 2, Summer Late  
**Classes:** 5 day-long seminars  
**Assessment:** Written papers (essays or case studies) and exam (100%)  

The Psychology of Peak Performance draws on theories and models of sport, performance and positive psychology and applies these to use in executive, workplace and personal coaching practice. Topics covered include flow, mental toughness, mental readiness, concentration enhancement strategies and techniques, rehearsal and debrief strategies, thriving under pressure, self-coaching, overcoming setbacks, performance protocols, focusing, and surviving success. In addition the unit covers issues related to high performing teams and groups. Issues of work/life balance are also addressed, particularly in relation to the management of optimal energy levels (avoiding burnout). There is emphasis on both theoretical understanding and personal practice. The experiential learning component requires students to evaluate each week's topic in relation to their own personal life experience and to participate in group discussion and coaching practice.

**Textbooks**  
No set text book. A reading pack can be obtained from the University Copy Centre

**PSYC5016**

**Research Project in Health Psychology A**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Barbara Mullan  
**Session:** Semester 1, Semester 2  
**Classes:** Contact will be mainly tutorials with students arranging the appropriate level of supervision needed. Some lectures will also be provided.  
**Prerequisites:** All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units.  
**Corequisites:** PSYC5017  
**Assessment:** Combined with PSYC5017. Project assignment 7000 to 9000 words (100%). In this unit of study the student will use as many of the identified sessions as s/he wishes for the collection of data, preparation of the project etc. under the supervision of his/her research supervisor. Lectures are voluntary and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the students’ supervisors. Students will prepare the ethics application (if applicable), review existing literature on the topic, formulate novel research questions, and test these questions through the application of contemporary psychological methodologies and appropriate data-analytic procedures. Lectures are voluntary, and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the student's supervisor.

In combination with PSYC5017 in this unit of study the student will be given the opportunity to carry out a substantial piece of research in the field of health psychology. The research process can be followed from start to finish allowing the individual to utilise knowledge and skills gained in the other unit of study. It is an intended outcome for students enrolled in the MApplSc (HealthPsych research stream) that they present evidence of their capacity to conduct a substantial piece of independent research that builds clearly upon their prior learning and which draws upon appropriate methodologies. The aim of this unit of study is to allow students to identify a research issue, review existing literature on the topic, formulate novel research questions, and test these questions through the application of contemporary psychological methodologies and appropriate data-analytic procedures. Lectures are voluntary and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the students’ supervisors. Students will prepare the ethics application (if applicable), the literature review, collect the data and write up the project with supervision.

**PSYC5017**

**Research Project in Health Psychology B**

**Credit points:** 6  
**Teacher/Coordinator:** Dr Barbara Mullan  
**Session:** Semester 1, Semester 2  
**Classes:** Contact will be mainly tutorials with students arranging the appropriate level of supervision needed. Some lectures will also be provided.  
**Prerequisites:** All of PSYC5010, PSYC5011, PUBH5018 and BACH5341; plus 12 credit points of electives. Students must have a Distinction average in the prerequisite units.  
**Corequisites:** PSYC5016  
**Assessment:** Combined with PSYC5016. Project assignment 7000 to 9000 words (100%). In this unit of study the student will use as many of the identified sessions as s/he wishes for the collection of data, preparation of the project etc. under the supervision of his/her research supervisor. Lectures are voluntary and are designed to cover common problems. The majority of support will be one-on-one tutorial sessions with the students’ supervisors. Students will prepare the ethics application (if applicable), the literature review, collect the data and write up the project with supervision.

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23. Psychology coursework degrees
24. Spatial Information Science coursework degrees

Graduate Certificate in Applied Science (Spatial Information Science)

Graduate Diploma in Applied Science (Spatial Information Science)

Master of Applied Science (Spatial Information Science)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the ‘Coursework Rule’), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

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<td>LG018</td>
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<td>Graduate Diploma in Applied Science (Spatial Information Science)</td>
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<tr>
<td>LC034</td>
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</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice, except that the graduate certificate is available part time only.

3 Master’s type

The master’s degree in these resolutions is an advanced learning master’s course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
(a) Graduate Certificate in Applied Science (Spatial Information Science)
(b) Graduate Diploma in Applied Science (Spatial Information Science)
(c) Master of Applied Science (Spatial Information Science)
(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.
(2) In exceptional circumstances the Dean may admit applicants to the Graduate Certificate or Graduate Diploma without the following qualifications, but whose evidence of experience and achievement is deemed by the Dean to be equivalent.
(3) Admission to the Graduate Certificate in Applied Science (Spatial Information Science) requires:
(a) a Bachelor of Science from the University of Sydney, or equivalent qualification; or
(4) Admission to the Graduate Diploma in Applied Science (Spatial Information Science) requires:
(a) a Bachelor of Science from the University of Sydney, or equivalent qualification; or
(b) completion of the embedded graduate certificate, from the University of Sydney, or equivalent qualification.
(5) Admission to the Master of Applied Science (Spatial Information Science) requires:
(a) a Bachelor of Science with Honours from the University of Sydney, or equivalent qualification; or
(b) a Bachelor of Science with Honours from the University of Sydney, or equivalent qualification; or
(c) completion of the embedded graduate diploma, from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Spatial Information Science postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master’s degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.
(2) To qualify for the Graduate Certificate in Applied Science (Spatial Information Science) a candidate must complete 24 credit points of core units of study.
(3) To qualify for the Graduate Diploma in Applied Science (Spatial Information Science) a candidate must complete 36 credit points of core units of study.
(4) To qualify for the Master of Applied Science (Spatial Information Science) coursework pathway a candidate must complete 48 credit points, including:
(a) 30 credit points of core units of study; and
(b) 18 credit points of elective units of study.
(c) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.
(5) To qualify for the Master of Applied Science (Spatial Information Science) research pathway a candidate must complete 48 credit points, including:
(a) 30 credit points of core units of study; and
(b) 18 credit points of elective units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview

The Applied Science (Spatial Information Science) articulated degree program provides an understanding of spatial analysis and modelling
Spatial Information Science postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Degrees: Core Units</td>
<td></td>
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</tr>
<tr>
<td>NB: All students must enrol in GEOG5001 in their first semester of enrolment</td>
<td></td>
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</tr>
<tr>
<td>GEOG5001 Geographic Information Science A</td>
<td>6</td>
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<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOG5002 Geographic Information Science B</td>
<td>6</td>
<td>A GEOG5001</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>GEOG5003 Environmental Remote Sensing</td>
<td>6</td>
<td>A Knowledge or experience equivalent to GEOG5001 (Introduction to GIS)</td>
<td></td>
<td></td>
<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>GEOG5004 Environmental Mapping and Monitoring</td>
<td>6</td>
<td></td>
<td></td>
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<td>Semester 2</td>
</tr>
</tbody>
</table>

Diploma and Masters: Optional Units

Diploma students must complete 12 credit points from the following:

Masters students may either: 1) if they have NOT completed 24 cp at credit average or better: complete 18 credit points from the following plus 6 Postgraduate credit points offered by the Faculty of Science and approved by the program coordinator, excluding GEOG5005 and RESP5001 OR 2) if they have completed 24 credit points at credit average or better: complete 24 credit points from the following table

<table>
<thead>
<tr>
<th>Unit of study</th>
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<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV15809 Environmental Simulation Modelling</td>
<td>6</td>
<td></td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>AFNRF502 Remote Sensing, GIS and Land Management</td>
<td>6</td>
<td>P Consent of the unit coordinator. Recommended units include GEOS2111/GEOS2911 (Natural Hazards: a GIS approach), ENVX3001 (Environmental GIS), SOIL 3004 (The Soil Resource), GEOS3014 (GIS in Coastal Management)</td>
<td></td>
<td></td>
<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>MARS5001 Coastal Processes and Systems</td>
<td>6</td>
<td>Note: Department permission required for enrolment Departmental permission required for enrolment</td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>MARS5004 Coastal Management Field School</td>
<td>6</td>
<td></td>
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<td></td>
<td></td>
<td>S2 Intensive</td>
</tr>
<tr>
<td>MARS5007 Coral Reefs and Climate Change</td>
<td>6</td>
<td>Note: Department permission required for enrolment Departmental permission required for enrolment</td>
<td></td>
<td></td>
<td></td>
<td>S1 Intensive</td>
</tr>
<tr>
<td>NTMP5005 Coastal Management</td>
<td>6</td>
<td>N NTMP3005 Note: Department permission required for enrolment Departmental permission required for enrolment</td>
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<td></td>
<td></td>
<td>S2 Intensive</td>
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<tr>
<td>PLAN9073 GIS Based Planning Policy and Analysis</td>
<td>6</td>
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<td></td>
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<td>S2 Late Int</td>
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</tbody>
</table>

Masters: Additional Optional Units

NB: These units are available only to Masters students who have completed 24 credit points at credit average or better

<table>
<thead>
<tr>
<th>Unit of study</th>
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<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG5005 Spatial Science Research Project</td>
<td>12</td>
<td>Note: Department permission required for enrolment Departmental permission required for enrolment</td>
<td></td>
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<td></td>
<td>Semester 1</td>
</tr>
<tr>
<td>RESP5001 Integrated Research Practice</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
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<td>Semester 1</td>
</tr>
</tbody>
</table>

Unit of study descriptions 2011

AFNRF502 Remote Sensing, GIS and Land Management

Credit points: 6 Teacher/Coordinator: A/Prof Inakwu Udeh Session: Semester 2 Classes: 3x1-hr lectures/week weeks 1-6, 1x1 project weeks 7-11, 1x1½ hour presentation scheduled for week s12 and 13, 1x3-hr practical weeks 1-6 Prerequisites: Consent of the unit coordinator. Recommended units include GEOS2111/GEOS2911 (Natural Hazards: a GIS approach), ENVX3001 (Environmental GIS), SOIL 3004 (The Soil Resource), GEOS3014 (GIS in Coastal Management). Assessment: 1x 20 min presentation (10%), laboratory work reports (30%), Group assignment (10%), 1x3000w project report (50%) This unit of study is aimed at advanced techniques in Remote Sensing (RS), linked with Geographical Information Systems (GIS), as applied to land management problems. We will review the basic principles of GIS and then focus on advanced RS principles and techniques used for land resource assessment and management. This will be followed by practical training in RS techniques, augmented by land management project development and implementation based on integration of GIS and RS tools. The unit thus consists of three separate but overlapping parts: 1) a short theoretical part which focuses on the concepts of RS; 2) a practical part which aims at developing hands-on skills in using RS tools, and 3) an application-focused module in which students will learn the skills of...
how to design a land management project and actualise it using integrated GIS and RS techniques.

Syllabus summary: Lectures will cover: Overview of the basic principles of Geographical Information Science (GISc), Advanced principles of remote sensing, Land resource information and data capture using RS, Digital elevation modelling and terrain analysis using remote sensing; Image enhancement and visualization; Image classification and interpretation; RS data interpretation for land resource inventory; RS and GIS for land use and land cover change analysis; Coupling of models of land resource assessment with GIS and RS. Fifty percent of learning time will be devoted to the design and implementation of projects, which can be selected from GIS and RS applications in: agricultural land management, vegetation studies, water and catchment (hydrological) studies; land-cover and land-use change modelling, pesticide and herbicide environmental risk assessment, environmental impact analysis, land degradation modelling including soil salinity, soil erosion, etc.

Textbooks

ENVIS009
Environmental Simulation Modelling
Credit points: 6 Teacher/Coordinator: Dr David Chapman Session: Semester 1 Classes: Six workshops. Assessment: Report (100%)

The concept and use of computer modelling in natural resource management is introduced in this unit of study, which is aimed particularly at non-programmers. The unit involves a combination of lecture and applied modelling skills, with students learning practical techniques that can be applied to different environmental issues.

GEOG5001
Geographic Information Science A
Credit points: 6 Teacher/Coordinator: Dr David Chapman Session: Semester 1, Semester 2 Classes: Six lectures plus six workshops. Assessment: Report (100%)

This unit of study gives an overview of basic spatial data models, and enables students to understand the use of data from a variety of sources within a geographical information system (GIS). The analysis of spatial data and its manipulation to address questions appropriate to planning or locational applications, will be addressed, as will the development of thematic maps from diverse data layers.

GEOG5002
Geographic Information Science B
Credit points: 6 Teacher/Coordinator: Dr Eleanor Bruce Session: Semester 2b Classes: One 2 hour lecture, one 1 hour tutorial, one 3 hour practical per week for 6 weeks. Assumed knowledge: GEOG5001 Assessment: 2500 word report, assignment, WebCT quiz (100%)

This course will provide the conceptual background to more advanced GIS analysis applications and spatial reasoning methods in the context of contemporary environmental issues. The course is designed to provide an understanding of spatial analysis techniques available within a GIS environment, explore a diversity of both social and physical environmental applications and address emerging issues in GIS research. A range of topics will be introduced including field based capture of spatial information, spatial data structures, surface modelling, visibility analysis, hydrological modeling, network analysis, spatial data uncertainty and social GIS. Conceptual material presented in lectures and tutorial workshops will be placed in an applied context through a series of laboratory and field sessions designed to strengthen practical understanding and awareness of GIS methods.

GEOG5003
Environmental Remote Sensing
Credit points: 6 Teacher/Coordinator: Dr Richard Murphy Session: Semester 1 Classes: 2 one hour lectures and a 4 hour practical per week. Assumed knowledge: Knowledge or experience equivalent to GEOG5001 (Introduction to GIS) Assessment: Assignments, practicals (100%)

The unit of study explores how remote sensing has enabled the science of Earth Observation to become the most valuable and widely-used tool for characterising and quantifying Earths vegetation, geology and marine ecosystems. The study introduces the physical processes that influence how light interacts with materials of the Earth's surface, which is the basis for Earth Observation. The course uses state-of-the-art, industry-standard software to introduce many different techniques in the analysis and interpretation of remotely sensed data. We will explore different kinds of remotely sensed data, starting from a simple colour photograph to multispectral and hyperspectral data gathered from satellites and aircraft. Earth Observation is becoming an essential skill for anyone interested in the natural environment - skills which are applicable across a wide range of science and environmental disciplines. Starting off simply, you will acquire the skills and knowledge to enable you to map and quantify vegetation and geology using image data acquired in different parts of the world. The objective of this course is to 'demystify' the use of satellite data and to provide the essential theoretical and practical skills to enable students to process data acquired by Earth Observation satellites and aircraft.

GEOG5004
Environmental Mapping and Monitoring
Credit points: 6 Teacher/Coordinator: A/Prof Peter Cowell Session: Semester 2 Classes: 2 hours of lectures and one three hour practical per week. Assessment: Assignments (100%) The unit introduces methods associated with acquiring data in the field and examines issues associated with application of spatial data to environmental monitoring, terrain mapping and geocomputing. Students will learn both theoretically and practically how environmental data is collected using different remote sensing techniques, (pre)processing methods of integrating data in a GIS environment and the role of spatial data in understanding landscape processes and quantifying environmental change.

GEOG5005
Spatial Science Research Project
Credit points: 12 Session: Semester 1, Semester 2 Classes: Regular meetings with supervisor Assessment: Written thesis (100%) Note: Department permission required for enrolment.

This unit provides students with an opportunity for research and in-depth inquiry in a spatial science topic of interest allowing students to further extend their knowledge or theoretical and conceptual material presented in other units. The research topic will be arranged between the student and supervisor and must have a spatial science focus. Potential topics range from modeling coastal impacts of predicted sea level rise, applying remote sensing in vegetation change detection to the spatial modeling of public transport accessibility. The project topic may involve a spatial modeling or field component, or may be entirely literature-based.

MARS5001
Coastal Processes and Systems
Credit points: 6 Teacher/Coordinator: Dr Ana Vila-Concejo Session: Semester 1 Classes: One 2 hour lecture, one 1 hour tutorial, one 3 hour practical per week for 6 weeks. Assessment: Assignment, presentation and quiz (100%) Note: Department permission required for enrolment.

This unit of study explains the major coastal processes and systems of relevance to coastal zone management. These include rocky coasts and cliffs; beaches, barriers and dunes; and estuaries and inlets. The interactions between these processes and systems that are of most relevance to coastal management are highlighted, including coastal hazards such as beach erosion, dune migration, bluff retreat, coastal flooding and inlet closure/opening. Anthropogenic impacts are also analysed. The unit is presented in lectures and field excursions, the latter enabling each system to be examined first hand.
MARS5004
Coastal Management Field School
Credit points: 6 Teacher/Coordinator: A/Prof Peter Cowell Session: S2 Intensive Classes: Fieldwork 80 hours block mode Assessment: Assignment and report (100%)

The field school will be based around visits to a series of coastal sites along the NSW coast. The unit will include a series of introductory lectures followed by visits to the sites where both unit staff and local coastal managers and stakeholders will address the students on the nature of the site, its historical development and contemporary coastal management issues and solutions. Sites will be selected to the representative of both the range of coastal systems present along the NSW coast, as well as the range of management issues presented by the sites.

MARS5007
Coral Reefs and Climate Change
Credit points: 6 Teacher/Coordinator: Dr Jody Webster Session: S1 Intensive Classes: 80 hours block mode includes lectures, tutorials and fieldwork Assessment: Written assignments: essay and project report; oral presentations; seminar and lecture participation (100%) Note: Department permission required for enrolment.

This unit provides an in-depth understanding of the key geological, oceanographic, biological and economic factors affecting climate change, energy generation and needs with specific reference to the Great Barrier Reef. Computer prediction of worst and best case scenarios are used to develop management strategies and policy implications. Learning activities will include a series of background lectures and research seminars, and tutorials on the development of a major research project. A major aspect of this unit is an independent research project conducted under the supervision of the course instructors. The unit concludes with a series of oral presentations based on student research. Assessment tasks will consist of two essays and a research project report and presentation. The curriculum in this unit is based on current research and a course book will be provided. This is a field intensive course held at One Tree Island Research Station. The course is ex-Gladstone Queensland and students are expected to make their own way there. The unit will be run over 8 days and there will be an additional course fee for food and accommodation, expected to be $600.

NTMP5005
Coastal Management
Credit points: 6 Teacher/Coordinator: Dr Ana Vila-Concejo Session: S2 Intensive Classes: Fieldschool 80 hours intensive, includes field work and field trips. Prohibitions: NTMP3005 Assessment: Assignment, presentation and quiz (100%) Note: Department permission required for enrolment.

This course examines the impacts of human activities on coastal and marine environments. It explores the complex relationships among the ecological and social values of these environments and outlines strategies and tools for their management. This is an intensive course that includes lectures on campus and at the Sydney Institute of Marine Science (SIMS) located in Chowder Bay as well as field trips to sites of interest.

PLAN9073
GIS Based Planning Policy and Analysis
Credit points: 6 Teacher/Coordinator: Prof Alan Peters Session: S2 Late Int Classes: lectures, studios and workshops 2 hrs/wk Assessment: Two smaller analytical assessments (2x25%) and a larger report (50%) This unit is concerned with using GIS to analyse planning problems and undertake policy analyses. The unit will include a comprehensive introduction to mapping and the use of GIS: data structures, topology, projections, spatial and non-spatial queries. Australian census products will be described and students will be expected to analyse census statistics using GIS maps. The role of GIS in coordinating various forms of information for policy analyses, preparing master plans, in presenting information for development control, impact analyses and wider management purposes will also be covered. The use of GIS to support visualisation will be covered, using examples about designing development projects and planning instruments. Finally, the various forms of distributing maps to the public and policy-makers will be discussed.

The unit integrates the hands-on learning of GIS software with a "research-based" approach. Teaching will involve short lectures, studios and workshops. Assessment will be on a series of smaller assignments and a larger report prepared by each student that integrates GIS-based (and other) graphics into a coherent policy analysis. In addition, each student will make oral presentations on their work in studio sessions.

RESP5001
Integrated Research Practice
Credit points: 6 Teacher/Coordinator: A/Prof D Dragovich Session: Semester 1, Semester 2 Assessment: Three 1000 word reports, oral presentation (100%) Note: Department permission required for enrolment.

This unit will provide research training for students wishing to undertake research at a Masters or PhD level. Students will revise or develop the necessary skills for commencing a research degree, including critical reading, developing the thesis proposal, developing a research plan with timelines and benchmarks, critical writing, library search techniques, use of referencing systems like EndNote, working with a supervisor, and matters relating to intellectual property and authorship.
25. Wildlife Health and Population Management coursework degrees

Graduate Certificate in Applied Science (Wildlife Health and Population Management)

Graduate Diploma in Applied Science (Wildlife Health and Population Management)

Master of Applied Science (Wildlife Health and Population Management)

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

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</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Applied Science (Wildlife Health and Population Management)
   (b) Graduate Diploma in Applied Science (Wildlife Health and Population Management)
   (c) Master of Applied Science (Wildlife Health and Population Management)
(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria.
(2) In exceptional circumstances the Dean may admit applicants to the Graduate Certificate or Graduate Diploma without the following qualifications, but whose evidence of experience and achievement is deemed by the Dean to be equivalent.

(3) Admission to the Graduate Certificate in Applied Science (Wildlife Health and Population Management) requires:
   (a) a Bachelor of Science or a Bachelor of Veterinary Science from the University of Sydney, or equivalent qualification; or
   (b) completion of the embedded graduate certificate in this stream, from the University of Sydney, or equivalent qualification.

(4) Admission to the Graduate Diploma in Applied Science (Wildlife Health and Population Management) requires:
   (a) a Bachelor of Science or a Bachelor of Veterinary Science, with a credit average, from the University of Sydney or equivalent qualification; or
   (b) a Bachelor of Science or a Bachelor of Veterinary Science with Honours from the University of Sydney, or equivalent qualification; or
   (c) completion of the embedded graduate diploma in this stream, from the University of Sydney, or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Wildlife Health and Population Management postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate diploma or master's degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.
(2) To qualify for the Graduate Certificate in Applied Science (Wildlife Health and Population Management) a candidate must complete 24 credit points, including:
   (a) 12 credit points of core units of study; and
   (b) 12 credit points of elective units of study.
(3) To qualify for the Graduate Diploma in Applied Science (Wildlife Health and Population Management) a candidate must complete 36 credit points, including:
   (a) 12 credit points of core units of study; and
   (b) 24 credit points of elective units of study.
(4) To qualify for the Master of Applied Science (Wildlife Health and Population Management) coursework pathway a candidate must complete 48 credit points, including:
   (a) 12 credit points of core units of study; and
   (b) 36 credit points of elective units of study.
(5) Subject to the availability of supervision and suitable projects, candidates with a credit average in 24 credit points of study from the degree may be admitted to the research pathway.
(6) To qualify for the Master of Applied Science (Wildlife Health and Population Management) research pathway a candidate must complete 48 credit points, including:
   (a) 24 credit points of core units of study; and
   (b) 24 credit points of elective units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that...
requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course overview
The Graduate Certificate in Applied Science (Wildlife Health and Population Management), Graduate Diploma in Applied Science (Wildlife Health and Population Management) and Master of Applied Science (Wildlife Health and Population Management) are articulated award courses that provide a professional qualification to biologists and veterinarians working in private practice, industry, research and education. The award program brings together the disciplines of animal health and wildlife population management, developing and enhancing skills in conservation techniques for native fauna, diagnosis and management of wildlife health, and management of native and pest species populations.

Candidates will normally commence their study in Semester 1, except with the permission of the Dean.

Course outcomes
The aim of this articulated coursework program is to provide students with a coordinated and interdisciplinary approach to wildlife health and wildlife management, thus developing expertise to recognise and solve a broad range of problems in field populations. Upon completion of the graduate certificate, graduate diploma or Master's, graduates will have a broad understanding of the topic of wildlife management and practical skills developed from field studies. In addition, the Master's will provide experience in designing, carrying out and completing a research project and thesis.

Graduates of the Master of Applied Science (Wildlife Health & Population Management) are eligible to apply for admission to a research degree (PhD).

Wildlife Health and Population Management postgraduate coursework degree table

<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Degrees: Core Units</td>
<td></td>
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<tr>
<td>WILD5001 Australasian Wildlife: Introduction</td>
<td>6</td>
<td></td>
<td></td>
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<td></td>
<td>S1 Intensive</td>
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<tr>
<td>WILD5002 Australasian Wildlife: Field Studies</td>
<td>6</td>
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<td></td>
<td>S1 Intensive</td>
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<tr>
<td>Masters: Additional Core Unit</td>
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<tr>
<td>WILD5009 Research Project</td>
<td>12</td>
<td>P Credit average or greater in 24 credit points from the program including WILD5001 and WILD5002 Core for the Masters program</td>
<td></td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>Optional Units</td>
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<tr>
<td>Graduate Certificate students must complete 12 credit points from the following</td>
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<tr>
<td>Graduate Diploma students must complete 24 credit points from the following</td>
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<td>Masters students must complete 30 credit points from the following</td>
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<tr>
<td>WILD5003 Wildlife Health</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S1 Late Int</td>
</tr>
<tr>
<td>WILD5004 Vertebrate Pest Management</td>
<td>6</td>
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<td></td>
<td></td>
<td></td>
<td>S2 Intensive</td>
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<tr>
<td>WILD5005 In Situ Wildlife Management</td>
<td>6</td>
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<td></td>
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<td></td>
<td>S1 Late Int</td>
</tr>
<tr>
<td>WILD5006 Ex Situ Wildlife Management</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S2 Late Int</td>
</tr>
<tr>
<td>ENVI5808 App Ecology for Environmental Scientists</td>
<td>6</td>
<td>This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program</td>
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<td>Semester 2</td>
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<tr>
<td>RESP5001 Integrated Research Practice</td>
<td>6</td>
<td>Note: Department permission required for enrolment</td>
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<td></td>
<td>Semester 1 Semester 2</td>
</tr>
</tbody>
</table>

Unit of study descriptions 2011

**WILD5001 Australasian Wildlife: Introduction**
Credit points: 6  
Teacher/Coordinator: Dr Crowther  
Session: S1 Intensive  
Classes: Intensively taught unit. The remainder of the unit will involve personal study and project activity. See the Wildlife Health and Population Management website for dates.  
Assessment: Assessments for each unit may include practical work, field studies, student presentations and written reports (100%)  

This unit of study provides an introduction to the wildlife of Australasia, an overview of the present status of that wildlife, and an understanding of both conservation problems and management solutions. Issues in wildlife management are exemplified using a broad range of vertebrate species occupying different environments. Emphasis is placed on providing students with a coordinated and interdisciplinary approach to wildlife health and management, and on developing expertise in recognising and solving a broad range of problems in field populations.  
The unit integrates lectures, practical work and supervised study, and offers students the opportunity to work through real-world wildlife conservation problems relevant to their individual backgrounds.

**WILD5002 Australasian Wildlife: Field Studies**
Credit points: 6  
Teacher/Coordinator: Dr Crowther  
Session: S1 Intensive  
Classes: Intensively taught unit. See the Wildlife Health and Population Management website for dates.  
Assessment: Assessments for each unit may include practical work, field studies, student presentations and written reports (100%)  

This unit of study provides a first-hand introduction to the wildlife of Australasia, a practical overview of the present status of that wildlife, and an understanding of both conservation problems and management solutions. Issues in wildlife management are exemplified using sampling and diagnostic methods on a broad range of vertebrate species occupying different environments. The unit follows on from
WILD5001 and provides practical experience via a five day field trip at the university farm “Arthursleigh” near Marulan NSW.

WILD5003 Wildlife Health
Credit points: 6 Teacher/Coordinator: Assoc Prof DN Phalen Session: S1 Late Int Classes: A full-time week on the Camden campus, with one day spent on a field trip to Taronga Zoo. Assessment: The assessment of this unit occurs both in the full-time week and in individual written assignments done in the student’s own time. The full-time week contributes 40% of the total mark through a number of individual and syndicate tasks, with presentations to the group (40%). The remaining 60% comes from two written assignments of 3000 words (20%) and 5000 words (40%) respectively.

This unit of study provides an introduction to the health issues confronting wildlife in Australasia, an overview of the health status of that wildlife, an understanding of both the investigation of health problems and the effective management of these. Issues in wildlife disease management are exemplified using a broad range of vertebrate species occupying different environments. Emphasis is placed on providing students with a coordinated and interdisciplinary approach to wildlife health, and on developing expertise in recognising and solving a broad range of health problems in field populations. The unit is taught intensively in a full-time week on the Camden campus, with one day spent on a field trip to Taronga Zoo. The unit integrates lectures, practical work and supervised study, and offers students the opportunity to work through real-world wildlife conservation problems relevant to their individual backgrounds.

Textbooks
Unit of Study Handbook is the primary reference.

WILD5004 Vertebrate Pest Management
Credit points: 6 Teacher/Coordinator: Tony Buckmaster Session: S2 Intensive Classes: The Unit is taught in a full-time week at the university farm “Arthursleigh” near Marulan NSW. There are lectures, tutorials, and a variety of practical classes. Assessment: The assessment of this unit occurs both in the full-time week and in individual written assignments done in the student’s own time. The full-time week contributes 40% of the total mark through a number of individual and syndicate tasks, with presentations to the group. The remaining 60% comes from two written assignments of 3000 words (20%) and 5000 words (40%) respectively.

Vertebrate pests occur in many parts of the world, and can pose significant problems for management of habitat, agricultural productivity, human and wildlife health. This unit focuses on vertebrates that have been introduced to new environments, and considers in detail the impacts and management of pest vertebrates in Australia. Steps in pest management are reviewed, from problem analysis to acceptable levels of control, using case studies of cane toads, rabbits, house mice and red foxes. Traditional mortality methods of management are reviewed, and emphasis placed on developing methods based on fertility control. The Unit is taught in a full-time week at the university farm “Arthursleigh” near Marulan NSW. There are lectures, tutorials, and a variety of practical classes.

Textbooks
Unit of Study Handbook is the primary reference.

WILD5005 In Situ Wildlife Management
Credit points: 6 Teacher/Coordinator: Dr Mathew Crowther Session: S1 Late Int Classes: Intensively taught unit. See the Wildlife Health and Population Management website for dates. Assessment: Assessments for each unit may include practical work, field studies, student presentations and written reports (100%)

Wildlife populations do not remain static, but change in size and composition over both time and space. The challenge for managers is to recognise when change in target populations exceeds acceptable limits and intervention is necessary. This unit of study develops skills in assessing population status and recognising differences between ‘small populations’ and ‘declining populations’. It introduces methods used in population pattern analysis, demographic analysis, threat and resource assessment, and determination of health, emphasising the value of a coordinated and interdisciplinary approach to problem recognition and resolution. This course is taught at both the Royal National Park and the main campus of the University of Sydney.

WILD5006 Ex Situ Wildlife Management
Credit points: 6 Teacher/Coordinator: Dr Derek Spielman Session: S2 Late Int Classes: The Unit is taught in a full-time week at Western Plains Zoo in Dubbo, NSW. Assessment: The assessment of this unit occurs both in the full-time week and an individual written assignment done in the student’s own time. The full-time week contributes 40% of the total mark through a number of individual and syndicate tasks, with presentations to the group (40%). The remaining 60% comes from a written assignment (60%).

Wildlife populations are under a variety of threats, most of which result from human activities. Modern conservation biology seeks practical solutions to these problems, using a wide variety of options. These options may include captive breeding and re-introduction programs, provided that a range of biological, ethical and socio-economic issues are addressed. This unit of study will provide students with the ability to evaluate the likely cost-effectiveness of such programs. It will also develop knowledge of the technologies available to capture and translocate wildlife, and of the planning required to ensure the best possible chance of success. The Unit is taught in a full-time week at Western Plains Zoo in Dubbo, NSW. The unit integrates lectures, tutorials, practical work and supervised study, and offers students the opportunity to examine real-world problems in the conservation and management of threatened wildlife populations using case studies relevant to their individual backgrounds.

Textbooks
Unit of Study Handbook is the primary reference.

WILD5009 Research Project
Credit points: 12 Session: Semester 1, Semester 2 Classes: meetings throughout semester to be arranged with supervisor. Prerequisites: Credit average or greater in 24 credit points from the program including WILD5001 and WILD5002. Assessment: independent research project (100%) Note: Core for the Masters program

A valuable opportunity to apply some of the knowledge gained from earlier coursework, WILD5009 comprises a research project on a topic with significant emphasis on wildlife health and/or population management, as arranged between the student and an appropriate supervisor. This research experience is highly valued by prospective employers as it shows a willingness and ability to undertake guided but independent research. The project is not conducted by way of contact hours per week for a semester. Instead the student is expected to work on the project full-time and in a continuous manner for the semester. This unit of study is available only to students enrolled in the Master of Applied Science (Wildlife Health and Population Management).

ENVI5808 App Ecology for Environmental Scientists
Credit points: 6 Teacher/Coordinator: Dr Clare McArthur Session: Semester 2 Classes: Three 1 hour lectures per week. Assessment: Essays and presentations (100%) Note: This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program

This unit of study complements ENVI5705, and covers in depth the concerns of modern ecology pertaining to both terrestrial and marine ecosystems. An understanding of the complex issues of invasive species, conservation of biodiversity and ecological management of the environment is provided.

RESP5001 Integrated Research Practice
Credit points: 6 Teacher/Coordinator: AProf D Dragovich Session: Semester 1, Semester 2 Assessment: Three 1000 word reports, oral presentation (100%) Note: Department permission required for enrolment

This unit will provide research training for students wishing to undertake research at a Masters or PhD level. Students will revise or
develop the necessary skills for commencing a research degree, including critical reading, developing the thesis proposal, developing a research plan with timelines and benchmarks, critical writing, library search techniques, use of referencing systems like EndNote, working with a supervisor, and matters relating to intellectual property and authorship.
26. Sustainability Coursework degrees

Graduate Certificate in Sustainability
Graduate Diploma in Sustainability
Master of Sustainability

These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Coursework) Rule 2000 (the 'Coursework Rule'), the Resolutions of the Faculty, the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended) and the Academic Board policies on Academic Dishonesty and Plagiarism.

Course resolutions

1 Course codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG025</td>
<td>Graduate Certificate in Sustainability</td>
</tr>
<tr>
<td>LF042</td>
<td>Graduate Diploma in Sustainability</td>
</tr>
<tr>
<td>LC054</td>
<td>Master of Sustainability</td>
</tr>
</tbody>
</table>

2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

3 Master's type

The master's degree in these resolutions is an advanced learning master's course.

4 Embedded courses in this sequence

(1) The embedded courses in this sequence are:
   (a) Graduate Certificate in Sustainability
   (b) Graduate Diploma in Sustainability
   (c) Master of Sustainability

(2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any course in this sequence. Only the highest award completed will be conferred.

5 Admission to candidature

(1) With approval from the Dean, available places will be offered to qualified applicants according to the following admissions criteria:
(2) Admission to the Graduate Certificate in Sustainability requires:
   (a) a degree of Bachelor from the University of Sydney or equivalent qualification;
   (b) experience which is considered to demonstrate the knowledge and aptitude required to undertake the units of study.
(3) Admission to the Graduate Diploma in Sustainability requires:
   (a) a degree of Bachelor from the University of Sydney or equivalent qualification;
   (b) completion of the requirements of the Graduate Certificate in Sustainability from the University of Sydney or equivalent qualification.
(4) Admission to the Master of Sustainability requires:
   (a) a degree of Bachelor with a credit average from the University of Sydney or equivalent qualification;
   (b) completion of the requirements of the Graduate Diploma in Sustainability from the University of Sydney or equivalent qualification.

6 Requirements for award

(1) The units of study that may be taken for these awards are set out in the table for Sustainability postgraduate courses. With the approval of the Dean and the program coordinator, candidates for the graduate certificate, graduate diploma or master's degree, with special aims or interests, may be allowed to substitute up to 12 credit points with relevant postgraduate units from outside the table.
(2) To qualify for the Graduate Certificate in Sustainability a candidate must complete 24 credit points, including:
   (a) 12 credit points of core units of study; and
   (b) 12 credit points of units of study selected from the remaining core units of study or elective units of study.
(3) To qualify for the Graduate Diploma in Sustainability a candidate must complete 48 credit points, including:
   (a) 36 credit points of core units of study; and
   (b) 12 credit points of units of study selected from the remaining core units of study or elective units of study.
(4) To qualify for the Master of Sustainability a candidate must complete 72 credit points, including:
   (a) 36 credit points of core units of study; and
   (b) 12 credit points of elective units of study from the remaining core units of study or elective units of study; and
   (c) 24 credit points of Capstone experience units of study.

7 Transitional provisions

(1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
(2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016, or later date as the faculty may, in special circumstances, approve.

Course Overview

The Sustainability degrees are cross disciplinary qualifications aimed at producing sustainability professionals able to augment their discipline-specific skills with an appreciation of the technological, commerical, legal, governmental and societal imperatives underpinning sustainability issues.

The Master of Sustainability has been developed in collaboration between the University's Institute of Sustainable Solutions and industry professionals from areas such as energy, finance, the media, planning, health, law, and government. It builds upon the Graduate Diploma in Sustainability and sets out in the table for Sustainability postgraduate courses.

Course Outcomes

Upon completion of the course, graduates will be equipped to engage in developing and implementing solutions to the complex conundrum of delivering acceptable life styles for all without compromising the fate of future generations.
<table>
<thead>
<tr>
<th>Unit of study</th>
<th>Credit points</th>
<th>A: Assumed knowledge</th>
<th>P: Prerequisites</th>
<th>C: Corequisites</th>
<th>N: Prohibition</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit of study descriptions 2011</strong></td>
<td></td>
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<tr>
<td><strong>Core unit - all degrees</strong></td>
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<tr>
<td>SUST5001 Introduction to Sustainability</td>
<td>6</td>
<td>A A three years Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>SUST5002 Food and Water Security</td>
<td>6</td>
<td>A A three year Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
<td>C SUST5001</td>
<td></td>
<td></td>
<td>Semester 1 Semester 2</td>
</tr>
<tr>
<td>SUST5003 Energy and Resources</td>
<td>6</td>
<td>A A three year Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
<td>C SUST5001</td>
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<td></td>
<td>Semester 1 Semester 2</td>
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<tr>
<td>SUST5004 Populations and Health</td>
<td>6</td>
<td>A A three year Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
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<td></td>
<td>S1 Intensive S2 Intensive</td>
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<tr>
<td>SUST5005 Policy and Security</td>
<td>6</td>
<td>A A three year Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
<td>C SUST5001</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>SUST5006 Sustainability, Society and Change</td>
<td>6</td>
<td>A A three year Bachelors (pass) degree from the University of Sydney or equivalent qualifications/learning.</td>
<td>C SUST5001</td>
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<td>Summer Main</td>
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<tr>
<td><strong>Elective units of study</strong></td>
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<tr>
<td>AFNR5502 Remote Sensing, GIS and Land Management</td>
<td>6</td>
<td>P Consent of the unit coordinator. Recommended units include GEOS2111/GEOS2911 (Natural Hazards: a GIS approach), ENVOX001 (Environmental GIS), SOIL 3004 (The Soil Resource), GEOS3014 (GIS in Coastal Management)</td>
<td></td>
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<td></td>
<td>Semester 2</td>
</tr>
<tr>
<td>BIOL5001 Molecular Genetics and Inheritance</td>
<td>6</td>
<td>Note: Department permission required for enrolment. Department permission not required for Stream A Bioinformatics students.</td>
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<td>Semester 1</td>
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<tr>
<td>ENGS5501 Greenhouse Gas Mitigation</td>
<td>6</td>
<td>Note: Department permission required for enrolment. Unit Administration: WebCT</td>
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<td>Semester 2</td>
</tr>
<tr>
<td>ENVIS5501 Environmental Research Project</td>
<td>12</td>
<td>P 24 credit points of study with a credit average or better</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>ENVIS505 Ecological Principles for Environ Scientists</td>
<td>6</td>
<td>This is a compulsory course for all levels of the postgraduate Applied Science (Environmental Science) program.</td>
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<tr>
<td>ENVIS507 Energy - Sources, Uses and Alternatives</td>
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<td>Semester 2</td>
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<tr>
<td>ENVIS508 Introduction to Environmental Chemistry</td>
<td>6</td>
<td>This is a compulsory course for the Grad Dip and Masters levels of the Applied Science (Environmental Science) program.</td>
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<tr>
<td>ENVIS501 Social Science of Environment</td>
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<tr>
<td>ENVIS503 Law and the Environment</td>
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<tr>
<td>ENVIS505 App Ecological Planning and Environment</td>
<td>6</td>
<td>This is a compulsory unit for all levels of the postgraduate Applied Science (Environmental Science) program</td>
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<tr>
<td>ENVIS509 Environmental Simulation Modelling</td>
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<tr>
<td>ENVIS503 Sustainable Development</td>
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<td>ENVIS504 Understanding Environmental Uncertainty</td>
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<td>ENVIS505 Management of Parks</td>
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<tr>
<td>GEOG5001 Geographic Information Science A</td>
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<td>Semester 1 Semester 2</td>
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<tr>
<td>GEOG5002 Geographic Information Science B</td>
<td>6</td>
<td>A GEOG5001</td>
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<td>Semester 2b</td>
</tr>
<tr>
<td>GEOG5003 Environmental Remote Sensing</td>
<td>6</td>
<td>A Knowledge or experience equivalent to GEOG5001 (Introduction to GIS)</td>
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<td>Semester 1</td>
</tr>
<tr>
<td>GEOG5004 Environmental Mapping and Monitoring</td>
<td>6</td>
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Units of Study 2011

SUST5001
Introduction to Sustainability
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three years Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5002
Food and Water Security
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three years Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5003
Energy and Resources
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three years Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5004
Populations and Health
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters Session: S1 Intensive, S2 Intensive Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three years Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5005
Policy and Security
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three year Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5006
Sustainability, Society and Change
Credit points: 6 Teacher/Coordinator: Associate Professor Tony Masters. Session: Summer Main Classes: One 3 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. Assumed knowledge: A three year Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Essays, short written assignments (100%)

SUST5007
Research Project A
Credit points: 24 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: Regular meetings at times by agreement with mentor. Assumed knowledge: A three year Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Combination of 3 written reports, presentations. Diary/Log, meeting attendance (100%)

SUST5008
Research Project B
Credit points: 12 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: Regular meetings at times by agreement with mentor. Assumed knowledge: A three year Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Combination of 3 written reports, presentations. Diary/Log, meeting attendance (100%)

SUST5009
Research Project C
Credit points: 12 Teacher/Coordinator: Associate Professor Tony Masters Session: Semester 1, Semester 2 Classes: Regular meetings at times by agreement with mentor. Assumed knowledge: A three year Bachelor's (pass) degree from the University of Sydney or equivalent qualifications/learning. Assessment: Combination of 3 written reports, presentations. Diary/Log, meeting attendance (100%)

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agreement with mentor  

**Prerequisites:** SUST5001, SUST5002, SUST5003, SUST5004, SUST5005, SUST5006  
**Prohibitions:** SUST5007  
**Assumed knowledge:** An undergraduate degree in Science  
**Assessment:** Combination of 3 written reports, 3 presentations. Diary/Log, meeting attendance (100%)
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