2007
handbook

Agriculture, Food and Natural Resources

The University of Sydney

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Acknowledgments

The Arms of the University

Sidere mens eadem mutato
Though the constellation may change
the spirit remains the same.

Disclaimer
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.

All updates to the information in this handbook can be found at www.usyd.edu.au/handbooks/handbooks_admin/updates.shtml

Disability
Accessible versions of this document in Microsoft Word are available at www.usyd.edu.au/handbooks/handbooks_disability/index.shtml

Resolutions
Numbering of Faculty Resolutions is for convenience only and does not affect the interpretation of the Faculty Resolutions, unless the context otherwise requires.

Production
Publications Office
Website: www.usyd.edu.au/about/organisation/pub/publications.shtml

Printing
University Publishing Service
Website: www.usyd.edu.au/ups/

Handbook enquiries
Copies of the handbooks are available online at www.usyd.edu.au/handbooks/

For any enquiries relating to the handbook, please email the publisher at handbooks@publications.com.au

The University of Sydney
NSW 2006, Australia
Phone: + 612 9351 2222
Website: www.usyd.edu.au

CRICOS Provider Code 00026A
ISSN: 1034-2575

Important dates – How to use a handbook

University semester and vacation dates for 2007

Summer School lectures	**Dates**
December program	Monday 11 December to Friday 28 February
Main program	Thursday 4 January to Friday 28 February
Late January program	Friday 12 January to Friday 28 February
Winter School lectures	**Dates**
For the latest dates please refer to http://www.summer.usyd.edu.au/winter/	
Semester One	**Dates**
International student orientation (Semester One)	Monday 12 February to Thursday 15 February
Lectures begin	Monday 5 March
AVCC Common Week/non-teaching Easter period	Friday 6 April to Friday 13 April
International Application Deadline (Semester Two) *	Monday 30 April
Last day of lectures	Friday 8 June
Study vacation	Monday 11 June to Friday 15 June
Examination period	Monday 18 June to Saturday 30 June
Semester ends	Saturday 30 June
AVCC Common Week/non-teaching period	Monday 2 July to Friday 6 July
Semester Two	**Dates**
International student orientation (Semester Two)	Monday 16 July to Thursday 19 July
Lectures begin	Monday 23 July
AVCC Common Week/non-teaching period	Monday 24 September to Friday 28 September
International application deadline (Semester One 2008)*	Wednesday 31 October*
Last day of lectures	Friday 26 October
Study vacation	Monday 29 October to Friday 2 November
Examination period	Monday 5 November to Saturday 17 November
Semester ends	Saturday 17 November

*Deadlines for application to the USydMP and BDent are different. Please see: www.acer.edu.au/tests/universit/gamsat

Last dates for withdrawal or discontinuation for 2007

Semester One units of study	**Dates**
Last day to add a unit	Friday 16 March
Last day for withdrawal	Saturday 31 March
Last day to discontinue without failure (DNF)	Friday 27 April
Last to discontinue (Discontinued – Fail)	Friday 8 June
Semester Two units of study	**Dates**
Last day to add a unit	Friday 3 August
Last day for withdrawal	Friday 31 August
Last day to discontinue without a failure (DNF)	Friday 7 September
Last day to discontinue (Discontinued – Fail)	Friday 26 October
Last day to withdraw from a non-standard unit of study	Census date of the unit, which must not be earlier than 20 per cent of the way through the period of time during which the unit is undertaken
Public holidays	**Dates**
Australia Day	Friday 26 January
Good Friday	Friday 6 April
Easter Monday	Monday 9 April
Anzac Day	Wednesday 25 April
Queen's Birthday	Monday 11 June
Labour Day	Monday 1 October

What is a handbook?

The handbook is an official publication and an essential guide for every student who studies at the University of Sydney. It is an important source of enrolment information. It can also help you with more than just planning your course of study.

As a student at the University of Sydney you need to be aware of course structures and content, who your lecturers are, as well as examination procedures. You should also become familiar with University policies and faculty rules and regulations. The handbook will supply a lot of this information.

It will also point you to places and people around the University who can help you with enquiries about library loans, childcare, fees, casual employment, places to eat and stay, support groups and much, much more.

What new students need to know

- terminology used for courses and programs of study
- semester dates and examination periods
- important contact details
- how to plan your study program
- rules and policies on assessment, satisfactory progression, honours etc.
- what University services are available and where to find them
- how to get around your campus

At the beginning of many of these chapters there will be explanations to help you proceed further.

Where to find what

Course terminology

University terminology – like 'credit point', 'unit of study', 'WAM' etc – can be found at the back of all handbooks.

Definitions of all terminology are located in the General University information section under **Abbreviations and Glossary**, at the back of this handbook.

Dates

The start and finish dates of semester can be found in the front section of the handbook. Summer School dates are in the General University section at the back of the handbook.

Contents and index

The comprehensive **contents** section at the front of the handbook explains the details you'll find within each chapter.

You'll find information like:

- how and where to contact Faculty staff
- how to select your units of study and programs
- a list of degrees
- detailed information on all units of study – classified by unit identifiers (a four-alpha, four-digit code and a title)
- electives and streams
- scholarships and prizes
- information specific to faculties

The **index** lists units of study only. It allows you to check every reference which refers to your unit of study within the handbook.

Colour-coded sections

- Ivory – for undergraduate courses
- Blue – for postgraduate courses

Faculty rules and regulations

Faculty resolutions are the rules and regulations pertaining to a specific faculty. They can generally be found in their own chapter, or next to the relevant units of study.

These should be read along with the University's own *Coursework Rule 2000 (as amended)* which can be found in the general University information towards the back of the book. Together they outline the agreement between student and faculty, and student and University. Senate resolutions are located in the University Calendar.

General University information

This is information about the University in general, rather than information specific to the faculty. This information is at the back of the book and includes, among other things:

- the University Coursework Rule
- the PhD Rule
- University terminology and abbreviations
- campus maps to help you find your way around
- Summer School information
- international student information
- student services

Course planner

You might like to plot the course of your degree as you read about your units of study. This planner can be found at the back of the handbook.

Timetables

For information about personal timetables, centrally timetabled units of study, and venue bookings, see http://www.usyd.edu.au/studentcentre/timetabling.shtml.

For the session calendar, see http://web.timetable.usyd.edu.au/calendar.jsp

Students with a disability

Accessible versions of this document, including word, pdf and html versions are available at http://www.usyd.edu.au/handbooks/handbooks_disability/.

You can find information on Disability Services in the General University information section of the handbook. The Service can provide information regarding assistance with enrolment and course requirement modifications where appropriate.

For details on registering with the Service and online resources see the Disability Services website http://www.usyd.edu.au/disability.

Handbook updates

The information in the handbook is current at the time of publication. Updated information to handbooks and references to University policies such as plagiarism and special consideration, among others can be found in the University's website.

Feedback regarding the Handbook is welcome.
Visit http://www.usyd.edu.au/handbooks/

Contents

Welcome from the Dean

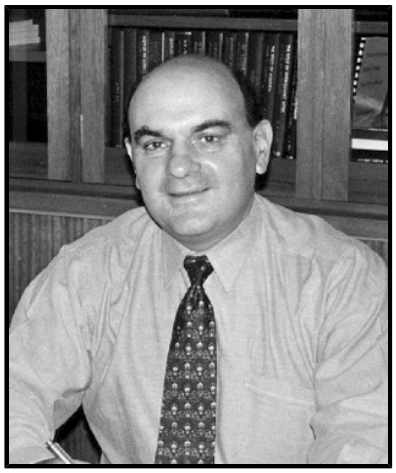
Welcome to the Faculty of Agriculture, Food and Natural Resources, which has been a leading provider of agricultural education for almost 100 years. The Faculty offers students many distinctive advantages. It has core academic activities in areas of strategic national and international importance at the important interface between applied science and applied economics.

The Faculty has a strong research culture, extensive engagement with industry, professions and agribusiness, and is part of a comprehensive University in one of the world's most attractive metropolitan areas. Teaching and research are conducted mainly on the Camperdown Campus of the University near Sydney's central business district, and also at Cobbitty about 65 kilometres south west of Sydney and at rural research stations and on farms owned by the University. The teaching programs recognise the diverse destinations of graduates, who enjoy high employment rates and express a high degree of career satisfaction.

All of the undergraduate degrees aim to give students an appreciation of the scientific and socio-economic framework of the agricultural and natural resources sectors, while affording students the opportunity to specialise in subject areas of their choosing. In Year 4, students complete a research project which, as employers frequently comment, equips graduates for the professional workplace. Rural field trips and professional experience put the teaching into a practical context and allow the development of networks for future careers. Excursions and field-based teaching help students to get to know each other well, establish an *esprit de corps* in the Faculty, and build a good rapport between students and staff.

The Faculty has major research strengths in plant improvement, plant biotechnology, plant disease, cereal science, soil science, precision agriculture, and agricultural and resource economics, whereas post-harvest horticulture, assessment and management of land and water resources, and land-use policy in developing countries are areas of emerging strength. The research attracts substantial external funding and a strong cohort of postgraduate students.

The Faculty hosts several research centres, including the Plant Breeding Institute, a world class facility for research on cereal rusts and cereal and horticultural plant breeding, and the Australian Centre for Precision Agriculture, which is at the leading edge internationally of research in this exciting field. The Faculty contributes in a major way to international agricultural research, through Australian Centre for International Agricultural Research and AusAID projects.



The agricultural work-force of the future faces interesting and exciting challenges. There is a need to increase food production with less land and water for agriculture, and rising energy costs; globalisation is impacting on markets and trade; consumers are taking greater interest in how their food is produced and farmers are more closely attuned to market signals; delivering health benefits through diet is seen as increasingly important. Scientists with a good appreciation of the relevant socioeconomic issues, and economists who have an understanding of technology, are needed to work as expert consultants, managers, researchers, policy makers and regulators in agricultural production, natural resource management, processing, food systems, marketing, and agribusiness.

I extend my best wishes for your studies and an enriching experience in the University of Sydney, and for your future professional career.

Professor Les Copeland
Dean

1. Important handbook information

About this handbook

Welcome to the Faculty of Agriculture, Food and Natural Resources Handbook. This handbook will provide you with a great deal of information about the Faculty and the University. In particular, it will help you to find out who are the people in the Faculty, the requirements for degrees in the Faculty and the ways that these can be satisfied.

A welcome from the Dean can be found on the previous page.

Chapter 1 (this chapter) has important information that should be read by all students.

Chapter 2 gives the names of people you may need to contact during the year.

Chapter 3 contains frequently asked questions affecting students in the Faculty. You should read this chapter in conjunction with Chapters 1, 4, 5 and 6.

Chapter 4 explains the requirements for each undergraduate degree.

Chapter 5 gives undergraduate unit of study descriptions.

In **Chapter 6** you will find the fine print - the undergraduate degree resolutions (rules) covering your degree. The information in this chapter takes precedence over all other earlier information. You should definitely read the relevant parts of this chapter, and refer to them from time to time during your studies to make sure you are on track to satisfy the requirements of your degree.

Chapter 7 contains scholarships and prizes information for undergraduate students.

Postgraduate students should look at Chapters 8, 9 and 10 for information regarding the requirements for their degrees.

Chapter 8 contains the requirements for each postgraduate degree and postgraduate unit of study information is in **Chapter 9**.

Like Chapter 6, **Chapter 10** contains the degree resolutions or rules, this time for postgraduate degrees. You should make sure you read the resolutions pertaining to your degree. It will be useful to read this in conjunction with the information in Chapter 8.

Chapter 11 contains scholarships and prizes information for postgraduate students.

Additional faculty information is contained in **Chapter 12**.

The sections folllowing Chapter 12 are handy reference pages for all sorts of services on campus or to explain that obscure term.

The **unit of study name index** and the **main index** provide unit of study information and the **campus maps** will help you find your way around the Camperdown, Cobbity and Narrabri campuses.

You can use the final section of this handbook, the **course planner**, to track your study.

We hope you find this handbook very useful. If you need any further information please don't hesitate to contact a member of the faculty.

Important student information

Students enrolled in units of study offered by the Faculty of Agriculture, Food and Natural Resources are required to familiarise themselves with the following key policies:

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.

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.

Details of special consideration and student plagiarism policies are provided later in this handbook.

2. Guide to the Faculty

Current as at 1 January 2007

Phone: +61 2 9351 2935
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Email: dean.agriculture@usyd.edu.au
Web: www.agric.usyd.edu.au

Dean
Les Copeland, BSc PhD, FRACI CChem

Pro Dean
Alexander B McBratney, DSc PhD *Aberd*

Associate Deans
International Development: M Robyn McConchie, BSc *Lond* MA(Ed) *Macq* PhD *LSU*
Learning and Teaching: Willem Vervoort, MSc *Wageningen* PhD *Georgia*
Postgraduate: Robert A Caldwell, MSc PhD, MRACI CChem
Research: Ivan R Kennedy, PhD DSc(Agric) *WAust*, FRACI CChem

Degree Coordinators
Bachelor of Agricultural Economics: Elizabeth Nolan, BScAgr
Bachelor of Horticultural Science: David Guest, BScAgr PhD
Bachelor of Land and Water Science: Willem Vervoort, MSc *Wageningen* PhD *Georgia*
Bachelor of Resource Economics: Tihomir Ancev, BScAgr *Skopje* MScEc *Reykjavik* PhDAgrEc *Oklahoma*
Bachelor of Science in Agriculture: Stephen R Cattle, BScAgr PhD
Postgraduate Coursework: Dhia Al Bakri, BSc *Mosul* MSc PhD *Sheff*

Professional Experience Coordinator
Lynn A Henry, BEc DipAgEc NE

Student Liaison and Administration Manager
Pam Brass, BSocSc, MBA (Exec) *UNSW*

Finance Officer
Arnold Lai, MBus *UTS*

Administrative Officer (Development)
Michele Gairn, DipAppSc(Agr) *Wagga AgricColl* DipEd

Executive Assistant to the Dean
Prue Winkler, BA *N'cle* (NSW)

Student Services Officer
Pamela J Stern, BA *UNSW*

Computer Systems Officer
Kyle Kiefer

Administrative Assistants
Fortunée Cantrell
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Discipline Leader
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Ross G Drynan, BAgrSc *Qld* PhD *NE*

Senior Lecturers
Michael Harris, BEc *ANU* PhD *Melbourne*

Lecturers
Tihomir Ancev, BScAgr *Skopje* MScEc *Reykjavik* PhD *Oklahoma*

Associate Lecturers
Lynn A Henry, BEc DipAgEc *NE*
Elizabeth Nolan, BScAgr
Shauna L Phillips, MComm *NSW* BAgrEc

Honorary Appointments

Honorary Associate Professor
Robert Batterham, BAgrEconomics *UNE* MSc PhD *Illinois*

Honorary Associate
David P Godden, BAgEc BA MEc *NE* PhD *Lond*

Honorary Research Fellow
Sally Marsh, MSc(AgricEcons), BSc(Agric)(Hons)

Sciences Discipline

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Discipline Leader
Lindsay C Campbell, BSc PhD

Professors
Alexander B McBratney, DSc PhD *Aberd*. Appointed 1995 *(Soil Science)*
Ivan R Kennedy, PhD DSc(Agric) *WAust*, FRACI CChem. Appointed 1996 *(Agricultural and Environmental Chemistry)*
Les Copeland, BSc PhD, FRACI CChem. Appointed 2001 *(Agriculture)*
David Guest, BScAgr PhD. Appointed 2004 *(Horticulture)*
Bruce G Sutton, BScAgr *Qld* PhD *ANU*

Associate Professors
Balwant Singh, BSc(Agr) MSc(SoilSc) *Hisar* PhD *WAust*

Senior Lecturers
Dhia Al Bakri, BSc *Mosul* MSc PhD *Sheff*
Robert A Caldwell, MSc PhD, MRACI CChem
Lindsay C Campbell, BSc PhD
Stephen R Cattle, BScAgr PhD
M Robyn McConchie, BSc *Lond* MA(Ed) *Macq* PhD *LSU*
IOA Odeh, BSc(Agric) *Ibadan* MSc *Ahmando Bello* PhD *Adel*

McCaughey Senior Lecturer in Hydrology and Catchment Management
Willem Vervoort, MSc *Wageningen* PhD *Georgia*

Lecturers
Sarah Mansfield, BSc MSc *University of Auckland* PhD *California*
Daniel Tan, BApplSc PhD *Qld* GradCertEdStu (Higher Education)

Associate Lecturers
Kathryn Aufflick, BScAgr GradCertEdStu (Higher Education)
Damien J Field, BSc PhD
Meredith Wilkes, BSc PhD

Principal Research Fellow
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Senior Research Fellows
Alan Clift, BScAgr PhD
Jenny Jobling, BScAgr *Syd* PhD *UWS*
Brett Whelan, BScAgr PhD

Research Fellows
Angus Crossan, BSc PhD
Edward Liew, BSc PhD
Budiman Minasny, BAgr *Sumatera Utara* MAgr PhD
Raphael Viscarra Rossel, BScAgr PhD

Research Associates – Postdoctoral Fellows
Rosalie Daniel, BScAgr *Melb* PhD *Deakin*
Rosalind J Deaker, MScAgr DipEd *Macq* PhD
Markus Grafe, BSc MSc *Virginia Polytechnic Institute & State University* PhD *Delaware*
Mihály L Kecskés, PhD *Hungary*
James A Taylor BScAgr

Honorary Appointments

Adjunct Professors
Greg Constable, MScAgr PhD *ANU*
Brian R Cullis, PhD *UNSW* BSc (Hons)
Brett Summerall, BScAgr PhD

Emeritus Professors
N Collis-George, MSc *Manc* PhD *Camb* HonDScAgr, FRSChem
Brian James Deverall, BSc *Edin* PhD DIC *Lond*
BDH Latter, PhD *Edin* BScAgr

Honorary Professor
GD Batten, PhD *ANU*
Lester W Burgess, BScAgr PhD DipEd, FAPPS FAPS

Honorary Associate Professor
Harley Rose, BAgrSc MAgrSc *Qld* PhD *Cornell*

Honorary Senior Lecturer
E Lees, BSc PhD *Lond*

Honorary Associates
N Ahmad, MSc *Peshawar* PhD
MA Battam, BScAg PhD
NJ Donovan, BScAgr PhD
HR Geering, MS *Cornell*
PB Goodwin, MScAgr PhD *Nottingham*
MRB Gray, BSc MSc *UWA* PhD *Macq*
D Hailstones, PhD
G Johnson, BAgrSc MAgrSc PhD *Qld*
MJ Knight, BSc PhD *Mel*
NK Matheson, PhD *Edin* MSc
PW Michael, BAgSc PhD *Adel*
CA Offord, MScAgr PhD
RJ Roughley, MScAgr PhD *Lond*
LA Tesoriero, BSc MScAgr

Plant Breeding Institute – Cobbity

Phone: +61 2 9351 8800
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Director and Professor of Molecular Plant Breeding
Peter J Sharp, BAgSc PhD *Adel.* Appointed 2003

GRDC Professor of Cereal Rust Research, Director of Rust Research
Robert F Park, BSc PhD *LaT.* Appointed 2003

Professor of Plant Breeding
Richard Trethowan, BScAgr PhD. Appointed 2006

Director of Amenity Plant Science
Peter Martin, ED, BScAgr (Hons), MScAgr, PhD, Dip Ed, FLS, FAIAST. Appointed 2006

Associate Professors
Neil Howes, BSc(Hons) PhD *Qld*

Senior Lecturer
Norman L Darvey, PhD *UNSW* BSc

Senior Research Fellow
Harbans S Bariana, MScAgr *Punj* PhD

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Chongmei Dong, MSc *Fudan* PhD *ANU*
Raju Tochachichu BScAg *APAU* MScAg *IARI* PhD *UAS*
Peng Zhang BSc *Qingdao* MSc *WAU* PhD *Kansas*
Xiaochun Zhao, BAgSc *Yau* PhD

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Urmil Kanta MScAgr PhD *Punj*
Haydar Karagolu BSc (Hons) PhD
Shuming Luo BScAg *Guangxi* MScHort *UWS* PhD

Honorary Appointments

Emeritus Professor
Donald R Marshall, PhD *Calif* BScAgr

Honorary Professor in Cereal Genetics and Cytogenetics
Robert A McIntosh, MScAgr PhD. Appointed 1993

Adjunct Professor in Industrial Plant Breeding
NF Derera AM, DipAgrSc *Royal Jozef Nador* DipPltBreeding *Uof Tech Budapest* FAIAS

Adjunct Professor in Cereal Quality
W Rathmell, MA PhD *Camb*

Adjunct Associate Professor
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Colin Wellings, BScAgr MScAgr BTh *Tabor* PhD

Honorary Associates
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Plant Breeding Institute – Narrabri

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Research Fellow
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Officer in Charge
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Honorary Research Associate
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Veterinary Science

Animal Science – relevant teaching staff

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Sydney

Professors
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Gareth Evans, BA *Oxf* PhD. Appointed 2002
Chis Maxwell, BScAgr PhD. Appointed 2002
Christopher Moran, PhD *ANU* BSc *(Sub Dean Animal and Veterinary Bioscience Teaching)*
Frank W Nicholas, PhD *Edin* BScAgr. Appointed 2002

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Rosanne M Taylor, BVSc PhD

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Rachael Gray, BVSc PhD
Christopher Grupen

Associate Lecturers
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Bengt Eriksson, BVSc PhD *Uppsala*
Lindsay Gillan, BMedSc PhD
Justine O'Brien, BScAgr PhD

Camden

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Jenny-Ann Toribio, BVSc PhD

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Jeff Downing, BScAgr PhD
Wendy Muir, BScAgr PhD

Research Fellows
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Sham Nair, BSc Macq PhD *UTS*
Kyall Zenger, BAppSc MSc *UWS* PhD *Macq*

Molecular and Microbial Biosciences

Microbiology – relevant teaching staff

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Professor
Peter Richard Reeves, BSc PhD *Lond,* FAA MASM. Appointed 1985.

Reader
Thomas Ferenci, BSc *Lond* PhD *Leic*

Senior Lecturers
Deidre A Carter, BSc *Otago* PhD *Lond*
Andy Holmes, BSc PhD *Qld*

Lecturer
Helen M Agus, MSc *UNSW* MASM
Nicholas V Coleman, PhD

Teaching Assistant
Deborah Blanckenberg, BMedSc

3. Frequently asked questions

This chapter is intended to answer frequently asked questions for students in the Faculty of Agriculture, Food and Natural Resources.

It should be stressed that the information in this chapter is intended to be a guide only. All students will have to decide for themselves how to plan their course of study to suit their particular interests and situation. It is recommended that you plan your studies carefully with an eye to your final years, so that you take the correct prerequisites in the preceding years. It will also be useful to revisit your plans during your studies as your interests take more detailed shape.

How many credit points should I take each semester?

Full-time undergraduate students should take 24 credit points each semester. Most units of study are valued at 6 credit points. 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 undergraduate 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. The degree summaries in this handbook assume you will enrol full-time.

Do I need to be full-time?

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. You should check carefully the terms and conditions of that support before going part-time.

Australian citizens and permanent residents who wish to receive a transport concession card must be full-time students.

International students are required to be full-time.

Can I take units of study from other faculties?

Yes. You should refer to the course requirements sections of this handbook for specific information about your particular degree. Each faculty website has links to the units of study they offer. There are limits and exclusions however.

Can I get credit for previous tertiary study?

Yes. The amount of credit you can receive depends on your individual circumstances, but in general is capped at 48 credit points for an undergraduate degree already completed or 96 credit points for an incomplete degree.

If you apply for credit before enrolment and receive a letter in return specifying the credit awarded, you can make your unit of study choices with this information in mind when enrolling.

If you do not apply for credit before enrolling you will have to make unit of study choices as if you have had no previous university study. You should then apply for your credit request to be processed. Because of the large numbers of applications received during the enrolment period there can be a considerable delay in processing your application. It is in your best interests to apply in the year preceding your planned enrolment.

The Faculty must sight originals of your academic transcripts, as well as unit of study descriptions clearly indicating credit point value or hours per week. You may only apply for credit ONCE in your degree.

Are there any bridging courses available?

There are bridging courses in biology, chemistry and mathematics, designed to cover the assumed knowledge that students would normally cover in the Higher School Certificate (HSC). They run in February each year after enrolment and are recommended for students who either didn't take a subject at the HSC or feel they need some revision.

Who can enrol in advanced units of study?

Advanced units of study are available to those students enrolled in any program in the Faculty who have performed at a high level in the HSC or who perform well in their studies at the University.

Consult an academic adviser about your eligibility to enrol in advanced level subjects in the first year of study.

Students should also consult the unit of study tables for assumed knowledge and prerequisite marks in the HSC required to enrol in advanced units of study. Advanced units of study are very demanding and students are required to perform at a higher standard than in normal units of study.

What is a 'major'?

A major is a specialisation within an undergraduate degree. It is useful for every undergraduate student to have an idea of what major, or group of majors, interest you now, so that you can plan each year of study properly. In some degrees it is possible to complete more than one major.

What are degree resolutions?

Degree resolutions are the rules which must be followed in order to successfully complete a degree. All students are expected to read the degree resolutions for their course before they commence their studies, and from time to time during their studies as it is each student's responsibility to meet the requirements of their degree. Degree resolutions, tables of undergraduate and postgraduate units of study available for each degree and unit of study descriptions appear in later chapters of this handbook.

Where can I find my class timetable?

These will be available in orientation week. To obtain a personal timetable showing rooms and lecture and tutorial times go to the web at
www.usyd.edu.au/timetable
and follow the prompts. If you have trouble or do not have access to the web, you can go to the Student Centre in the Carslaw Building where computers are available.

You will be asked to enter your login name and password. These will be found on the last page of your enrolment form and at the bottom of your Confirmation of Enrolment sheet.

Tutorials and most practicals normally start in the second week of semester, but check on this at the first lecture.

Ensure that you know which classes you are in and find room locations before the first day of class.

The Faculty takes all possible care to avoid timetable clashes for core units of study but it is the responsibility of every student to make sure that no timetable clashes exist between repeat or elective units.

What happens in orientation week?

In orientation week, first year undergraduate students are introduced to the University and the Faculty. The Faculty orientation program runs for two days and includes an excursion to the University's Camden Farms.

How can I find accommodation?

If you need help in finding accommodation go to:
www.media.usyd.edu.au/stuserv/accommodation/accommodation.shtml

What if I need financial assistance?

The University has a number of loan and bursary funds to assist students who experience financial difficulties. This assistance is not intended to provide ongoing income support but to help in emergencies and to supplement other income.

The Financial Assistance Office is located on Level 7 of the Education Building (A35). The hours of business are Monday to Thursday, 10am to 4pm.
Phone: + 61 2 9351 2416
Fax: + 61 2 9351 7055
Email: fao@stuserv.usyd.edu.au

Further information can be found at
www.usyd.edu.au/stuserv/financial_assistance_office/index.html

For information about student allowances provided by the Commonwealth Government go to:
www.centrelink.gov.au

Where do I find further information?

Faculty Office

The Faculty Office is on the ground floor of the McMillan Building. All enquiries in relation to matters specific to the Faculty can be made at this office in the first instance, including:

- information about admission to a degree of the Faculty
- enrolments in the Faculty
- applications for credit for previous studies
- facilities available in the Faculty.

Email

The University gives you an email address. The University and the Faculty CONSTANTLY send information to you via the University email address. This is the Faculty's only method of communication to you in most cases.

It is your obligation and your responsibility to check your email every day in order to be informed about matters concerning your candidature.

Noticeboards

Information is also displayed on the Faculty noticeboards.
The main noticeboard for undergraduate students is in the foyer of the Watt Building. A postgraduate student noticeboard is located in the Watt Common Room (Level 1, Watt Building). Broader University information will be displayed on noticeboards around the campuses.

Publications

The University Map Guide, Faculty handbooks and other publications are available from the Student Centre and also online at www.usyd.edu.au

Glossary

The Glossary in this handbook may also provide you with very helpful information.

4. Undergraduate course requirements

Brief introduction to undergraduate degree courses

Teaching in the undergraduate units of study in the Faculty develops skills and graduate attributes. A Statement of Generic Graduate Attributes can be found in Chapter 12 of this handbook.

Bachelor of Agricultural Economics (BAgrEc)

(Part-time study, daytime only, may be available in certain circumstances)

Assumed knowledge: Mathematics.
The focus of this economics degree is on the development of analytical, quantitative, computing and communication skills with an emphasis on commodity markets and agricultural and natural resource issues. Skills highly regarded by employers are gained in fourth year through the completion of a research thesis, research exercises and research project reports. A wide range of elective courses is available.

Major studies: Include accounting (restricted entry), agribusiness management, agricultural economics, agricultural finance, agricultural marketing, agricultural policy, agricultural science, commercial law, econometrics, economics, finance, geography, government, international trade, (management), marketing, modern languages, natural resource economics, psychology.

Professional experience: You must complete 60 days of approved professional experience and field excursions before graduation. Overseas experience is encouraged.

Professional recognition: Undergraduates and graduates are eligible for membership of the Australian Agricultural and Resource Economics Society, the Economic Society of Australia, the Agribusiness Association of Australia and the American Agricultural Economics Association.

Career opportunities: Graduates are employed as applied economists and researchers with commodity and futures brokers, merchant banks and trading banks; Department of Agriculture, Fisheries and Forestry, ABARE, Meat and Livestock Australia and the Productivity Commission and they are also employed by accounting firms; management consultants, international agencies and agribusiness firms; the wider business community; large corporate farms; and in the media as economic journalists.

Bachelor of Horticultural Science (BHortSc)

(Part-time study, daytime only, may be available in certain circumstances)

Assumed knowledge: Mathematics, Chemistry and Biology.
The course has a strong scientific base. The focus of the degree is on the development of analytical, quantitative, computing and communication skills. Highly regarded skills are gained in the fourth year through the completion of a research thesis.
Production horticulture deals with the application of scientific and economic principles to all phases of the production, postharvest care and marketing of fruit, vegetables, cut flowers and nursery stock. Urban/Amenity horticulture deals with the horticultural and ecological aspects of the management of parks, sports fields and golf courses, as well as plantings for streets etc. Environmental impact deals with habitat preservation and ex-situ conservation of rare and endangered species including their marketing; strategies for integrated management for control of pests, diseases and weeds; and environmental legislation and testing.

Major studies: Fruit, vegetable and ornamental production, postharvest biology and technology, urban horticulture and horticultural specialisations within areas of agribusiness, biometry, biotechnology, chemistry, economics, entomology, genetics and plant breeding, plant pathology, resource economics and soil science.

Professional experience: You must complete 60 days approved professional experience and field excursions with a focus towards horticultural production industries (temperate, sub-tropical and tropical). Overseas experience is encouraged.

Professional recognition: Admission for professional membership by the Australian Society of Horticultural Science and the Australian Institute of Agricultural Science.

Career opportunities: Examples include employment in horticultural research, horticultural consultancy, management of horticultural enterprises and as horticultural advisers with private, state and local government bodies. Opportunities exist in production horticulture, postharvest technology, urban/amenity horticulture, sustainable horticulture, horticultural biotechnology, precision horticulture, viticulture, environmental impact analysis, endangered species conservation, habitat preservation, ornamental plant breeding for the world market, crop protection, plant ecology and irrigation science.

Bachelor of Land and Water Science (BLWSc)

(Part-time study, daytime only, may be available in certain circumstances)

Assumed knowledge: Mathematics, Chemistry and Biology.
The course has a strong scientific base. The focus of this four year applied degree is on the development of analytical, quantitative, computing and communication skills. Students learn how to apply the knowledge and principles of science to the understanding, management and conservation of our land and water resources. Highly regarded skills are gained in the fourth year through the completion of a research thesis.

Major studies: will include basic and applied aspects of biology, chemistry, geography, geographic information systems, geology, hydrology, soil science, statistics, sustainable agriculture and resource economics relevant to land and water science.

Professional experience: You must complete 60 days of approved professional experience and field excursions before graduation.

Professional recognition: Graduates are eligible for membership of professional societies including the International Association of Hydrogeologists and Australian Soil Science Society Inc.

Career opportunities: include technical experts and researchers in catchment management organisations, sustainable land and water management, environmental assessment, remediation and protection, landcare, environmental consultants; media researchers and journalists; national parks and wildlife services; educators.

Bachelor of Resource Economics (BResEc)

(Part-time study, daytime only, may be available)

Assumed knowledge: Extension 1 Mathematics.

Major studies: Resource economics, economics, environmental economics, fishery economics, mineral and energy economics, water and land economics, agricultural science, commercial law, finance, geography, geology, government, marine science, mathematics, soil science and statistics.

Professional experience: You must complete 60 days approved professional experience and field excursions. Overseas experience is encouraged.

Professional recognition: Graduates and undergraduates are eligible for membership of the Australian Agricultural and Resource Economics Society, the Economic Society of Australia, the Australia and New Zealand Society of Ecological Economics, the Australian Institute of Agricultural Science and Technology and the American Agricultural Economics Association.

Career opportunities: include environmental consulting firms, “green” organisations, mining and energy companies. State and Federal government opportunities include environmental agencies, land and water departments, agriculture departments, fisheries and forestry authorities. Economic analysis skills are transferable, allowing employment as economists in any sector of the economy.

Additional information: BResEc is a unique applied economics degree, blending a basic science foundation with a strong disciplinary base in economics. All students will take units of basic science, complete sequences in economics, resource economics, and quantitative analytical economics; undertake electives in economics and/or science; and examine a wide range of natural resource management problems. Students will specialise in and complete a research project in a selected area of resource economics.
The focus is on developing broadly applicable analytical economic skills complemented with an adequate knowledge of ecological and other natural resource systems and skills in modelling those systems in order to contribute to the solution of challenging environmental and management problems.
The course is targeted at students interested in: economic management of natural resources systems, environmental economics, fishery and forestry economics, ecosystems, conservation issues, and sustainability.

Bachelor of Science in Agriculture (BScAgr)

(Part-time study, daytime only, may be available in certain circumstances)

Assumed knowledge: Mathematics, Chemistry and Biology.
The course has a strong scientific base and offers a broad training in the scientific disciplines. The focus of this four year applied degree is on the development of analytical, quantitative, computing and communication skills. Students learn how to apply the knowledge and principles of science to the understanding and management of the production and processing and marketing of agricultural products, and to the management and conservation of our natural resources. Highly regarded skills are gained in the fourth year through the completion of a research thesis.

Major studies: Agricultural economics, entomology, genetics, agricultural microbiology, agronomy, biometry, environmental chemistry, food science, livestock production, plant breeding, plant pathology, soil science. Special interdisciplinary programs may also be approved in fourth year.

Professional experience: You must complete 60 days of approved professional experience and field excursions before graduation.

Professional recognition: Membership of professional societies, such as the Australian Institute of Agricultural Science, is available.

Career opportunities: Examples include environmental scientists or research scientists in: environmental protection, land and water conservation, conservation of endangered species, sustainable agriculture, precision agriculture, plant breeding, horticulture, agronomy, integrated pest management, animal nutrition, molecular genetics (plant, animal and human); medical researchers; reproductive technologists in animal production enterprises and IVF clinics; biotechnologists (plant, animal and microbial); microbiologists (industrial and environmental); food scientists and cereal chemists; feedlot managers, managers of large scale intensive and extensive animal production enterprises; agricultural consultants (domestic and international); statisticians; media researchers and journalists; personnel for: biosoil programs, environmental protection groups, national parks and wildlife service and the forestry commissions; educators; applied marketing and agribusiness management.

Progress through the years

Under normal circumstances, the degree requirements may be satisfied in four years. If you fail to achieve a satisfactory standard in a unit of study at the first attempt, you may repeat the unit. Should you not achieve a satisfactory standard at the second attempt, you will be asked to show good cause or explain why you should be re-admitted to that unit of study and/or degree (see 'satisfactory progress' in chapter 6. Students repeating units of study which belong to the first, second or third year groups of units of study may, with the permission of the Faculty, enrol in one or more units of study prescribed for the next higher year. The Faculty will normally grant permission for you to undertake units from the next year when:

1. the timetable arrangements are such that you can attend all lectures, practical classes, tutorials, seminars and excursions in all of the units of study undertaken;
2. you have fulfilled all of the prerequisites; and
3. you can satisfy the corequisites for the units belonging to the higher year group of units.

Prerequisites are units of study which you must pass before proceeding to another unit.

Corequisites are units of study which should be studied in the same year as another unit if you have not already passed in them.

In the year groupings on the following pages, prerequisites and corequisites for each of the specified units of study are listed. There are circumstances, however, in which the Faculty may waive the formal prerequisite and corequisite requirements if you are otherwise suitably qualified to enrol for a unit. The onus is on students to consult the various unit coordinators as to the waivers which may be granted for each unit. The approval of the Discipline Leader must be obtained before you can proceed to a unit of study unless you have passed the necessary prerequisites.

Bachelor of Agricultural Economics (BAgrEc)

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
All students complete an Agricultural Economics major and one non-Agricultural Economics major. Details of majors can be found in Tables 3 and 4.			
Year 1			
Year 1 will have a minimum of 48 credit points comprised of:			
AGEC1101 **Agricultural and Resource Systems**	6	**A** HSC Mathematics or HSC Mathematics Extension 1 **N** AGEC1001	Semester 1
ECON1001 **Introductory Microeconomics**	6	**A** Mathematics	Semester 1 Summer Main
ECMT1010 **Business and Economic Statistics A**	6	**N** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021	Semester 1 Semester 2 Summer Main
AGEC1102 **Agricultural Economics 1**	6	**A** HSC Mathematics or HSC Mathematics Extension 1 **C** AGEC1101 **N** AGEC1002	Semester 2
ECON1002 **Introductory Macroeconomics**	6	**A** Mathematics	Semester 2 Summer Main
ECMT1020 **Business and Economic Statistics B**	6	**C** ECMT1010 **N** ECMT1021, ECMT1022, ECMT1023 *Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.*	Semester 2
and units from Table 1 (minimum of 12 credit points), with a view to completing a Table 4 non-AGEC major.			
Year 2			
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
or			
ECMT2110 **Regression Modelling**	6	**P** ECMT1010 **N** ECMT2010	Semester 1
ECOS2001 **Intermediate Microeconomics**	6	**P** ECON1001 **C** ECMT1010 **N** ECON2001, ECOS2901, ECON2901 *Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.*	Semester 1 Semester 2 Summer Main
or			
ECOS2901 **Intermediate Microeconomics** **Honours**	6	**P** ECON1001 and ECON1002 with a Credit average or better in the two units of study combined **C** ECOS2903 and ECMT1010 **N** ECON2901, ECOS2001, ECON2001 *Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.*	Semester 1
ECOS2002 **Intermediate Macroeconomics**	6	**P** ECON1002 **C** ECMT1010 **N** ECON2002, ECOS2902, ECON2902 *Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.*	Semester 1 Semester 2 Summer Main
or			
ECOS2902 **Intermediate Macroeconomics** **Honours**	6	**P** ECOS2901 **C** ECMT1010 **N** ECON2902, ECOS2002, ECON2002 *Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.*	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
and units from Tables 1 and 2 (minimum 18 credit points), with a view to completing a Table 4 non-AGEC major.			
Year 3			
Year 3 will have a minimum of 48 credit points comprised of:			
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC3104 **Research Methods**	6	**P** AGEC2105 or ECMT2010 or ECMT2110 or AGEC2005 **N** AGEC3004	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
or			
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
and units from Table 2 (minimum 30 credit points), such that an Economics major or other Table 4 non-AGEC major is completed.			
Notes: 1) AGEC 3001 and AGEC 3101 are both incompatible with AGEC1102. A student who takes AGEC1102 will take AGEC3103. A student who has taken AGEC1002 in lieu of AGEC 1102 must take either AGEC 3001 or AGEC 3101, and not AGEC 3103. 2) AGEC 3101 will not be available in the BAgrEc program after 2007.			

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
Year 4			
Year 4 will have a minimum of 48 credit points comprised of:			
AGEC4112 **Research Project A**	9	**P** AGEC3104 or AGEC3004 **C** AGEC4113 **N** AGEC4012 *Note: Department permission required for enrolment*	Semester 1
or			
AGEC4121 **Research Exercises A**	9	**P** AGEC3104 or AGEC 3004 **C** AGEC4122 **N** AGEC4012, AGEC4112	Semester 1
AGEC4110 **Professional Skills**	3	**C** AGEC4011 or AGEC4111 **N** AGEC4010	Semester 1
AGEC4113 **Research Project B**	9	**P** AGEC3104 or AGEC3004 **C** AGEC4112 **N** AGEC4013 *Note: Department permission required for enrolment*	Semester 2
or			
AGEC4122 **Research Exercises B**	9	**P** AGEC3104 or AGEC3004 **C** AGEC4121 **N** AGEC4013, AGEC4113	Semester 2
AGEC4111 **Contemporary Issues**	3	**C** AGEC4010 **N** AGEC4011	Semester 2
and units from below (normally 24 credit points), with no more than 12 credit points of RSEC units. Not all of these units will be offered in all years.			
AGEC4101 **Agricultural Marketing Analysis**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4004	Semester 2
AGEC4102 **Agricultural Development Economics**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 2
AGEC4103 **International Agricultural Trade**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4104 **Agribusiness Analysis**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
AGEC4107 **Special Topics**	6	**N** AGEC4007 *Note: Department permission required for enrolment*	Semester 1 Semester 2
AGEC4108 **Quantitative Planning Methods**	6	**P** AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 **N** AGEC4008	Semester 1
AGEC4109 **Agricultural Finance and Risk**	6	**P** {(AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)} OR (AGEC1102 and AGEC3103) **N** AGEC4009	Semester 2
RSEC4131 **Benefit-Cost Analysis**	6	**P** ECON2001 and (AGEC2103 or AGEC2003) **N** AGEC4037	Semester 1
RSEC4132 **Environmental Economics**	6	**A** ECON2002, AGEC3001, AGEC2101 and (AGEC2105 or AGEC2005 or ECMT2010 or ECMT2110) **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 1
RSEC4133 **Economics of Mineral & Energy Industries**	6	**A** ECON2002, AGEC3001, AGEC2101, AGEC2105 **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 2
RSEC4134 **Economics of Water & Bio-resources**	6	**A** ECON2002, AGEC3001, AGEC2101, AGEC2105 **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 2

Table 1 – BAgrEc Years 1 and 2 elective units

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
ACCT1001 **Accounting IA**	6	**A** HSC Mathematics **N** ACCT1003, ACCT1004 *Restricted entry*	Semester 1 Semester 2 Summer Dec
ACCT1002 **Accounting IB**	6	**P** ACCT1001 **N** ACCT1003, ACCT1004 *Restricted entry*	Semester 1 Semester 2
ACCT1003 **Financial Accounting Concepts**	6	**N** ACCT1001, ACCT1002 *Terminating unit.*	Semester 1
ACCT1004 **Management Accounting Concepts**	6	**N** ACCT1001, ACCT1002 *Terminating unit.*	Semester 2

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
BIOL1002 **Living Systems**	6	**A** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **N** BIOL1902	Semester 2
CROP1001 **Agricultural Science 1A**	6	**A** HSC Chemistry **N** HORT1001, LWSC1001	Semester 1
CROP1002 **Agricultural Science 1B**	6	**C** CROP1001 **N** HORT1002, LWSC1002	Semester 2
CLAW1001 **Commercial Transactions A**	6		Semester 1 Semester 2 Summer Main
CLAW1002 **Commercial Transactions B**	6	**P** CLAW1001	Semester 2
GEOS1001 **Earth, Environment and Society**	6	**N** GEOS1901, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902	Semester 1
GEOS1002 **Introductory Geography**	6	**N** GEOS1902, GEOG1001, GEOG1002	Semester 2
GOVT1101 **Australian Politics**	6		Semester 1
GOVT1105 **Geopolitics**	6		Semester 2
GOVT1104 **Power in Society**	6		Semester 2
GOVT1202 **World Politics**	6		Semester 1
GOVT1406 **International Business and Politics** *This unit of study is not available in 2007*	6		
HORT1001 **Horticultural Science 1A**	6	**A** HSC 2 unit Chemistry **N** CROP1001, LWSC1001	Semester 1
HORT1002 **Horticultural Science 1B**	6	**C** HORT1001 **N** CROP1002, LWSC1002	Semester 2
INFS1000 **Business Information Systems Foundations**	6	**N** ISYS1003, INFO1000, INFO1003, INFO1903	Semester 1 Semester 2 Summer Main
LWSC1001 **Land and Water Science 1A**	6	**N** CROP1001, HORT1001	Semester 1
LWSC1002 **Land and Water Science 1B**	6	**C** LWSC1001 Land and Water Science 1A **N** CROP1002, HORT1002	Semester 2
MATH1011 **Life Sciences Calculus**	3	**A** HSC Mathematics **N** MATH1111, MATH1001, MATH1901, MATH1906	Semester 1 Summer Main
MATH1012 **Life Sciences Algebra** *This unit of study is not available in 2007*	3	**A** HSC Mathematics **N** MATH (1002 or 1902).	
MATH1013 **Differential and Difference Equations**	3	**A** HSC Mathematics or MATH1111 **N** MATH1003, MATH1903, MATH1907	Semester 2
MKTG1001 **Marketing Principles**	6	**N** MKTG2001	Semester 1 Semester 2
MKTG1002 **Marketing Research 1**	6	**P** MKTG1001 (or MKTG2001) **N** MKTG2003	Semester 2
PSYC1001 **Psychology 1001**	6		Semester 1 Summer Main
PSYC1002 **Psychology 1002**	6		Semester 2 Summer Main
WORK1003 **Foundations of Work and Employment**	6	*This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.*	Semester 1 Semester 2
Modern Language (Level 1 or higher) units, with the approval of the Dean FAFNR			

Notes:

1. Students may count no more than 24 credit points of the units specified in the above table towards meeting the requirements of their degree, and no more than 12 credit points from the listed INFS, MATH, PSYC and Modern Language units.
2. ACCT1001 and ACCT1003 are mutually exclusive.
3. ACCT1002 and ACCT1004 are mutually exclusive.
4. Entry to ACCT1001 and ACCT1002 is restricted: the student's academic record must be as good as that needed for admission to the University's BCom program.
5. Prerequisites apply for many second semester units.

Table 2 – BAgrEc Years 2 and 3 elective units

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGEC2102 Agribusiness Marketing	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGRO3002 Agronomy 3	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
AGRO3003 Crop Water Management	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
ANSC2002 Animal Science 2	6	**P** CROP1001 and one of BIOL1001, BIOL1101, BIOL1901	Semester 2
HORT2002 Horticultural Science 2	6	**A** HORT1001, HORT1002 **P** (BIOL1001or BIOL1101 or BIOL1901) and (BIOL1002 or BIOL1902 or BIOL1003 or BIOL1903)	Semester 2
LWSC2002 Sustainable Land and Water Management	6	**P** LWSC1001, LWSC1002.	Semester 2
PLNT2002 Aust Flora: Ecology and Conservation	6	**A** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **P** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **N** PLNT2902, BIOL2004, BIOL2904	Semester 1
PLNT2003 Plant Form and Function	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 **N** PLNT2903, BIOL2003, BIOL2903, CROP2001	Semester 2
RSEC4131 Benefit-Cost Analysis	6	**P** ECON2001 and (AGEC2103 or AGEC2003) **N** AGEC4037	Semester 1
SOIL2003 Soil Properties and Processes	6		Semester 1
SOIL3008 Rural Spatial Information Systems	6		Semester 2
Any level 2 or 3 semester units in Accounting (ACCT), Commercial Law (CLAW), Econometrics (ECMT), Economics (ECOS), Finance (FINC), Geography (GEOG or GEOS), Government (GOVT), Industrial Relations and Human Resource Management (WORK), Information Systems (INFS), Marketing (MKTG), Psychology (PSYC). Units in Asian Studies (ASNS) or Modern Languages may also be taken (with the approval of the Dean FAFNR)			
Any level 4 units in Agricultural Economics (AGEC) other than those which are core requirements for Year 4.			
Other units of study from the BScAgr, BHortSc and BLWSc degrees, with approval of the Dean FAFNR and the Head of the Discipline concerned.			
AGEC2102 Agribusiness Marketing can only be included for Year 2.			
Prerequisites and/or corequisites apply for most units.			
Electives must be chosen such that the student will complete a non-AGEC major as specified in the Table of Majors.			

Majors in the BAgrEc Degree

The definitions of majors in the following tables apply for students commencing in 2005 or later. These students are required to complete 48 credit points in their chosen majors. Their majors must comply with the requirements for the BAgrEc degree as set out below, and also with the minimum requirements of the discipline teaching that major.

Students who commenced in 2004 or earlier will be required to complete 44 credit points to obtain a major. The major will be defined according to the criteria as currently determined by the discipline teaching that major. The current requirements for majors in the Faculty of Economics and Business and the Faculty of Science can be found in the respective Faculty Handbooks.

All students must complete an Agricultural Economics major and a non Agricultural Economics major. The Agricultural Economics major is defined in Table 3. The other majors available in the BAgrEc degree are defined in Table 4. Up to three majors will be noted on a student's transcript.

Table 3 – Agricultural Economics major

Junior (Level 1) units
AGEC(1101 or 1001)
AGEC(1101 or 1002)
Level 2 and 3 units
AGEC(2101 or 2001) and AGEC(2103 or 2003)
AGEX(3001 or 3102) and AGEX(3101 or3001 or 3103)
Two level 4 AGEC elective units

Table 4 – Non AGEC majors available in the BAgrEc Degree

Accounting

Junior (Level 1) units
ACCT1001*, ACCT1002*
Level 2 and 3 units
ACCT2011 and ACCT2012
And four of the following units: ACCT3011, ACCT3012, ACCT3013, ACCT3014, ACCT3031, ACCT3032, CLAW2201
See FEB Handbook
**Note: Restricted entry*

Agribusiness

Junior (Level 1) units
ACCT1004 and either (INFS1000 and CLAW1001) or WORK1003
Level 2 and 3 units
AGEC2102
AGEC4104
One of AGEC4101, 4109
Either 12 credit points INFS level 2/3 units or 18 credit points WORK level 2/3 units

Agricultural Finance

Junior (Level 1) units
ACCT1001* or ACCT1003 and either ECMT1010 or ECON1001
Level 2 and 3 units
Two FINC2000 units as for a Finance major
Two FINC3000 units
AGEC4104, AGEC4108, AGEC4109
**Note: Restricted entry*

Agricultural Marketing

Junior (Level 1) units
MKTG1001
MKTG1002 or AGEC3104
Level 2 and 3 units
MKTG2112 and (MKTG3111 or MKTG3118)
Two other MKTG3000 units
AGEC4101, AGEC4104

Agricultural Science

Junior (Level 1) units
CROP1001 and CROP1002
Level 2 and 3 units
PLNT2003, SOIL2003
Four other Level 2/3/4 Agricultural Science units of study

Commercial Law

Junior (Level 1) units
CLAW1001
And either CLAW1002 or any CLAW2000 or CLAW3000 unit of study
Level 2 and 3 units
Any five further CLAW2000 or 3000 units
CLAW2201
See FEB Handbook

Econometrics

Junior (Level 1) units
ECMT1010 and ECMT1020
Level 2 and 3 units
ACCT2011 and ACCT2012
ECMT2110 and ECMT3110
Four further ECMT2000 and ECMT3000 units
See FEB Handbook

Economics

Junior (Level 1) units
ECON1001 and ECON1002
Level 2 and 3 units
ECOS2001 and ECOS2002
Any four further ECOS2000 or ECOS3000 units, of which at least two must be at the 3000 level.
See FEB Handbook

Finance

Junior (Level 1) units
ACCT1001* or ACCT1003 and either ECMT1010 or ECON1001
Level 2 and 3 units
FINC2011 and either FINC2012 or FINC2014
Any four further FINC3000 units, or three further FINC3000 units and one of ACCT3013 or CLAW3201.
See FEB Handbook
**Note: Restricted entry*

Geography

Junior (Level 1) units
GEOG1001, GEOS1001, ENVI1002, GEOL1002 or GEOS1003
GEOG1002, GEOS1002 or other level 1 science unit
Level 2 and 3 units
Two GEOG or GEOS2000 units
Four GEOG or GEOS3000 units
See FSc Handbook

Government and International Relations

Junior (Level 1) units
Two level 1000 Government (GOVT) units
Level 2 and 3 units
Six GOVT2000 units
See FEB Handbook

Management

Junior (Level 1) units
WORK1003
One GOVT1000 unit or ECON1001
Level 2 and 3 units
WORK2201
Five units from: ECOS3003, 3005, 3008, 3012, GOVT2552, 2557, WORK 2204, 2205, 2209, 2210, 2211, 2217, 2218, 2219, 2221
See FEB Handbook

Marketing

Junior (Level 1) units
MKTG1001 and MKTG1002
Level 2 and 3 units
MKTG2112 and MKTG3111
Four other MKTG2000 or 3000 units
See FEB Handbook

Psychology

Junior (Level 1) units
PSYC1001 and PSYC1002
Level 2 and 3 units
PSYC2011, 2012, 2013 and 2014
24 credit points PSYC3000 units
See FEB Handbook
**Note: A Psychology major requires the completion of 60 credit points of PSYC units*

Notes:

- For disciplines based in other faculties (e.g. Geography is based in the Faculty of Science) the specification of a major here may differ from that in its 'home' faculty. The requirement for a major within the BAgrEc degree is no less, nor more liberal, than in the discipline's 'home' faculty.
- A student can count a particular unit of study towards only one major.
- Where a student could count a unit of study towards more than one major, the student must nominate by the end of their final year the particular major to which the unit is to be allocated.

Bachelor of Horticultural Science

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Year 1			
Year 1 will have the following 48 credit point structure:			
AGEC1006 **Economic Environment of Agriculture**	6	**A** HSC Mathematics **N** AGEC1003, AGEC1004	Semester 1
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
or			
BIOL1101 **Biology - Ecosystems to Genes**	6	**P** HSC 2-unit Biology or equivalent. **N** BIOL1001, BIOL901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
or			
BIOL1901 **Biology - Ecosystems to Genes (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1001, BIOL1101 *Note: Department permission required for enrolment* *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
HORT1001 **Horticultural Science 1A**	6	**A** HSC 2 unit Chemistry **N** CROP1001, LWSC1001	Semester 1
BIOL1002 **Living Systems**	6	**A** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **N** BIOL1902	Semester 2
or			
BIOL1902 **Living Systems (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1002, BIOL1904, BIOL1905 *Note: Department permission required for enrolment*	Semester 2
BIOM1003 **Biometry 1**	6	**A** 70 or more in HSC Mathematics	Semester 2
HORT1002 **Horticultural Science 1B**	6	**C** HORT1001 **N** CROP1002, LWSC1002	Semester 2
And 12 credit points of first year Chemistry			
CHEM1001 **Fundamentals of Chemistry 1A**	6	**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, CHEM1909	Semester 1
CHEM1002 **Fundamentals of Chemistry 1B**	6	**P** CHEM (1001 or 1101) or equivalent **N** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 2
or			
CHEM1901 **Chemistry 1A (Advanced)**	6	**P** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation **C** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1101, CHEM1109, CHEM1903, CHEM1909 *Note: Department permission required for enrolment*	Semester 1
CHEM1902 **Chemistry 1B (Advanced)**	6	**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, CHEM1102, CHEM1108, CHEM1904, CHEM1908 *Note: Department permission required for enrolment*	Semester 2
Year 2			
Year 2 will have the following 48 credit point structure:			
BIOM2001 **Biometry 2**	6	**P** BIOM1003 or equivalent	Semester 1
PLNT2001 **Plant Biochemistry and Molecular Biology**	6	**P** 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **N** PLNT2901, AGCH2001	Semester 1
or			
PLNT2901 **Plant Biochem & Molecular Biology (Adv)**	6	**P** A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **N** PLNT2001, AGCH2001	Semester 1
PLNT2002 **Aust Flora: Ecology and Conservation**	6	**A** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **P** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **N** PLNT2902, BIOL2004, BIOL2904	Semester 1
or			

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
PLNT2902 **Aust Flora: Ecology & Conservation (Adv)**	6	**A** The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202).These requirements may be varied and students with lower averages should consult the unit Executive Officer **N** PLNT2002, BIOL2004, BIOL2904	Semester 1
SOIL2003 **Soil Properties and Processes**	6		Semester 1
ENTO2001 **Entomology**	6		Semester 2
HORT2002 **Horticultural Science 2**	6	**A** HORT1001, HORT1002 **P** (BIOL1001or BIOL1101 or BIOL1901) and (BIOL1002 or BIOL1902 or BIOL1003 or BIOL1903)	Semester 2
MICR2024 **Microbes in the Environment**	6	**P** 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. **N** MICR2021, MICR2921, MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2909 *Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).*	Semester 2
PLNT2003 **Plant Form and Function**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 **N** PLNT2903, BIOL2003, BIOL2903, CROP2001	Semester 2
or			
PLNT2903 **Plant Form and Function (Advanced)**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) **N** PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3			
Year 3 will have the following structure: a core (36 credit points) of:			
GENE2001 **Agricultural Genetics 2**	6	**P** (BIOL1001 or BIOL1101 or BIOL1901) and (BIOL1002 or and BIOL1902) and (BIOM1001 or BIOM1003)	Semester 1
HORT3005 **Production Horticulture**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 1
PPAT3003 **Plant Disease**	6	**P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903, MICR2024, MICR2026 or MICR2101	Semester 1
HORT3004 **Postharvest Biology and Technology**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 2
PLNT3001 **Plant, Cell and Environment**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3901	Semester 2
or			
PLNT3901 **Plant, Cell and Environment (Advanced)**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3001 *Note: Department permission required for enrolment* *Entry is restricted and is based on a combination of a high WAM and student motivation*	Semester 2
PLNT3002 **Plant Growth and Development**	6	**P** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent **N** PLNT3902, BIOL3021, BIOL3931	Semester 2
or			
PLNT3902 **Plant Growth and Development (Advanced)**	6	**P** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, 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 coordinator **N** PLNT3002, BIOL3021, BIOL3931	Semester 2
And 12 credit points selected from the following electives:			
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGCH3030 **Rural Environmental Chemistry A**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGRO3002 **Agronomy 3**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
MICR2022 **Microbes in Society**	6	**A** MICR (2021 or 2921 or 2024) **P** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **N** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 *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 MBLG1001 or PLNT (2001 or 2901).*	Semester 2
MICR3022 **Microbial Biotechnology**	6	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** MICR3922, MICR3002, MICR3902	Semester 2
SOIL3004 **The Soil Resource**	6	**P** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL3008 **Rural Spatial Information Systems**	6		Semester 2
Year 4			
In Year 4, students will complete:			
*two 6 credit point core units as indicated in the following table (Table 1)			
*a project of 24 credit points relevant to specialisation (Table 2)			
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.			

Table 1 – BHortSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
HORT4004 **Issues in Horticultural Science 4A**	6	**P** HORT3001 or HORT3004	Semester 1
HORT4005 **Research and Practice in Hort Science**	6	**P** HORT3005	Semester 2

Table 2 – BHortSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGRI4101 **Research Project A**	12	**C** MICR3022 or (AGEC4103 or 4104) or AGRO(4003 or 4004) or BIOM(4003 or 4004 or 4005) or ENTO4004 or AGCH4007 or GENE4012 or HORT4004 or PPAT(4003 or 4004 or 4005) or SOIL(4005 or 4006) or LWSC4003	Semester 1
AGRI4102 **Research Project B**	12	**P** AGRI4101	Semester 2

Table 3 – BHortSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGCH3030 **Rural Environmental Chemistry A**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 1
AGCH4007 **Instrumentation in Analytical Chemistry**	6	**A** PLNT2001, AGCH2003 or AGCH2004	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC4103 **International Agricultural Trade**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4104 **Agribusiness Analysis**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
AGRO3002 **Agronomy 3**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
AGRO4003 **Crop and Pasture Agronomy**	6	**P** AGRO3001 or AGRO3002	Semester 1
AGRO4004 **Sustainable Farming Systems**	6	**P** AGRO3001 or AGRO3002	Semester 1
ANSC3102 **Animal Reproduction**	6	**P** ANSC2002	Semester 1
ANSC3103 **Animal Structure and Function 3A**	6	**P** ANSC2002	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
BIOM3005 **Environmetrics 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM 3004	Semester 1
BIOM4003 **Matrix Algebra and Linear Models**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4004 **Applied Multivariate Analysis**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4005 **Biometrical Methods**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
ENTO4004 **Insect Taxonomy and Systematics**	6	**A** ENTO2001	Semester 1
ENVI3111 **Environmental Law and Ethics**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3001, ENVI3003.	Semester 1
GENE4013 **Molecular Genetics and Breeding**	6	**P** BIOM2001, GENE2001, AGCH3016	Semester 1
GENE4014 **Population and Quantative Genetics**	6	**P** BIOM2001, GENE2001 **C** GENE4012	Semester 1
LWSC3004 **Limnology and Water Quality**	6	**P** LWSC2002 or AGCH2003 **N** AGCH3030	Semester 1
LWSC4003 **Landscape Hydrology and Management**	6	**P** GEOG2321 or LWSC3004.	Semester 1
PPAT4004 **Adv Mycology & Diagnostic Plant Path'ogy**	6	**P** PPAT3003 or equivalent.	Semester 1
PPAT4005 **Soil Biology and Biodiversity**	6		Semester 1
SOIL4005 **Field and Laboratory Soil Physics**	6	**P** SOIL3004	Semester 1
SOIL4006 **Field and Laboratory Pedology**	6	**P** SOIL 3004	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
VIRO3001 **Virology**	6	**A** MICR (2021 or 2921 or 2022 or 2922) **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 BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** VIRO3901 *Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.*	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
ANSC3101 **Animal Nutrition 3**	6	**P** ANSC2002	Semester 2
ANSC3104 **Animal Structure and Function 3B**	6	**P** ANSC2002, ANSC3103 OR ANSC3003	Semester 2
BIOM4006 **Statistical Computing and Consulting**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 2
ENTO4003 **Applied Entomology (Crops)**	6	**A** ENTO2001	Semester 2
ENVI3112 **Environmental Assessment**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3002, ENVI3004.	Semester 2
GENE4011 **Plant Cytogenetics**	6	**P** BIOM2001, GENE2001.	Semester 2
GENE4012 **Plant Breeding**	6	**P** BIOM2001, GENE2001	Semester 2
MICR2022 **Microbes in Society**	6	**A** MICR (2021 or 2921 or 2024) **P** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **N** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 *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 MBLG1001 or PLNT (2001 or 2901).*	Semester 2
MICR3022 **Microbial Biotechnology**	6	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** MICR3922, MICR3002, MICR3902	Semester 2
SOIL3004 **The Soil Resource**	6	**P** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL3008 **Rural Spatial Information Systems**	6		Semester 2
SOIL4007 **Environmental Soil Chemistry**	6	**P** SOIL3004	Semester 2

Bachelor of Land and Water Science

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Year 1			
Year 1 will have the following 48 credit point structure:			
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
or			
BIOL1101 **Biology - Ecosystems to Genes**	6	**P** HSC 2-unit Biology or equivalent. **N** BIOL1001, BIOL901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
or			

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
BIOL1901 **Biology - Ecosystems to Genes (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1001, BIOL1101 *Note: Department permission required for enrolment* *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
GEOS1001 **Earth, Environment and Society**	6	**N** GEOS1901, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902	Semester 1
LWSC1001 **Land and Water Science 1A**	6	**N** CROP1001, HORT1001	Semester 1
RSEC1031 **Resource Economics 1**	6	**N** AGEC1031	Semester 2
BIOM1003 **Biometry 1**	6	**A** 70 or more in HSC Mathematics	Semester 2
LWSC1002 **Land and Water Science 1B**	6	**C** LWSC1001 Land and Water Science 1A **N** CROP1002, HORT1002	Semester 2
And 12 credit points of first year Chemistry			
CHEM1001 **Fundamentals of Chemistry 1A**	6	**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, CHEM1909	Semester 1
CHEM1002 **Fundamentals of Chemistry 1B**	6	**P** CHEM (1001 or 1101) or equivalent **N** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 2
Or from standard level CHEM 1101 Chemistry 1A and CHEM 1102 Chemistry 1B			
Or from advanced level CHEM 1901 Chemistry 1A (Advanced) and CHEM 1902 Chemistry 1B (Advanced)			
Year 2			
Year 2 will have the following 48 credit point structure:			
AGCH2003 **Rural Environmental Chemistry (Intro)**	6	**P** 12 credit points of Junior Chemistry **N** AGCH2001, AGCH2002, CHEM2404	Semester 1
BIOM2001 **Biometry 2**	6	**P** BIOM1003 or equivalent	Semester 1
PLNT2002 **Aust Flora: Ecology and Conservation**	6	**A** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **P** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **N** PLNT2902, BIOL2004, BIOL2904	Semester 1
or			
PLNT2902 **Aust Flora: Ecology & Conservation (Adv)**	6	**A** The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202).These requirements may be varied and students with lower averages should consult the unit Executive Officer **N** PLNT2002, BIOL2004, BIOL2904	Semester 1
SOIL2003 **Soil Properties and Processes**	6		Semester 1
GEOG2321 **Fluvial and Groundwater Geomorphology**	6	**P** GEOG(2311 or 2001) or 36 credit points of Junior study including GEOG1001 or ENVI (1001 or 1002) or GEOL (1001 or 1002 or 1501). Students in the Bachelor of Resource Economics should have 36 credit points of study in Biology (or Land and Water Science), Chemistry and Mathematics. Students in the Bachelor of Land and Water Science should have ENVI1002, 12 credit points of Chemistry, 6 credit points of Biology, BIOM1002. **N** GEOG (2002 or 2302 or 2303) or MARS2002 or MARS2006	Semester 2
LWSC2002 **Sustainable Land and Water Management**	6	**P** LWSC1001, LWSC1002.	Semester 2
MICR2024 **Microbes in the Environment**	6	**P** 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. **N** MICR2021, MICR2921, MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2909 *Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).*	Semester 2
PLNT2003 **Plant Form and Function**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 **N** PLNT2903, BIOL2003, BIOL2903, CROP2001	Semester 2
or			
PLNT2903 **Plant Form and Function (Advanced)**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) **N** PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3			
Year 3 will have a core (24 credit points) of:			

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
BIOM3005 **Environmetrics 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM 3004	Semester 1
LWSC3004 **Limnology and Water Quality**	6	**P** LWSC2002 or AGCH2003 **N** AGCH3030	Semester 1
SOIL3004 **The Soil Resource**	6	**P** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL3008 **Rural Spatial Information Systems**	6		Semester 2
And 24 credit points selected from the following electives:			
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGRO3002 **Agronomy 3**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
ENVI3111 **Environmental Law and Ethics**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3001, ENVI3003.	Semester 1
PPAT3003 **Plant Disease**	6	**P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903, MICR2024, MICR2026 or MICR2101	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
ENVI3112 **Environmental Assessment**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3002, ENVI3004.	Semester 2
Year 4			
In Year 4 students will complete:			
*two 6-credit point core units as indicated in the following table (Table 1)			
*a project of 24 credit points relevant to specialisation (Table 2)			
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.			

Table 1 – BLWSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Year 4			
LWSC4003 **Landscape Hydrology and Management**	6	**P** GEOG2321 or LWSC3004.	Semester 1
SOIL4005 **Field and Laboratory Soil Physics**	6	**P** SOIL3004	Semester 1

Table 2 – BLWSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGRI4101 **Research Project A**	12	**C** MICR3022 or (AGEC4103 or 4104) or AGRO(4003 or 4004) or BIOM(4003 or 4004 or 4005) or ENTO4004 or AGCH4007 or GENE4012 or HORT4004 or PPAT(4003 or 4004 or 4005) or SOIL(4005 or 4006) or LWSC4003	Semester 1
AGRI4102 **Research Project B**	12	**P** AGRI4101	Semester 2

Table 3 – BLWSc

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGCH4007 **Instrumentation in Analytical Chemistry**	6	**A** PLNT2001, AGCH2003 or AGCH2004	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC4103 **International Agricultural Trade**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4104 **Agribusiness Analysis**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
AGRO3002 **Agronomy 3**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
AGRO4003 **Crop and Pasture Agronomy**	6	**P** AGRO3001 or AGRO3002	Semester 1
AGRO4004 **Sustainable Farming Systems**	6	**P** AGRO3001 or AGRO3002	Semester 1
ANSC3102 **Animal Reproduction**	6	**P** ANSC2002	Semester 1
ANSC3103 **Animal Structure and Function 3A**	6	**P** ANSC2002	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
BIOM4003 **Matrix Algebra and Linear Models**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4004 **Applied Multivariate Analysis**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4005 **Biometrical Methods**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
ENVI3111 **Environmental Law and Ethics**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3001, ENVI3003.	Semester 1
HORT3005 **Production Horticulture**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 1
PPAT3003 **Plant Disease**	6	**P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903, MICR2024, MICR2026 or MICR2101	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
PPAT4004 **Adv Mycology & Diagnostic Plant Path'ogy**	6	**P** PPAT3003 or equivalent.	Semester 1
PPAT4005 **Soil Biology and Biodiversity**	6		Semester 1
RSEC4132 **Environmental Economics**	6	**A** ECON2002, AGEC3001, AGEC2101 and (AGEC2105 or AGEC2005 or ECMT2010 or ECMT2110) **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 1
SOIL4006 **Field and Laboratory Pedology**	6	**P** SOIL 3004	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
BIOM4006 **Statistical Computing and Consulting**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 2
ENVI3112 **Environmental Assessment**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3002, ENVI3004.	Semester 2
HORT3004 **Postharvest Biology and Technology**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 2
MICR2022 **Microbes in Society**	6	**A** MICR (2021 or 2921 or 2024) **P** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **N** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 *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 MBLG1001 or PLNT (2001 or 2901).*	Semester 2
MICR3022 **Microbial Biotechnology**	6	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** MICR3922, MICR3002, MICR3902	Semester 2
PLNT3001 **Plant, Cell and Environment**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3901	Semester 2
or			
PLNT3901 **Plant, Cell and Environment (Advanced)**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3001 *Note: Department permission required for enrolment* *Entry is restricted and is based on a combination of a high WAM and student motivation*	Semester 2
RSEC4134 **Economics of Water & Bio-resources**	6	**A** ECON2002, AGEC3001, AGEC2101, AGEC2105 **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 2
PLNT3002 **Plant Growth and Development**	6	**P** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent **N** PLNT3902, BIOL3021, BIOL3931	Semester 2
or			
PLNT3902 **Plant Growth and Development (Advanced)**	6	**P** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, 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 coordinator **N** PLNT3002, BIOL3021, BIOL3931	Semester 2
SOIL4007 **Environmental Soil Chemistry**	6	**P** SOIL3004	Semester 2

Bachelor of Resource Economics

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Year 1			
Year 1 will have a minimum of 48 credit points comprised of:			
ECON1001 **Introductory Microeconomics**	6	**A** Mathematics	Semester 1 Summer Main
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
or			
BIOL1901 **Biology - Ecosystems to Genes (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1001, BIOL1101 *Note: Department permission required for enrolment* *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
or			
CHEM1001 **Fundamentals of Chemistry 1A**	6	**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, CHEM1909	Semester 1
or			
CHEM1101 **Chemistry 1A**	6	**A** HSC Chemistry and Mathematics **C** Recommended concurrent units of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1109, CHEM1901, CHEM1903, CHEM1909	Semester 1 Semester 2 Summer Main
or			
CHEM1901 **Chemistry 1A (Advanced)**	6	**P** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation **C** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1101, CHEM1109, CHEM1903, CHEM1909 *Note: Department permission required for enrolment*	Semester 1
or			
LWSC1001 **Land and Water Science 1A**	6	**N** CROP1001, HORT1001	Semester 1
MATH1001 **Differential Calculus**	3	**A** HSC Mathematics Extension 1 **N** MATH1011, MATH1901, MATH1906, MATH1111	Semester 1 Summer Main
or			
MATH1901 **Differential Calculus (Advanced)**	3	**A** HSC Mathematics Extension 2 **N** MATH1111, MATH1011, MATH1001, MATH1906 *Note: Department permission required for enrolment*	Semester 1
MATH1002 **Linear Algebra**	3	**A** HSC Mathematics Extension 1 **N** MATH1902, MATH1012, MATH1014	Semester 1 Summer Main
or			
MATH1902 **Linear Algebra (Advanced)**	3	**A** HSC Mathematics Extension 2 **N** MATH1002, MATH1012, MATH1014 *Note: Department permission required for enrolment*	Semester 1
ECON1002 **Introductory Macroeconomics**	6	**A** Mathematics	Semester 2 Summer Main
Either1			
BIOL1002 **Living Systems**	6	**A** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **N** BIOL1902	Semester 2
or			
BIOL1902 **Living Systems (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1002, BIOL1904, BIOL1905 *Note: Department permission required for enrolment*	Semester 2
or			
CHEM1002 **Fundamentals of Chemistry 1B**	6	**P** CHEM (1001 or 1101) or equivalent **N** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 2
or			
CHEM1102 **Chemistry 1B**	6	**P** CHEM (1101 or 1901) or a Distinction in CHEM1001 or equivalent **C** Recommended concurrent units of study: 6 credit points of Junior Mathematics **N** CHEM1002, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 1 Semester 2 Summer Main
or			
CHEM1902 **Chemistry 1B (Advanced)**	6	**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, CHEM1102, CHEM1108, CHEM1904, CHEM1908 *Note: Department permission required for enrolment*	Semester 2
or			
LWSC1002 **Land and Water Science 1B**	6	**C** LWSC1001 Land and Water Science 1A **N** CROP1002, HORT1002	Semester 2

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
MATH1003 **Integral Calculus and Modelling**	3	**A** HSC Mathematics Extension 2 or MATH1001 or MATH1111 **N** MATH1013, MATH1903, MATH1907	Semester 2 Summer Main
or			
MATH1903 **Integral Calculus and Modelling Advanced**	3	**A** HSC Mathematics Extension 2 or Credit or better in MATH1001 or MATH1901 **N** MATH1003, MATH1013, MATH1907 *Note: Department permission required for enrolment*	Semester 2
MATH1005 **Statistics**	3	**A** HSC Mathematics **N** MATH1905, MATH1015, ECMT Junior units of study, STAT1021, STAT1022	Semester 2 Summer Main
or			
MATH1905 **Statistics (Advanced)**	3	**A** HSC Mathematics Extension 2 **N** MATH1005, MATH1015, ECMT Junior units of study, STAT1021, STAT1022 *Note: Department permission required for enrolment*	Semester 2
or			
ECMT1020 **Business and Economic Statistics B**	6	**C** ECMT1010 **N** ECMT1021, ECMT1022, ECMT1023 *Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.*	Semester 2
RSEC1031 **Resource Economics 1**	6	**N** AGEC1031	Semester 2
And units from Table RE1 (a minimum of 6 credit points)			
Note: 1. The second core science unit must be taken in the same discipline as the first core science unit.			
Year 2			
Year 2 will have a minimum of 48 credit points comprised of:			
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
or			
ECMT2110 **Regression Modelling**	6	**P** ECMT1010 **N** ECMT2010	Semester 1
GEOS2113 **Making the Australian Landscape**	6	**P** 24 credit points of Junior units of study, including GEOS1002 or GEOS1003 or GEOS1902 or GEOS1903 or GEOG1001 or ENVI1002 or GEOL1001 or GEOL1002 or GEOL1902 **N** GEOS2913	Semester 1
ECOS2001 **Intermediate Microeconomics**	6	**P** ECON1001 **C** ECMT1010 **N** ECON2001, ECOS2901, ECON2901 *Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.*	Semester 1 Semester 2 Summer Main
or			
ECOS2901 **Intermediate Microeconomics Honours**	6	**P** ECON1001 and ECON1002 with a Credit average or better in the two units of study combined **C** ECOS2903 and ECMT1010 **N** ECON2901, ECOS2001, ECON2001 *Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.*	Semester 1
ECOS2002 **Intermediate Macroeconomics**	6	**P** ECON1002 **C** ECMT1010 **N** ECON2002, ECOS2902, ECON2902 *Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.*	Semester 1 Semester 2 Summer Main
or			
ECOS2902 **Intermediate Macroeconomics Honours**	6	**P** ECOS2901 **C** ECMT1010 **N** ECON2902, ECOS2002, ECON2002 *Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.*	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
And units from Tables RE1 and RE2 (normally a minimum of 12 credit points)			
Year 3			
Year 3 will have a minimum of 48 credit points comprised of:			
ENVI3111 **Environmental Law and Ethics**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3001, ENVI3003.	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGEC3104 **Research Methods**	6	**P** AGEC2105 or ECMT2010 or ECMT2110 or AGEC2005 **N** AGEC3004	Semester 2
ECOS 3ddd Economics level 3 unit (6 credit points)			
Level 2/3 Faculty of Economics and Business unit (6 credit points)			
And units from Table RE2 (normally a minimum of 12 credit points)			

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
Year 4			
Year 4 will have a minimum of 48 credit points comprised of:			
RSEC4131 **Benefit-Cost Analysis**	6	**P** ECON2001 and (AGEC2103 or AGEC2003) **N** AGEC4037	Semester 1
RSEC4132 **Environmental Economics**	6	**A** ECON2002, AGEC3001, AGEC2101 and (AGEC2105 or AGEC2005 or ECMT2010 or ECMT2110) **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 1
RSEC4141 **Resource Economics Project A**	9	**P** AGEC3104 or AGEC3004 or AGEC4041 **C** RSEC4142 **N** AGEC4012, AGEC4112 *Note: Department permission required for enrolment*	Semester 1
RSEC4142 **Resource Economics Project B**	9	**P** AGEC3104 or AGEC3004 or AGEC4041 **C** RSEC4141 **N** AGEC4013, AGEC4113	Semester 2
Plus an aggregate of 18 credit points of the following elective RSEC and AGEC units, of which at least 6 credit points must be elective RSEC units:			
RSEC4133 **Economics of Mineral & Energy Industries**	6	**A** ECON2002, AGEC3001, AGEC2101, AGEC2105 **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 2
RSEC4134 **Economics of Water & Bio-resources**	6	**A** ECON2002, AGEC3001, AGEC2101, AGEC2105 **P** ECON2001 and (AGEC2103 or AGEC2003) **N** ECON3013 *Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator*	Semester 2
AGEC4110 **Professional Skills**	3	**C** AGEC4011 or AGEC4111 **N** AGEC4010	Semester 1
AGEC4103 **International Agricultural Trade**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4108 **Quantitative Planning Methods**	6	**P** AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 **N** AGEC4008	Semester 1
AGEC4107 **Special Topics**	6	**N** AGEC4007 *Note: Department permission required for enrolment*	Semester 1 Semester 2
AGEC4102 **Agricultural Development Economics**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 2
AGEC4111 **Contemporary Issues**	3	**C** AGEC4010 **N** AGEC4011	Semester 2
When needed to complete a major, 6 credit points from the above elective units can be substituted with level 3 units from other disciplines, with approval of the degree coordinator.			

Table RE1: Elective units of study available for inclusion in years 1 or 2 of the BResEc degree

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
ACCT1001 **Accounting IA**	6	**A** HSC Mathematics **N** ACCT1003, ACCT1004 *Restricted entry*	Semester 1 Semester 2 Summer Dec
ACCT1003 **Financial Accounting Concepts**	6	**N** ACCT1001, ACCT1002 *Terminating unit.*	Semester 1
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
BIOL1901 **Biology - Ecosystems to Genes (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1001, BIOL1101 *Note: Department permission required for enrolment* *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
BIOL1002 **Living Systems**	6	**A** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **N** BIOL1902	Semester 2
BIOL1902 **Living Systems (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1002, BIOL1904, BIOL1905 *Note: Department permission required for enrolment*	Semester 2
CHEM1001 **Fundamentals of Chemistry 1A**	6	**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, CHEM1909	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
CHEM1101 **Chemistry 1A**	6	**A** HSC Chemistry and Mathematics **C** Recommended concurrent units of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1109, CHEM1901, CHEM1903, CHEM1909	Semester 1 Semester 2 Summer Main
CHEM1901 **Chemistry 1A (Advanced)**	6	**P** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation **C** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1101, CHEM1109, CHEM1903, CHEM1909 *Note: Department permission required for enrolment*	Semester 1
CHEM1002 **Fundamentals of Chemistry 1B**	6	**P** CHEM (1001 or 1101) or equivalent **N** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 2
CHEM1102 **Chemistry 1B**	6	**P** CHEM (1101 or 1901) or a Distinction in CHEM1001 or equivalent **C** Recommended concurrent units of study: 6 credit points of Junior Mathematics **N** CHEM1002, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 1 Semester 2 Summer Main
CHEM1902 **Chemistry 1B (Advanced)**	6	**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, CHEM1102, CHEM1108, CHEM1904, CHEM1908 *Note: Department permission required for enrolment*	Semester 2
CLAW1001 **Commercial Transactions A**	6		Semester 1 Semester 2 Summer Main
CLAW1002 **Commercial Transactions B**	6	**P** CLAW1001	Semester 2
CROP1001 **Agricultural Science 1A**	6	**A** HSC Chemistry **N** HORT1001, LWSC1001	Semester 1
CROP1002 **Agricultural Science 1B**	6	**C** CROP1001 **N** HORT1002, LWSC1002	Semester 2
ECMT1010 **Business and Economic Statistics A**	6	**N** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021	Semester 1 Semester 2 Summer Main
GEOS1001 **Earth, Environment and Society**	6	**N** GEOS1901, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902	Semester 1
GEOS1002 **Introductory Geography**	6	**N** GEOS1902, GEOG1001, GEOG1002	Semester 2
GEOS1003 **Introduction to Geology**	6	**N** GEOS1903, GEOL1002, GEOL1902	Semester 2
LWSC1001 **Land and Water Science 1A**	6	**N** CROP1001, HORT1001	Semester 1
LWSC1002 **Land and Water Science 1B**	6	**C** LWSC1001 Land and Water Science 1A **N** CROP1002, HORT1002	Semester 2
PSYC1001 **Psychology 1001**	6		Semester 1 Summer Main
PSYC1002 **Psychology 1002**	6		Semester 2 Summer Main
Modern Language (Level 1 or higher) units, with the approval of the Dean FAFNR			

Notes:

1. Students may count no more that 12 credit points of the units specified in this table as elective units towards meeting the requirements of their degree (equivalently, 24 credit points in total when the units of compulsory Year 1 science are counted).
2. ACCT1001 and ACCT1003 are mutually exclusive.
3. Entry to ACCT1001 is restricted: the student's academic record must be as good as that needed for admission to the University's BCom program.
4. Prerequisites apply for many second semester units.

Table RE2: Elective units of study available for inclusion in years 2 or 3 of the BResEc degree

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
ECOS3002 **Development Economics**	6	**P** One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) **N** ECON3002	Semester 2
ECOS3003 **Hierarchies, Incentives & Firm Structure**	6	**P** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **N** ECON3003	Semester 2
ECOS3005 **Industrial Organisation**	6	**P** One of (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **N** ECON3005, ECOS2201	Semester 2 Summer Main
ECOS3006 **International Trade**	6	**P** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **N** ECON3006	Semester 1
ECOS3007 **International Macroeconomics**	6	**P** One of (ECOS2002 or ECON2002) or (ECOS2902 or ECON2902) **N** ECON3007	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
ECOS3009 **Markets, Regulation & Government Policy** *This unit of study is not available in 2007*	6	**P** One of ECOS2001 (or ECON2001), ECOS2901 (or ECON2901), ECOP2011 (or ECOP2001), plus one of ECOS2002 (or ECON2002), ECOS2902 (or ECON2902), ECOP2012 (or ECOP2002). **N** ECON3009 *Note: Department permission required for enrolment* *Please Note. This unit of study is under review for Semester 2 2006. Please contact the Faculty of Economics and Business Student Information Office on +61 2 9351 3076 or email student@econ.usyd.edu.au for further details.*	
ECOS3010 **Monetary Economics**	6	**P** one of (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) or (ECOS2002 or ECON2002) or (ECOS2902 or ECON2902) **N** ECON3010	Semester 1
ECOS3011 **Public Finance**	6	**P** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **N** ECON3011	Semester 2
ECOS3012 **Strategic Behaviour**	6	**P** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **N** ECON3012	Semester 1
Units of study in the following discipline areas (level 2000 or level 3000 unless otherwise specified):			
Agricultural Economics (Level 3000), Agricultural Chemistry, Animal Science, Biology (including plant science units), Chemistry, Commercial Law, Crop, Science, Econometrics, Environmental Science, Finance, Geography, Geology, Land and Water Science, Mathematics (including Statistics), Marine Science, Psychology, Soil Science			

Notes:

1. AGEC2102 is permitted for Year 2 only.
2. Prerequisites and/or corequisites apply for most units

Majors in the BResEc degree

The definitions of majors in the following tables apply for students commencing in 2005 or later. These students are required to complete 48 credit points in their chosen majors. Their majors must comply with the requirements for the BResEc degree as set out below, and also with the minimum requirements of the discipline teaching that major.

Students who have commenced in 2004 or earlier will be required to complete 44 credit points to obtain a major. The major will be defined according to the criteria as currently determined by the discipline teaching that major. The current requirements for majors in the Faculty of Economics and Business and the Faculty of Science can be found in the respective 2006 Faculty Handbooks.

All students must complete a Resource Economics major. In addition, students may also complete major(s) in other disciplines.

Resource Economics major

Junior (Level 1) units
RSEC1031
Two of (MATH1001, 1002, 1003 and 1005) or ECMT1010
Level 2 and 3 units
AGEC2101 and 2103
Three of AGEC3103 and Level 4 RSEC units

Non-Resource Economics majors available in the BResEc Degree

Agricultural Science

Junior (Level 1) units
CROP1001 CROP1002
Level 2 and 3 units
PLNT2003 SOIL2003
Four other level 2/3/4 Agricultural Science units of study

Biology

Junior (Level 1) units
Two BIOL1000 units
Level 2 and 3 units
Two BIOL2000 units
Two BIOL3000 units
See FSc Handbook

Chemistry

Junior (Level 1) units
One or two CHEM1000 units
Two of MATH1001, 1002, 1003 and 1005
Level 2 and 3 units
Two specified CHEM2000 units
Four CHEM2000 units
See FSc Handbook

Commercial Law

Junior (Level 1) units
CLAW1001 And either CLAW1002 or any CLAW2000 or CLAW3000 level units of study
Level 2 and 3 units
CLAW2201
Any five further CLAW2000 or 3000 units
See FEB Handbook

Economics

Junior (Level 1) units
ECON1001 and ECON1002
Level 2 and 3 units
ECOS2001 and ECOS2002
Any four further ECOS2000 or ECOS3000 units, of which at least two must be at the 3000 level.
See FEB Handbook

Finance

Junior (Level 1) units
ACCT1001* or ACCT1003 and either ECMT1010 or ECON1001
Level 2 and 3 units
FINC2011 and either FINC2012 or FINC2014
Any four further FINC3000 units, or three further FINC3000 units and one of either ACCT3013 or CLAW3201
See FEB Handbook
**Note: Restricted entry*

Geography

Junior (Level 1) units
GEOG1001, GEOS1001, ENVI1002, GEOL1002 or GEOS1003 GEOG1002, GEOS1002 or other level 1 science unit
Level 2 and 3 units
Two GEOG or GEOS2000 units
Four GEOG or GEOS3000 units
See FSc Handbook

Geology

Junior (Level 1) units
(GEOL1002 or GEOS1003) and CHEM1001
Level 2 and 3 units
Two GEOL2000, GEOS2000 or MARS2000 units
Four GEOS3000 or MARS3000 units
See FSc Handbook

Government and International Relations

Junior (Level 1) units
Two Level 1000 Government (GOVT) units
Level 2 and 3 units
Six GOVT2000 units
See FEB Handbook

Marine Science

Junior (Level 1) units
Two units (12 credit points) of Level 1 units in CHEM, BIOL or LWSC
Level 2 and 3 units
MARS2005 and MARS2006
Four MARS3000 units
See FSc Handbook

Mathematics

Junior (Level 1) units
MATH1001, 1002, 1003 and 1005 (or parallel advanced units)
Level 2 and 3 units
Two of MATH2061, MATH2065, MATH2070
Six 4 credit point MATH3000 units
See FSc Handbook

Soil Science

Junior (Level 1) units
Two CHEM1000 units
Level 2 and 3 units
AGCH2003 SOIL2003
24 credit points of SOIL3000 units

Statistics

Junior (Level 1) units
MATH1001, 1002, 1003 and 1005 (or parallel advanced units)
Level 2 and 3 units
STAT2011 and STAT2012 and 24 credit points of STAT3000 units
See FSc handbook

Notes:

- For disciplines based in other faculties (e.g. Geography is based in the Faculty of Science), the specification of a major here may differ from that in its 'home' faculty. The requirement for a major within the BResEc degree is no less, nor more liberal, than in the discipline's 'home' faculty.
- A student can count a particular unit of study towards only one major.
- Where a student could count a unit of study towards more than one major, the student must nominate by the end of their final year the particular major to which the unit is to be allocated.

Bachelor of Science in Agriculture

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Year 1			
Year 1 will have the following 48 credit point structure:			
AGEC1006 **Economic Environment of Agriculture**	6	**A** HSC Mathematics **N** AGEC1003, AGEC1004	Semester 1
BIOL1001 **Concepts in Biology**	6	**A** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **N** BIOL1101, BIOL1901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1 Summer Main
or			
BIOL1101 **Biology - Ecosystems to Genes**	6	**P** HSC 2-unit Biology or equivalent. **N** BIOL1001, BIOL901 *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
or			
BIOL1901 **Biology - Ecosystems to Genes (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1001, BIOL1101 *Note: Department permission required for enrolment* *It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.*	Semester 1
CROP1001 **Agricultural Science 1A**	6	**A** HSC Chemistry **N** HORT1001, LWSC1001	Semester 1
BIOL1002 **Living Systems**	6	**A** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **N** BIOL1902	Semester 2
or			
BIOL1902 **Living Systems (Advanced)**	6	**P** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **N** BIOL1002, BIOL1904, BIOL1905 *Note: Department permission required for enrolment*	Semester 2
BIOM1003 **Biometry 1**	6	**A** 70 or more in HSC Mathematics	Semester 2
CROP1002 **Agricultural Science 1B**	6	**C** CROP1001 **N** HORT1002, LWSC1002	Semester 2
and 12 credit points of first year chemistry			

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
CHEM1001 **Fundamentals of Chemistry 1A**	6	**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, CHEM1909	Semester 1
or			
CHEM1901 **Chemistry 1A (Advanced)**	6	**P** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation **C** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **N** CHEM1001, CHEM1101, CHEM1109, CHEM1903, CHEM1909 *Note: Department permission required for enrolment*	Semester 1
CHEM1002 **Fundamentals of Chemistry 1B**	6	**P** CHEM (1001 or 1101) or equivalent **N** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908	Semester 2
or			
CHEM1902 **Chemistry 1B (Advanced)**	6	**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, CHEM1102, CHEM1108, CHEM1904, CHEM1908 *Note: Department permission required for enrolment*	Semester 2
Year 2			
Year 2 will have the following 48 credit point structure:			
BIOM2001 **Biometry 2**	6	**P** BIOM1003 or equivalent	Semester 1
GENE2001 **Agricultural Genetics 2**	6	**P** (BIOL1001 or BIOL1101 or BIOL1901) and (BIOL1002 or and BIOL1902) and (BIOM1001 or BIOM1003)	Semester 1
PLNT2001 **Plant Biochemistry and Molecular Biology**	6	**P** 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **N** PLNT2901, AGCH2001	Semester 1
or			
PLNT2901 **Plant Biochem & Molecular Biology (Adv)**	6	**P** A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **N** PLNT2001, AGCH2001	Semester 1
SOIL2003 **Soil Properties and Processes**	6		Semester 1
ANSC2002 **Animal Science 2**	6	**P** CROP1001 and one of BIOL1001, BIOL1101, BIOL1901	Semester 2
ENTO2001 **Entomology**	6		Semester 2
MICR2024 **Microbes in the Environment**	6	**P** 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. **N** MICR2021, MICR2921, MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2909 *Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).*	Semester 2
PLNT2003 **Plant Form and Function**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 **N** PLNT2903, BIOL2003, BIOL2903, CROP2001	Semester 2
or			
PLNT2903 **Plant Form and Function (Advanced)**	6	**A** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) **N** PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3			
Year 3 will have the following structure: a core (18 credit points) of			
AGRO3002 **Agronomy 3**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 1
PPAT3003 **Plant Disease**	6	**P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903, MICR2024, MICR2026 or MICR2101	Semester 1
SOIL3004 **The Soil Resource**	6	**P** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
And 30 credit points selected from the following electives:			
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGCH3030 **Rural Environmental Chemistry A**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
ANSC3102 **Animal Reproduction**	6	**P** ANSC2002	Semester 1
ANSC3103 **Animal Structure and Function 3A**	6	**P** ANSC2002	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
HORT3005 **Production Horticulture**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 1
PLNT2002 **Aust Flora: Ecology and Conservation**	6	**A** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **P** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **N** PLNT2902, BIOL2004, BIOL2904	Semester 1
or			
PLNT2902 **Aust Flora: Ecology & Conservation (Adv)**	6	**A** The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202).These requirements may be varied and students with lower averages should consult the unit Executive Officer **N** PLNT2002, BIOL2004, BIOL2904	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
ANSC3101 **Animal Nutrition 3**	6	**P** ANSC2002	Semester 2
ANSC3104 **Animal Structure and Function 3B**	6	**P** ANSC2002, ANSC3103 OR ANSC3003	Semester 2
HORT3004 **Postharvest Biology and Technology**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 2
MICR2022 **Microbes in Society**	6	**A** MICR (2021 or 2921 or 2024) **P** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **N** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 *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 MBLG1001 or PLNT (2001 or 2901).*	Semester 2
PLNT3001 **Plant, Cell and Environment**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3901	Semester 2
or			
PLNT3901 **Plant, Cell and Environment (Advanced)**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3001 *Note: Department permission required for enrolment* *Entry is restricted and is based on a combination of a high WAM and student motivation*	Semester 2
PLNT3002 **Plant Growth and Development**	6	**P** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent **N** PLNT3902, BIOL3021, BIOL3931	Semester 2
or			
PLNT3902 **Plant Growth and Development (Advanced)**	6	**P** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, 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 coordinator **N** PLNT3002, BIOL3021, BIOL3931	Semester 2
SOIL3008 **Rural Spatial Information Systems**	6		Semester 2
Year 4			
In Year 4 students will complete:			

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
*two or three 6-credit point core units specified for their chosen specialisation, as indicated in the following table (Table 1)			
*a project of 24 credit points relevant to specialisation (Table 2)			
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.			

Table 1 – BScAgr

Unit of study	Credit points	A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition	Session
Agricultural Microbiology			
PPAT4005 Soil Biology and Biodiversity	6		Semester 1
MICR3022 Microbial Biotechnology	6	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** MICR3922, MICR3002, MICR3902	Semester 2
Agricultural Economics			
AGEC3102 Agricultural and Resource Policy	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC4103 International Agricultural Trade	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4104 Agribusiness Analysis	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
Agronomy			
AGRO4003 Crop and Pasture Agronomy	6	**P** AGRO3001 or AGRO3002	Semester 1
AGRO4004 Sustainable Farming Systems	6	**P** AGRO3001 or AGRO3002	Semester 1
Biometry			
BIOM4003 Matrix Algebra and Linear Models	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4004 Applied Multivariate Analysis	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4005 Biometrical Methods	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4006 Statistical Computing and Consulting	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 2
Entomology			
ENTO4003 Applied Entomology (Crops)	6	**A** ENTO2001	Semester 2
ENTO4004 Insect Taxonomy and Systematics	6	**A** ENTO2001	Semester 1
Environmental Chemistry			
AGCH4007 Instrumentation in Analytical Chemistry	6	**A** PLNT2001, AGCH2003 or AGCH2004	Semester 1
SOIL4007 Environmental Soil Chemistry	6	**P** SOIL3004	Semester 2
Food Science			
AGCH4006 Food Processing Science	6	**A** AGCH2003, AGCH2004 or PLNT2001. **N** AGCH3026	Semester 1
AGCH4007 Instrumentation in Analytical Chemistry	6	**A** PLNT2001, AGCH2003 or AGCH2004	Semester 1
Genetics/Plant Breeding/Biotechnology			
GENE4011 Plant Cytogenetics	6	**P** BIOM2001, GENE2001.	Semester 2
GENE4012 Plant Breeding	6	**P** BIOM2001, GENE2001	Semester 2
Horticulture			
HORT4004 Issues in Horticultural Science 4A	6	**P** HORT3001 or HORT3004	Semester 1
HORT4005 Research and Practice in Hort Science	6	**P** HORT3005	Semester 2

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
Livestock Production			
AGRO4003 **Crop and Pasture Agronomy**	6	**P** AGRO3001 or AGRO3002	Semester 1
AGRO4004 **Sustainable Farming Systems**	6	**P** AGRO3001 or AGRO3002	Semester 1
Plant Pathology			
PPAT4004 **Adv Mycology & Diagnostic Plant Path'ogy**	6	**P** PPAT3003 or equivalent.	Semester 1
PPAT4005 **Soil Biology and Biodiversity**	6		Semester 1
Soil Science			
SOIL4005 **Field and Laboratory Soil Physics**	6	**P** SOIL3004	Semester 1
SOIL4006 **Field and Laboratory Pedology**	6	**P** SOIL 3004	Semester 1
SOIL4007 **Environmental Soil Chemistry**	6	**P** SOIL3004	Semester 2

Table 2 – BScAgr

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGRI4101 **Research Project A**	12	**C** MICR3022 or (AGEC4103 or 4104) or AGRO(4003 or 4004) or BIOM(4003 or 4004 or 4005) or ENTO4004 or AGCH4007 or GENE4012 or HORT4004 or PPAT(4003 or 4004 or 4005) or SOIL(4005 or 4006) or LWSC4003	Semester 1
AGRI4102 **Research Project B**	12	**P** AGRI4101	Semester 2

Table 3 – BScAgr

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
AGCH3025 **Chemistry and Biochemistry of Foods A**	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **N** AGCH3017, AGCH3024	Semester 1
AGCH3026 **Chemistry and Biochemistry of Foods B**	6	**P** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **C** AGCH3025 **N** AGCH3003, AGCH3005, AGCH4006	Semester 1
AGCH3030 **Rural Environmental Chemistry A**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 1
AGCH4006 **Food Processing Science**	6	**A** AGCH2003, AGCH2004 or PLNT2001. **N** AGCH3026	Semester 1
AGCH4007 **Instrumentation in Analytical Chemistry**	6	**A** PLNT2001, AGCH2003 or AGCH2004	Semester 1
AGEC2102 **Agribusiness Marketing**	6	**P** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031	Semester 1
AGEC2103 **Production Economics**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2003	Semester 1
AGEC2105 **Applied Econometric Modelling**	6	**P** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **N** AGEC2005	Semester 1
AGEC3102 **Agricultural and Resource Policy**	6	**P** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **N** AGEC3002	Semester 1
AGEC4103 **International Agricultural Trade**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC4003	Semester 1
AGEC4104 **Agribusiness Analysis**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
AGRO4003 **Crop and Pasture Agronomy**	6	**P** AGRO3001 or AGRO3002	Semester 1
AGRO4004 **Sustainable Farming Systems**	6	**P** AGRO3001 or AGRO3002	Semester 1
ANSC3102 **Animal Reproduction**	6	**P** ANSC2002	Semester 1
ANSC3103 **Animal Structure and Function 3A**	6	**P** ANSC2002	Semester 1
BIOM3004 **Biometry 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM3005	Semester 1
BIOM3005 **Environmetrics 3**	6	**P** BIOM2001 or BIOM2002 **N** BIOM 3004	Semester 1

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
BIOM4003 **Matrix Algebra and Linear Models**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4004 **Applied Multivariate Analysis**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
BIOM4005 **Biometrical Methods**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 1
ENTO4004 **Insect Taxonomy and Systematics**	6	**A** ENTO2001	Semester 1
ENVI3111 **Environmental Law and Ethics**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3001, ENVI3003.	Semester 1
GENE4013 **Molecular Genetics and Breeding**	6	**P** BIOM2001, GENE2001, AGCH3016	Semester 1
GENE4014 **Population and Quantative Genetics**	6	**P** BIOM2001, GENE2001 **C** GENE4012	Semester 1
HORT3005 **Production Horticulture**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 1
HORT4004 **Issues in Horticultural Science 4A**	6	**P** HORT3001 or HORT3004	Semester 1
LWSC3004 **Limnology and Water Quality**	6	**P** LWSC2002 or AGCH2003 **N** AGCH3030	Semester 1
LWSC4003 **Landscape Hydrology and Management**	6	**P** GEOG2321 or LWSC3004.	Semester 1
PLNT2002 **Aust Flora: Ecology and Conservation**	6	**A** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **P** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **N** PLNT2902, BIOL2004, BIOL2904	Semester 1
or			
PLNT2902 **Aust Flora: Ecology & Conservation (Adv)**	6	**A** The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL(1003 or 1903) will need to do some preparatory reading **P** Distinction average in 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202).These requirements may be varied and students with lower averages should consult the unit Executive Officer **N** PLNT2002, BIOL2004, BIOL2904	Semester 1
PPAT4004 **Adv Mycology & Diagnostic Plant Path'ogy**	6	**P** PPAT3003 or equivalent.	Semester 1
PPAT4005 **Soil Biology and Biodiversity**	6		Semester 1
SOIL4005 **Field and Laboratory Soil Physics**	6	**P** SOIL3004	Semester 1
SOIL4006 **Field and Laboratory Pedology**	6	**P** SOIL 3004	Semester 1
VIRO3001 **Virology**	6	**A** MICR (2021 or 2921 or 2022 or 2922) **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 BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** VIRO3901 *Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.*	Semester 1
AGCH3015 **Agricultural Biotechnology**	6	**A** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units	Semester 2
AGCH3031 **Rural Environmental Chemistry B**	6	**P** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **N** AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC2101 **Market and Price Analysis**	6	**P** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC2001	Semester 2
AGEC3101 **Agribusiness Management**	6	**P** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **N** AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC3103 **Applied Optimisation**	6	**P** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **N** AGEC3101	Semester 2
AGRO3003 **Crop Water Management**	6	**A** CROP1001 or HORT1001 or LWSC1001 **P** PLNT2003 or PLNT2903	Semester 2
ANSC3101 **Animal Nutrition 3**	6	**P** ANSC2002	Semester 2
ANSC3104 **Animal Structure and Function 3B**	6	**P** ANSC2002, ANSC3103 OR ANSC3003	Semester 2
BIOM4006 **Statistical Computing and Consulting**	6	**P** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent	Semester 2
ENTO4003 **Applied Entomology (Crops)**	6	**A** ENTO2001	Semester 2

Unit of study	*Credit points*	*A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition*	*Session*
ENVI3112 **Environmental Assessment**	6	**A** Intermediate Environmental Science. **P** 12 credit points of Intermediate Science or Agriculture units. **N** ENVI3002, ENVI3004.	Semester 2
GENE4011 **Plant Cytogenetics**	6	**P** BIOM2001, GENE2001.	Semester 2
GENE4012 **Plant Breeding**	6	**P** BIOM2001, GENE2001	Semester 2
HORT3004 **Postharvest Biology and Technology**	6	**A** HORT1001, HORT1002 and HORT2002. **P** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903.	Semester 2
HORT4005 **Research and Practice in Hort Science**	6	**P** HORT3005	Semester 2
MICR2022 **Microbes in Society**	6	**A** MICR (2021 or 2921 or 2024) **P** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **N** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 *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 MBLG1001 or PLNT (2001 or 2901).*	Semester 2
MICR3022 **Microbial Biotechnology**	6	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **N** MICR3922, MICR3002, MICR3902	Semester 2
PLNT3001 **Plant, Cell and Environment**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3901	Semester 2
or			
PLNT3901 **Plant, Cell and Environment (Advanced)**	6	**P** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **N** PLNT3001 *Note: Department permission required for enrolment* *Entry is restricted and is based on a combination of a high WAM and student motivation*	Semester 2
PLNT3002 **Plant Growth and Development**	6	**P** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent **N** PLNT3902, BIOL3021, BIOL3931	Semester 2
or			
PLNT3902 **Plant Growth and Development (Advanced)**	6	**P** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, 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 coordinator **N** PLNT3002, BIOL3021, BIOL3931	Semester 2
SOIL3008 **Rural Spatial Information Systems**	6		Semester 2
SOIL4007 **Environmental Soil Chemistry**	6	**P** SOIL3004	Semester 2

5. Undergraduate units of study

Accounting units of study

For ACCT units of study not listed below please refer to the Faculty of Economics and Business Handbook (http://www.econ.usyd.edu.au/content.php?pageid=74).

ACCT1001
Accounting IA

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Dec **Classes:** Three hours of lectures/tutorials per week **Prohibitions:** ACCT1003, ACCT1004 **Assumed knowledge:** HSC Mathematics **Assessment:** Quiz; Mid-semester examination; Tutorial and research assignments; Practice Set; Final examination

Note: Restricted entry

Introduces accounting and the double entry system of financial recording. Students are introduced to the skills necessary to prepare, interpret and analyse financial statements. Examines assumptions underlying the preparation of financial statements for external users. Development of skills necessary to understand, discuss, analyse and write about accounting-related topics. Designed as an introduction to accounting. No prior knowledge of accounting assumed.

ACCT1002
Accounting IB

Credit points: 6 **Session:** Semester 1, Semester 2 **Classes:** Three hours of lectures/tutorials per week **Prerequisites:** ACCT1001 **Prohibitions:** ACCT1003, ACCT1004 **Assessment:** Homework task and worked examples; Group project; Mid-semester examination; Final examination.

Note: Restricted entry

Accounting is about the recording, classification, reporting and interpretation of information to help make economic decisions. Accounting 1A introduces accounting and the double entry system for financial recording. Accounting 1B develops themes and competencies learnt in Accounting 1A. The primary focus of this unit of study is on conceptual and technical issues relating to management accounting and the information required by internal users to make strategic and operational decisions relating to managing a business. A second theme is the financial accounting information businesses are required to produce to assess a firm's financial state and performance. Students examine how commercial and ethical issues affect business decisions and how there are present and future consequences that will affect different groups of interest

ACCT1003
Financial Accounting Concepts

Credit points: 6 **Session:** Semester 1 **Classes:** Three hours of lectures/tutorials per week **Prohibitions:** ACCT1001, ACCT1002 **Assessment:** Group assignments; Mid-semester examination; Final examination.

Note: Terminating unit.

Provides an introduction to the concepts underlying "external" accounting and is designed for students who are not majoring in accounting. The unit utilises a transaction-effect approach to the preparation of financial statements with basic bookkeeping minimalised. Accounting-method choices are analysed for their effect on the financial statements, and, thus, on decision-making.

ACCT1004
Management Accounting Concepts

Credit points: 6 **Session:** Semester 2 **Classes:** Three hours of lectures/tutorials per week **Prohibitions:** ACCT1001, ACCT1002 **Assessment:** Quizzes; Assignment; Presentation; Final examination.

Note: Terminating unit.

This unit is designed to explain how managers use accounting information, with an emphasis on identifying relevant accounting information for decision-making. Topics include: estimating cost functions, relevant costing, cost allocation, budgeting, short and long term decision making and managing within a changing environment.

AGCH2003
Rural Environmental Chemistry (Intro)

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell **Session:** Semester 1 **Classes:** 3 lec/week and 33 hours of lab/semester **Prerequisites:** 12 credit points of Junior Chemistry **Prohibitions:** AGCH2001, AGCH2002, CHEM2404 **Assessment:** One 2 hr exam, prac & quizzes **Practical field work:** 38 hr prac in semester

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 biophysical, environmental and aquatic chemistry with particular reference to protocols for specimen sampling and maintenance of specimen quality; the principles of basic analytical methods such as spectroscopy, chromatography and electrochemistry; environmental aspects of water such as thermal properties and its behaviour as a solvent of hydrophobic solutes, surfactants, neutral hydrophilic solutes, salts and other electrolytes, and gases. The lectures will also include environmental nutrient cycling (C, N, S, O, P, micronutrients) with reference to pesticides, herbicides, organic and inorganic pollutants affecting agricultural produce and the environment, and gases of environmental concern. Eleven 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 and conductance measurement, water as a solvent including the effect of surfactants and electrolytes. Students will analyse natural water samples using the skills acquired in earlier laboratory and write an environmental assessment from their findings. The introductory laboratory session for the unit will include a tutorial on safety procedures in a chemistry laboratory.

AGCH3015
Agricultural Biotechnology

Credit points: 6 **Teacher/Coordinator:** Prof Peter Sharp **Session:** Semester 2 **Classes:** 3 lec/wk, 1.5hr tut/wk for 6 wks, 3h lab/wk for 5 wks **Assumed knowledge:** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units **Assessment:** One 3 hr exam (60%), practical reports 20%, assignments (20%). Two assignments during the course, one including an oral presentation

The unit develops a basic understanding of the principles, practice and applications of biotechnology related to agricultural and environmental sciences. Students are introduced to the principles of molecular biology, recombinant technology, genomics, transformation of plants and animals, molecular diagnostics, bioinformatics and issues concerning bioethics. The theory of biotechnology is integrated into practical and tutorial sessions. Case studies will be drawn from the plant and animal sciences, bioremediation and gene therapy areas

AGCH3025
Chemistry and Biochemistry of Foods A

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell **Session:** Semester 1 **Classes:** 3 lec/wk, 8 x 3 hr prac per semester **Prerequisites:** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry **Prohibitions:** AGCH3017, AGCH3024 **Assessment:** One 2 hr theory exam, one 1 hr theory of prac exam, assignment and prac reports

This unit of study aims to give students an understanding of the constituents of foods and fibres. The lecture topics cover the chemistry, biochemistry and processing behaviour of major food constituents - oligosaccharides, polysaccharides, lipids and proteins; the relationship

between molecular structure of constituents and their functionality in foods; natural fibres and gel-forming biopolymers - uses in foods, importance in dietary fibre and commercial products; enzymes in foods and food processing; wheat flour dough and protein chemistry during baking and cooking; anti-nutritional and toxic constituents of plants and foods; and flavour chemistry. The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include analysis of carbohydrates including starch and dietary fibre; spectroscopic, enzymic, and chromatographic methods.

AGCH3026
Chemistry and Biochemistry of Foods B

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell **Session:** Semester 1 **Classes:** 2 hr lec/seminar/workshop/wk; 24 hrs of prac/semester; site visits **Prerequisites:** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry **Corequisites:** AGCH3025 **Prohibitions:** AGCH3003, AGCH3005, AGCH4006 **Assessment:** Five written assignments, one 1 hr theory of prac exam, prac reports and poster presentation

This unit of study aims to give students an understanding of global food systems and global food security. In the lecture/seminar/workshop component, topics covered will include the sustainable production of major food crops; the role of genetically modified crops in food sustainability and quality; principles and methods in food quality control and assessment; chemical and biochemical aspects of food quality in relation to food processing and nutritional values. The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include analysis and examination of protein functionality in foods; spectroscopic, enzymic, and chromatographic methods.

AGCH3030
Rural Environmental Chemistry A

Credit points: 6 **Teacher/Coordinator:** Prof Ivan Kennedy (Coordinator) **Session:** Semester 1 **Classes:** 6 day field trip in orientation week, 21 hr lec & 25 hr prac **Prerequisites:** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **Prohibitions:** AGCH3020, AGCH3021, AGCH3022 **Assessment:** One 2 hr exam, field trip and laboratory reports

This unit commences with a field trip to the Namoi and the Macquarie Valleys, where agriculture largely based on irrigation has been developed. Environmental impacts on vegetation, soil and water of agricultural enterprises such as cotton farming and human settlement will be assessed in a professional field trip report. Field observations on pH, nutrient and salt content, pesticide, and microbial content will be made on water, sediment, soils and in constructed wetlands, with samples returned for more detailed laboratory analysis at the University. Lectures will complement the field trip, including environmental chemistry of heavy metals, their effects on organisms; mechanisms of tolerance and phytoremediation; risk assessment of pesticides including herbicides, their mode of action and environmental fate; analysis and monitoring of pesticide residues by GC, GC-MS and immunoassay (ELISA); maximum residue limits (MRLS) and residue surveys; remediation of pesticides in ecosystems; design of new pesticides and means of pest control. Laboratory sessions will be related to these lecture topics, including 6-7 sessions on atomic absorption analysis for nutrients and heavy metals, mercury analysis, pesticide analysis by GLC, HPLC, MS and ELISA.

AGCH3031
Rural Environmental Chemistry B

Credit points: 6 **Teacher/Coordinator:** Prof Ivan Kennedy (Coordinator) **Session:** Semester 2 **Classes:** 5-day field trip in AVCC common break; 21 hr lec and 30 hr prac and project/semester **Prerequisites:** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science **Prohibitions:** AGCH3020, AGCH3021, AGCH3022 **Assessment:** One 2 hr exam, field-trip report and laboratory reports

This field-oriented course will (i) provide understanding of chemical and biochemical processes in rural ecosystems and their sustainability, with particular reference to global warming, (ii) include a field trip and professional report to illustrate relevant case studies at several centres in eastern Australia (Canberra, Snowy Mountains, Murray and Murrumbidgee catchments) specialising in research related to global warming, acidification and water quality including salinisation (iii) conduct laboratory sessions and group research project to study a problem in a professional setting. Practical solutions will be sought by students, based on a field theory of action in ecosystems. Lectures will cover the environmental carbon, nitrogen and sulphur cycles, including bioenergetics of autotrophic and heterotrophic action; photosynthesis; nitrification and denitrification; biological nitrogen fixation; sulphur metabolism; production of greenhouse gases; pH balancing and efficient nutrient uptake; acidification of ecosystems and effects on plants and animals; remediation and control of greenhouse emissions; bioremediation of acidification and salinisation. The laboratory sessions and the group project will illustrate these environmental processes, including greenhouse gas production, methane and NOx, photosynthesis and nitrogen fixation, and monitoring of endocrine-disrupting compounds including pesticides using GLC, HPLC and ELISA.

AGCH4006
Food Processing Science

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell **Session:** Semester 1 **Classes:** Classes (24 hrs of lec and 36 hrs of lab during the semester). **Prohibitions:** AGCH3026 **Assumed knowledge:** AGCH2003, AGCH2004 or PLNT2001. **Assessment:** One 2-hr exam (40%), laboratory reports (20%), major assignment (40%)

Lecture, reading list and laboratory topics will cover the principles and practice of food processing science including food raw materials, the components of food raw materials, industrial isolation of food components. Processing of raw materials such as milling, brewing, dairy products, oil seed products. Others areas to be examined include food preservation techniques, enzyme biotechnology in food processing, processed meat products, and malting. A part of the unit will be devoted to technologies used to examine food quality

AGCH4007
Instrumentation in Analytical Chemistry

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell **Session:** Semester 1 **Classes:** 22 hrs of lecs and 32 hrs of lab during the semester **Assumed knowledge:** PLNT2001, AGCH2003 or AGCH2004 **Assessment:** One 2-hr exam (30%), laboratory reports (30%), major assignment (40%)

Lecture, reading list and laboratory topics will cover the theory and fundamentals of both common and advanced instrumentation used in analytical chemistry. Topics will cover ion selective electrode technology, pH meters, and other electrochemical devices; instrumentation in atomic and molecular spectrophotometry, gas and liquid chromatography, gel and capillary electrophoresis; automated derivatization methods; mass spectrometry, and immuno-analytical technology

AGEC1006
Economic Environment of Agriculture

Credit points: 6 **Teacher/Coordinator:** Ms Lynn Henry **Session:** Semester 1 **Classes:** (3 lec & 1 workshop)/wk **Prohibitions:** AGEC1003, AGEC1004 **Assumed knowledge:** HSC Mathematics **Assessment:** One two hour exam, one assignment, workshop reports, one 1 hour mid-semester exam **Practical field work:** Laboratories, fieldwork

This unit of study introduces students to the basic principles of economics and to the major features of the economic environment impacting on and driving farm and off-farm agriculture. Topics discussed include the organization of economies and the role agriculture plays, the industrial structure of Australian agriculture, introductory principles of production economics and farm business management; elementary price theory and the factors affecting the demand and supply of agricultural commodities, nature and behaviour of markets for agricultural commodities; marketing of agricultural products; agricultural trade, resource and environmental management, and the political and administrative institutions affecting Australian agriculture

Textbooks
HE Drummond and JW Goodwin, Agricultural Economics, 2nd edn (Prentice-Hall, 2004)

AGEC1101
Agricultural and Resource Systems

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (3x1hour lectures, 1x1hour tutorial)/week **Prohibitions:** AGEC1001 **Assumed knowledge:** HSC Mathematics or HSC Mathematics Extension 1 **Assessment:** 1x1hour mid-semester exam, 1x2hour final exam, 1xassignment, tutorial papers

An introductory unit of study which serves as a foundation for later units in agricultural economics, and introduces some of the basic economic principles required in the discipline of agricultural and resource economics. Topics covered include the agricultural and resource industries in the Australian and world economies; changing place of agriculture in world economies; place of agriculture in economic development; economic and physical factors determining the location of agricultural and resources industries; the changing structure of the Australian agricultural and resource sectors; the physical and biological environment in which farm firms operate; issues in natural resources

AGEC1102
Agricultural Economics 1

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (3x1hour lectures, 1x1hour tutorial)/week **Corequisites:** AGEC1101 **Prohibitions:** AGEC1002 **Assumed knowledge:** HSC Mathematics or HSC Mathematics Extension 1 **Assessment:** 1x1hour mid-semester exam, 1x2hour final exam, 1xassignment, tutorial papers

The unit applies principles studied in introductory microeconomics to the agricultural sector. The first part of the unit is focused on basic concepts of supply, demand, equilibrium in agricultural markets, and how markets can be modelled mathematically. Market dynamics are considered. The second part of the unit is focused on agricultural business decision making. Concepts of income, cost and profit, their measurement and documentation in farm business accounts, ownership structures and taxation issues are covered. Sources of risk in agriculture, alternative management strategies, and basic techniques of decision making in the face of risk are explored

AGEC2101
Market and Price Analysis

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2-3 lec & 1x1hour tut)/wk **Prerequisites:** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **Prohibitions:** AGEC2001 **Assessment:** Mid semester exam (I hour), final exam (2 hours), tutorial assignments

This unit focuses on the nature of agricultural and resource commodity markets, market demand relationships, market supply relationships, price determination under alternative market structures, marketing margin relationships, derived demand for inputs, spatially and temporally related markets, market dynamics, price expectations, commodity futures markets and other pertinent topics. Applied examples from the agricultural and resource industries and the overall economy will be used throughout the semester as illustrations of the principles involved

AGEC2102
Agribusiness Marketing

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** 2x1hour lectures, 1x1hour tutorial **Prerequisites:** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031 **Assessment:** 1x1hour mid-semester exam, 1x2hour final exam, 1x assignment, tutorial papers

This unit of study is designed to provide an introductory understanding of agribusiness marketing. It emphasises firm-level marketing mix and marketing strategy, decision making, marketing management and planning, market research and information. The unit of study will also address the organisation and trends of agribusiness marketing including value-adding and market power in the supply chain, market efficiency and international marketing by agribusiness firms. The unit content is analytical, and draws on applied microeconomics

AGEC2103
Production Economics

Credit points: 6 **Teacher/Coordinator:** A/Prof Ross Drynan **Session:** Semester 1 **Classes:** (3 lec & 2 tut)/wk **Prerequisites:** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) **Prohibitions:** AGEC2003 **Assessment:** One end-of semester (2 hr) exam, assignments, class work

This unit is concerned with the principles of resource allocation at the firm, industry and economy levels. The topics include: the nature of natural resource based production processes; production functions; factor substitution; constrained and unconstrained optimisation; principles of enterprise combination and multi-product production; input demands; cost functions and other dual relationships; economies of scale, size and scope in farming; principles of resource allocation over time; productivity and technical change; modelling risk in production processes; principles of resource allocation under risk and the illustration of the principles through the use of practical applications and exercises involving both the agricultural and resource industries

AGEC2105
Applied Econometric Modelling

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2 lec & tut)/wk **Prerequisites:** (ECMT1010 and ECMT1020) or (MATH1001 and 1002 and 1003 and 1005) or BIOM1003 **Prohibitions:** AGEC2005 **Assessment:** One mid semester exam (1 hour), one 2 hour final exam, assignments

The unit focuses on the concepts and basic procedures of regression analysis and the application of these methods to the analysis of economic data in the agricultural and resource sectors. Topics covered will include: simple and multiple regression, forecasting, dummy variables, violations of OLS assumptions, dynamics, an introduction to cointegration, and estimation with panel data. Emphasis will be placed on developing the ability to estimate and interpret economic relationships. The computing side of the unit involves the use of the statistical package EVIEWS

AGEC3101
Agribusiness Management

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (3 lec & 2 wkshp)/wk **Prerequisites:** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) **Prohibitions:** AGEC1102; AGEC3103; AGEC3001 **Assessment:** One mid semester exam (1 hour) one final exam (2 hour), assignments, workshop reports

This unit of study deals with the application of economic principles and techniques of business management to agribusiness firms, with a particular focus on farms. The topics covered will include: management goals and objectives; budgeting; gross margins analysis; parametric budgeting; sources of management information and its analysis; simple systems simulation; applications of linear programming to farm and agribusiness planning; financial management; risk in planning and management; cash, credit, debt and taxation management; evaluation of investment and firm growth alternatives; acquisition and transfer of assets; the role of financial institutions in the agricultural credit market. Students develop skills in computer-based farm planning

AGEC3102
Agricultural and Resource Policy

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2-3 lec & 1x1 hour tut)/wk **Prerequisites:** {(AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)} OR {(ECON2001 or ECOS2001) and (ECON2002 or ECOS2002)} **Prohibitions:** AGEC3002 **Assessment:** One mid semester exam (1 hour); one final exam (2 hours); assignments; tutorial papers

This unit is designed to cover basic theoretical and modelling frameworks for economic evaluation of policy formation (including Pareto welfare economics and public choice theory); market and government failure; the institutional structure of agricultural and resource policy formulation in Australia; micro and macroeconomic issues in agricultural and resource policy; and issues arising from

linkages between agriculture and the resource industries and with the rest of the economy. Students will be expected to read widely

Textbooks
Godden, D. 1997, Agricultural and Resource Policy: Principles and Practice, Oxford University Press, Melbourne (currently out of print)
Stiglitz, J. 2000, Economics of the Public Sector, Norton, New York.
N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

AGEC3103
Applied Optimisation

Credit points: 6 **Teacher/Coordinator:** A/Prof Ross Drynan **Session:** Semester 2 **Classes:** (2 lec & 2 tut)/wk **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC3101 **Assessment:** One end-of-semester exam (2 hours), assignments, class work

This unit of study deals with constrained optimization problems in which when one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The focus of the unit in on linear programming (LP) problems, i.e. ones in which both the objective and the constraints are linear functions. Linear programming has wide application to farm planning, financial planning, and other planning contexts. Graphical and mathematical representations of linear programming problems are covered. Topics include solution methods, solution information, primal and dual formulations, stability of optimal solutions, and parametric programming. After covering the basics of LP, the focus shifts to modelling of real world scenarios in LP models. Special formulations (eg. transportation model), and extension to integer programming are examined. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (eg. LINDO)

AGEC3104
Research Methods

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2 lec & 1-2 hr tut)/wk **Prerequisites:** AGEC2105 or ECMT2010 or ECMT2110 or AGEC2005 **Prohibitions:** AGEC3004 **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), assignments, research proposal

This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; inductive thought and deductive logic; creativity; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data; statistical design of sample surveys; questionnaire construction; interviewing techniques; and methods of analysis of survey data. Topics are illustrated with examples of research in theoretical economics, empirical discipline-advancing research, empirical exploratory research, and research using policy-evaluation modelling. Students are expected to read widely

AGEC4101
Agricultural Marketing Analysis

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2-3 hr lec & 1x1 hour tut)/wk **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC4004 **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

Performance of the agricultural and resource marketing systems, marketing margins, transportation, storage, advertising, wholesaling, and retailing. The structure, conduct and performance of marketing firms, and government and public interest in the food system will also be addressed via a number of case studies. Extensive readings will be required. The unit is designed to focus on analysing applied strategic management problems facing marketing firms. Students will be required to read widely

Textbooks
Collections of readings

AGEC4102
Agricultural Development Economics

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2-3 hours lec & 1x1 hour tut)/wk **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

This unit is designed to expose students to issues of economic growth and development, and their policy and welfare impacts in developing countries. More specifically the unit will focus on agricultural development policies and outcomes. Linkages with other industries, environment, sustainability, globalisation and national and international development agencies will also be discussed. Extensive reading will be required

Textbooks
Collections of readings

AGEC4103
International Agricultural Trade

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2-3 hours lec & 1x1 hour tutorial)/wk **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC4003 **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

In this unit of study the basic economic principles underlying international trade in agricultural and resource commodities and the policies involved will be presented. Issues related to trade and development will also be considered. The main topics covered will include: trends in agricultural and resources trade; economics and politics of protection, economic integration and impacts on international commodity trade; international trade policy making. An understanding of globalisation, including foreign direct investment, will also be required. Extensive reading will be required

Textbooks
Collections of readings

AGEC4104
Agribusiness Analysis

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2-3 hours lec & 1x1 hour tut)/wk **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), case studies

This unit focuses on applications of economic theory and methods in agribusiness decision making. It provides advanced treatment of the industrial organisation of agribusiness firms. Case studies will be used to examine the economic complexities of global agribusiness systems. Extensive readings make up the central component of the unit

Textbooks
Collections of readings

AGEC4107
Special Topics

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1, Semester 2 **Classes:** Individual research and consultation **Prohibitions:** AGEC4007 **Assessment:** Research paper

Note: Department permission required for enrolment .

This unit deals with the specialised areas of agricultural and resource economics of particular interest to approved students. The student will read under the guidance of a member of staff and complete designated learning tasks

Textbooks
Individual reading

AGEC4108
Quantitative Planning Methods

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2 lec & 2 tut/lab session)/wk **Prerequisites:** AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 **Prohibitions:** AGEC4008 **Assessment:** One end-of-semester exam (2 hours), 2 assignments

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sectoral level. While the principal focus is on formal optimization, simulation and Monte

Carlo methods are briefly discussed. Topics include non-linear programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (eg. dynamic programming and optimal control). Sectoral level planning applications considered include transportation and plant location studies; spatial equilibrium; and resource utilization across time. Firm level applications include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization

AGEC4109
Agricultural Finance and Risk

Credit points: 6 **Teacher/Coordinator:** A/Prof Ross Drynan **Session:** Semester 2 **Classes:** (2 lec & 2 tut/lab session)/wk **Prerequisites:** {(AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)} OR (AGEC1102 and AGEC3103) **Prohibitions:** AGEC4009 **Assessment:** One end-of-semester exam (2 hours), 2 assignments

This unit has two related components. One component concerns risk and risk management in agriculture; the other deals with issues of agricultural producer finance. Risk topics include: risk measurement, subjective probability, adjusting beliefs as a result of new information; risk attitudes; decision making under risk; expected utility theory; valuing information; generalizations of expected utility theory; E-V analysis; stochastic dominance; internal measures to cope with risk including diversification and flexibility; insurance, futures, options and other market instruments for managing risk. Finance topics include the implications of capital market imperfections and consequential differences between corporate and small business finance; financial relationships between debt/equity levels and risk, optimal debt levels; cost of capital; short term working capital management; and longer term capital (investment) budgeting. Techniques of valuation of projects in risk-free and risk situations are examined. Financial and risk management practices in Australian agriculture are reviewed

AGEC4110
Professional Skills

Credit points: 3 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (One 2 hr sem)/wk **Corequisites:** AGEC4011 or AGEC4111 **Prohibitions:** AGEC4010 **Assessment:** Discussion papers

A series of lectures, seminars and workshops designed to provide students with enhanced professional skills.. Sessions will focus on communication skills, including report writing, preparation of policy briefs, seminar and workshop presentations. Other sessions will be focused on aspects of professional ethics, attitudes and responsibilities and leadership. Participatory activities such as team debates and mock inquiry hearings addressing issues of current relevance to agricultural /resource economists are used to develop the student's communication skills and knowledge of issues

AGEC4111
Contemporary Issues

Credit points: 3 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (One 2 hr seminar)/wk **Corequisites:** AGEC4010 **Prohibitions:** AGEC4011 **Assessment:** 1x2hour final exam, 1xgroup presentation, 1x assignment

Through regular seminars by guest speakers and occasional workshops or other participatory activities, students examine a broad range of national and international issues of current relevance to Australian agricultural and resource economists

AGEC4112
Research Project A

Credit points: 9 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2 hr sem)/wk **Prerequisites:** AGEC3104 or AGEC3004 **Corequisites:** AGEC4113 **Prohibitions:** AGEC4012 **Assessment:** Research thesis; presentations

Note: Department permission required for enrolment .

In this unit of study, students develop skills in economic research by designing, undertaking and reporting on a single research study (thesis). Students undertake research on an approved topic under the supervision of a member of staff and prepare a report of approximately 25,000 words in length. Students are allocated to the thesis on the basis of available resources and the advice and approval of the co-ordinator for the Research Project

AGEC4113
Research Project B

Credit points: 9 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2 hr sem)wk **Prerequisites:** AGEC3104 or AGEC3004 **Corequisites:** AGEC4112 **Prohibitions:** AGEC4013 **Assessment:** Research thesis; presentations

Note: Department permission required for enrolment .

In this unit of study, students develop skills in economic research by designing, undertaking and reporting on a single research study (thesis). Students undertake research on an approved topic under the supervision of a member of staff and prepare a report of approximately 25,000 words in length. Students are allocated to the thesis on the basis of available resources and the advice and approval of the co-ordinator for the Research Project

AGEC4121
Research Exercises A

Credit points: 9 **Teacher/Coordinator:** A/Prof Ross Drynan **Session:** Semester 1 **Classes:** (2 lec or sem)/wk **Prerequisites:** AGEC3104 or AGEC 3004 **Corequisites:** AGEC4122 **Prohibitions:** AGEC4012, AGEC4112 **Assessment:** Written research report/paper(s), seminar

This unit of study is taken in conjunction with the companion unit, AGEC4122 Research Exercises B. Students develop skills in economic research by participating in the designing, undertaking and reporting on one or more research exercises undertaken under the guidance of a staff member. Students typically work partly individually and partly in groups on a project that is common to the entire class. Students may be required to work on separate aspects of that project or may be required to examine the same aspect using different approaches. Students will be required to prepare individual and/or group written reports and/or oral presentations concerning data acquisition, analysis and interpretation of results. The precise nature of the research, the research methods, and the emphasis of the exercises will be determined in conjunction with the specification of the research exercise(s) undertaken in the companion unit, AGEC4122

AGEC4122
Research Exercises B

Credit points: 9 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2 lec or sem)/wk **Prerequisites:** AGEC3104 or AGEC3004 **Corequisites:** AGEC4121 **Prohibitions:** AGEC4013, AGEC4113 **Assessment:** Written research reports and papers

This unit of study is taken in conjunction with the companion unit, AGEC4121 Research Exercises A. See AGEC4121 for details

AGRI4101
Research Project A

Credit points: 12 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 1 **Classes:** No formal classes, approx 18 hrs per week **Corequisites:** MICR3022 or (AGEC4103 or 4104) or AGRO(4003 or 4004) or BIOM(4003 or 4004 or 4005) or ENTO4004 or AGCH4007 or GENE4012 or HORT4004 or PPAT(4003 or 4004 or 4005) or SOIL(4005 or 4006) or LWSC4003 **Assessment:** Oral presentation, literature review

The research project which consists of AGRI 4101 and AGRI 4102, constitutes half the work in fourth year and is a major vehicle for developing specialist knowledge and skills. The research project is undertaken in the area of fourth year specialization and aims to develop a strong analytical capacity, well-developed research skills using a range of resource materials, the capacity to work independently over a sustained period of time, the ability to produce results of high quality and excellent written and oral presentation skills. Each student will work with an academic supervisor in the area of specialization. A defined research project is developed with the supervisor, existing literature is reviewed and an experimental program is pursued to illuminate areas not well understood. In this unit, the research results are presented as in a format of a research paper as submitted to a refereed journal; the research paper plus the corrected literature review

are presented together as a thesis. An oral presentation of the research is also required to demonstrate a sound grasp of the topic and an ability to interpret the results in a broad framework

AGRI4102
Research Project B

Credit points: 12 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 2 **Classes:** No formal classes, approx 18 hrs per week **Prerequisites:** AGRI4101 **Assessment:** Oral presentation, literature review

The research project which consists of AGRI 4101 and AGRI 4102, constitutes half the work in fourth year and is a major vehicle for developing specialist knowledge and skills. The research project is undertaken in the area of fourth year specialization and aims to develop a strong analytical capacity, well-developed research skills using a range of resource materials, the capacity to work independently over a sustained period of time, the ability to produce results of high quality and excellent written and oral presentation skills. Each student will work with an academic supervisor in the area of specialization. A defined research project is developed with the supervisor, existing literature is reviewed and an experimental program is pursued to illuminate areas not well understood. In this unit, the research results are presented in a thesis and poster and are defended in an oral presentation

AGRO3002
Agronomy 3

Credit points: 6 **Teacher/Coordinator:** A/Prof Bruce Sutton **Session:** Semester 1 **Classes:** 5 student contact hrs/wk, workshops and discussions (36 hr total), labs (26 hr total) **Prerequisites:** PLNT2003 or PLNT2903 **Assumed knowledge:** CROP1001 or HORT1001 or LWSC1001 **Assessment:** One 2 hour exam, consultancy report, practical reports

Agronomy studies the practices and underlying concepts of sustainable crop and pasture production. The scientific basis of modern practices used in crop production, particularly those relevant to New South Wales, is explored. This knowledge is used to appreciate the scale of future problems such as climate change, soil degradation and increased costs of petrochemical-based inputs like fuel and fertilizer. Possible responses to these problems that will help maintain productivity will be examined. The relationship between agricultural production and natural resource management is also considered as part of a modern production environment, with the impact of recent legislation supporting Ecologically Sustainable Development on agriculture and the agricultural response to it as the focus of discussion. The practical classes will develop key skills appropriate to precision agriculture and use of current decision support systems

AGRO3003
Crop Water Management

Credit points: 6 **Teacher/Coordinator:** A/Prof Bruce Sutton **Session:** Semester 2 **Classes:** Five student contact hours per week (65 h total); workshops and discussions (36 h total) laboratories (26 h total) **Prerequisites:** PLNT2003 or PLNT2903 **Assumed knowledge:** CROP1001 or HORT1001 or LWSC1001 **Assessment:** One 2 hour exam, consultancy report, practical reports

This unit of study provides a scientific understanding and practical working knowledge of water management in dryland and irrigated agricultural systems, with most of the emphasis at the field scale. The first section of the unit examines the mechanisms underlying a crop water balance, its calculation and measurement and management options for using rainfall as effectively as possible. The second section examines the major forms of irrigation, the scientific principles involved in each, their benefits and shortcomings and management to maximize water use efficiency. The practical classes will develop key skills appropriate to irrigation system management and use of current decision support systems

Textbooks

M.E. Jensen (1980). Design and Operation of Farm Irrigation Systems (ASAE).
Allen, R.G, Periera, L.S., Raes, D. and Smith, M. (1998). Crop Evapotranspiration. Guidelines for computing crop water requirements. FAO Irrigation and Drainage Paper 56.
Hillel, D. (2004). Introduction to Environmental Soil Physics. Elsevier Academic Press.

AGRO4003
Crop and Pasture Agronomy

Credit points: 6 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 1 **Classes:** Tutes, intensives/workshops, excursion **Prerequisites:** AGRO3001 or AGRO3002 **Assessment:** Report, oral presentation and exam

This unit examines agronomy as the discipline that underpins agricultural production. As a case study, the cotton industry is examined in detail to understand the end-user and social demands on agricultural production, the technical issues that challenge the farmer and the diversity of other specialist information from relevant disciplines such as entomology, pathology and soil science that must be integrated into the farming system. Likewise the rice and/or pastoral industries provide a contrasting farming system as another case study. The unit includes a one-week excursion to cotton growing areas in northern NSW, specialist intensive instruction provided by the Cotton CRC and a series of workshops) tutorials that provides analysis and synthesis of the major farming systems in this industry

AGRO4004
Sustainable Farming Systems

Credit points: 6 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 1 **Classes:** Pracs, workshops as advised **Prerequisites:** AGRO3001 or AGRO3002 **Assessment:** Reports

This unit provides training in the professional skills specific to the practice of agronomy. Several case studies involving client-driven experimental or R&D projects both in the field and laboratory will be used to illuminate sound professional practice, including budget management, in field and laboratory experimental design and methodology, data acquisition and assimilation and compilation and dissemination of professional reports. Assessment will be based on professional involvement in the case studies and on the final reports. Students participate in a long-term experiment that involves planning, decision making and management of a sustainable farming system

ANSC2002
Animal Science 2

Credit points: 6 **Teacher/Coordinator:** Mrs I van Ekris (coordinator), Dr Melanie Collier, A/Prof Rosanne Taylor, Ms Jane Stevenson. **Session:** Semester 2 **Classes:** 3 hours/week (39 hours total) **Prerequisites:** CROP1001 and one of BIOL1001, BIOL1101, BIOL1901 **Assessment:** Assignments (55%), end of semester exam (45%) **Practical field work:** 3 hours/week

The unit of study is an integrated course providing a framework for understanding the structure, function and management of agricultural animals. The emphasis of the course is on how animals maintain a steady state in the face of variations in their environment, physiological state and management systems. It aims to help students acquire the language necessary to discuss body structure and function and to understand the fundamental internal processes and their interactions, which take place in the maintenance of normal function. Concepts discussed in lectures are reinforced by practical classes held in the laboratory and on-farm at Camden.

Textbooks

A course handbook will be available for students to purchase. It contains details of lecture outlines, objectives, reference lists, details of practical classes, staffing as well as other relevant class material.
Battaglia, R.A. (2001) Handbook of Livestock Management. Prentice Hall.
Frandson, R.D., Wilke, W.L. and Fails, A.D. (2003) Anatomy and Physiology of Farm Animals. Williams and Wilkins.
McDonald, P. et al. (1988) Animal Nutrition, 4th ed. Longman Scientific & Technical.
Reece, W.O. (1991) Physiology of Domestic Animals. Lea and Febiger.
Starr, C. and Taggart, R. (2004) Animal Structure and Function. Brooks and Cole.

ANSC3101
Animal Nutrition 3

Credit points: 6 **Teacher/Coordinator:** Dr Michelle Hyde **Session:** Semester 2 **Classes:** Lectures 3 hrs/week, Tutorials 0.5 hrs/week, Laboratories 1.5 hrs/week, Field work 2 field trips per semester (6 hours). **Prerequisites:** ANSC2002 **Assessment:** Assignments including web based problem solving exercises (50%), oral presentation (10%), written end of semester examination (40%).

This Unit of Study builds upon principles discussed in ANSC 2002 (Animal Science 2). The Unit is broadly divided into four sections, namely: estimating the nutritive value of feeds; estimating the nutrient requirements of animals; diet formulation; errors in feeding. The focus is on coming to an understanding of the assessment of nutritional adequacy and the avoidance and solving of nutritional problems, with a particular emphasis on animals used in agricultural production systems. The principles discussed in this course will be expanded in the following year, in which species-specific systems will be described. The basis of successful feeding management is an understanding of the following: the composition of feeds; the digestibility and efficiency of utilisation of nutrients by the animal; the requirements of the animal for nutrients; interactions between nutrients that influence health and production. And following from this an ability to: formulate diets to meet animal requirements for a variety of purposes and under a variety of constraints; identify deficiencies, excesses and imbalances in diets and so avoid a decline in productive efficiency and/or a decline in health.

Textbooks

McDonald, Edwards, Greenhalgh and Morgan (2002) Animal Nutrition, 6th edn, Prentice Hall

ANSC3102
Animal Reproduction

Credit points: 6 **Teacher/Coordinator:** Prof G Evans **Session:** Semester 1 **Classes:** lectures 2 hrs/week, tutorials 1 hr/week, practicals 3 hrs/week. **Prerequisites:** ANSC2002 **Assessment:** End of semester written exam (60%), intrasemester written exam (15%), written and oral assignments (25%).

A comprehensive program on basic and applied male and female reproductive biology with particular emphasis on domestic animals. The unit of study includes reproductive cycles, sexual differentiation, fertilization, development, gestation and parturition. Applied aspects include tuition on semen collection and processing, control and management of reproduction, artificial insemination, embryo transfer, pregnancy diagnosis, and induction of parturition. Tuition is given on campus in Sydney and at the University Farms, Camden.

Textbooks

Hafez, B & Hafez, E.S.E. (Eds) (2000) Reproduction in Farm Animals, Lippincott Williams and Wilkins.
Senger, P.L. (2003) Pathways to Pregnancy and Parturition, 2nd Edn. Current Conceptions Inc.

ANSC3103
Animal Structure and Function 3A

Credit points: 6 **Teacher/Coordinator:** Dr Melanie Collier **Session:** Semester 1 **Classes:** Lectures 3 hrs/wk, Laboratories/tutorials 2 hrs/wk (these will vary depending upon the week) **Prerequisites:** ANSC2002 **Assessment:** One theory exam (55%), assignments/presentations (45%).

Animal Structure and Function 3A will build on the understanding of animal form and operation that students have developed in prior Units, particularly ANSC 2002. In ASF3A the structure and function of the integument, digestive, endocrine, immune and central nervous systems of the body are explored in depth particularly with reference to the maintenance of homeostasis and an animal's perception of its environment. These topics will provide the basis for advanced, applied studies in Animal Nutrition, Animal Behaviour and Animal Reproduction. The overall goals of the Unit are twofold. First, to enable students to develop a rich understanding of the relationships between body systems and structures (begun in ANSC2002 and continued in ASF3B). Second, to develop an appreciation of the links between structure, function and their relevance to animal production that will be further developed in 4th year Animal Production.

Textbooks

The recommended textbook for the animal structure component of the unit is:
Dyce, K.M., Sack, W.O. and Wensing, C.J.G. (2002) Textbook of Veterinary Anatomy, 3rd edn, W.B. Saunders, Philadelphia.
Each student should purchase for the physiology component of this unit:
Starr, C. & Taggart, R. (2001) Animal Structure and Function, 9th edn, Brooks/Cole, Thomson Learning, Australia.
OR
Frandson, R.D., Wilke, W.L & Fails, A.D (2003) Anatomy and Physiology of Farm Animals, 6th edn. Lippincott, Williams & Wilkins.

Handbook: A course handbook will be available for students to purchase. It contains details of lecture outlines, objectives, reference lists, details of practical classes, staffing as well as other relevant class material.

ANSC3104
Animal Structure and Function 3B

Credit points: 6 **Teacher/Coordinator:** Dr Melanie Collier **Session:** Semester 2 **Classes:** Lectures 3 hrs/wk, laboratories/tutorials 3 hrs/wk. Activities will vary on a weekly basis. **Prerequisites:** ANSC2002, ANSC3103 OR ANSC3003 **Assessment:** Final exam (60%), anatomy dissection project (20%), topic test (20%).

In this Unit students will complete the study of the structure and function of organ systems in animals started in ANSC3103. The role of the cardiovascular, respiratory and renal systems will be investigated in relation to maintenance of homeostasis and applied to analysis and resolution of problems in animal production. A study of the structure and function of muscle will include its role in movement, as meat in a production setting and an integration of muscle, cardiovascular, renal and endocrine physiology in a study of a horse's response to exercise. There will be comprehensive study of both avian and fish anatomy and physiology that will form the basis for study of production systems in poultry and aquaculture. Handbook - a comprehensive course handbook will be available. It contains details of practicals, assessments, lecture outlines and handouts, objectives, reference lists and textbooks, staffing.

Textbooks

For Animal Structure:
Dyce, K.M., Sack, W.O. & Wensing, C.J.G. (2002) Textbook of Veterinary Anatomy, 3rd Edn, W.B.Saunders, Philadelphia . OR
Smallwood, J.E. (1973) An introductory study to bovine anatomy. The author, Bryan,Texas.
For Animal function:
Frandson, R.D., Wilke, W.L. & Fails, A.D. (2003) Anatomy and Physiology of Farm Animals, 6th edn, Lippincott, Williams & Wilkins. OR
Starr, C. and Taggart, R. (2001) Animal Structure and Function, 9th Edn, Brooks/Cole, Thompson Learning, Australia.

BIOL1001
Concepts in Biology

Credit points: 6 **Session:** Semester 1, Summer Main **Classes:** Three 1 hour lectures and one 3 hour practical per week. **Prohibitions:** BIOL1101, BIOL1901 **Assumed knowledge:** No previous knowledge required. Students who have not taken HSC biology are recommended to take the Biology Bridging Course (in February). Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **Assessment:** One 2.5 hour exam, assignments, quizzes

Note: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.

Concepts in Biology is an introduction to the major themes of modern biology. Starting with interactions between organisms in biological communities, we move on to introductory cell biology, which particularly emphasises how cells obtain and use energy, followed by the diversity and biology of microorganisms. This leads into an introduction to molecular biology through the role of DNA in protein synthesis and development. The genetics of organisms is then discussed, leading to consideration of theories of evolution and the origins of the diversity of modern organisms.

Textbooks

Knox R B et al. 2005. Biology, 3rd ed. McGraw-Hill

BIOL1002
Living Systems

Credit points: 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures and one 2 hour practical per week. **Prohibitions:** BIOL1902 **Assumed knowledge:** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete a Biology Bridging Course (in February). **Assessment:** One 2.5 hour exam, assignments, quizzes.

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. It is recommended that BIOL (1001 or 1101 or 1901) be taken before this unit of study. This unit of study, together with BIOL (1001 or 1101 or 1901) provides entry to all Intermediate units of study in biology in the School of Biological Sciences.

Textbooks
Knox R B et al. 2005. Biology. 3rd ed. McGraw-Hill.

BIOL1101
Biology - Ecosystems to Genes

Credit points: 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures and one 3 hours practical per week. **Prerequisites:** HSC 2-unit Biology or equivalent. **Prohibitions:** BIOL1001, BIOL901 **Assessment:** One 2.5 hour exam, assignments, quizzes.

Note: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.

Biology - Ecosystems to Genes builds on a satisfactory prior knowledge of the HSC 2-unit biology course. A brief revision of the basic concepts of the high school course is given. Biology - Ecosystems to Genes builds on the main themes introduced in HSC biology to provide a background to the breadth of biology, including genetics of organisms, theories of evolution and the origins of diversity of modern organisms; diversity of microorganisms, cell biology with emphasis on how cells obtain and use energy, modern molecular biology and interactions between organisms in biological communities.

Textbooks
Knox R B et al (2005) Biology., 3rd ed., McGraw-Hill

BIOL1901
Biology - Ecosystems to Genes (Advanced)

Credit points: 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures and one 3 hour practical per week. **Prerequisites:** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **Prohibitions:** BIOL1001, BIOL1101 **Assessment:** One 2.5 hour exam, assignments, quizzes

Note: Department permission required for enrolment .
Note: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.

This unit of study shares lectures and practical classes with BIOL1101 but also includes more demanding alternative components of Biology - Ecosystems to Genes.

Textbooks
As for BIOL1101.

BIOL1902
Living Systems (Advanced)

Credit points: 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures and one 2 hour practical per week. **Prerequisites:** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **Prohibitions:** BIOL1002, BIOL1904, BIOL1905 **Assessment:** One 2.5 hour exam, assignments, quizzes, independent project

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.

BIOM1003
Biometry 1

Credit points: 6 **Teacher/Coordinator:** Mrs Kathryn Aufflick **Session:** Semester 2 **Classes:** (2 lec, 1 prac & 1 tut)/wk **Assumed knowledge:** 70 or more in HSC Mathematics **Assessment:** Quizzes, assignments and exam. All open book **Practical field work:** Seminars/workshops, 2 labs, fieldwork

It is a core first year unit for all our science-based degrees. It provides a foundation of quantitative skills to be used in further study in applied statistics in later years and in other Units within the Agricultural, Animal, Land & Water, or Horticultural Science degrees. It creates an awareness of the role of experimental design and statistical analysis in the research process. It examines some useful mathematical techniques such as least squares, differentiation and integration as applied to growth curves and linear and nonlinear modelling, especially via the use of computers. Basic statistical topics covered include: describing biological data and variability, sampling and estimation, framing biological hypotheses; estimating a single treatment mean via a confidence interval and testing for a particular mean via a z-test or t-test; estimating or testing the difference between two treatment means. The spreadsheet package Excel and the statistical package GenStat will be used for mathematical and statistical analysis and for graphical presentation

Textbooks
No single text is recommended as extensive course notes are made available. Reference books:
Causton, DR (1977). A Biologist's Mathematics. Edward Arnold: London.
Clewer, AG & Scarisbrick, DH (2001). Practical Statistics and Experimental Design for Plant and Crop Science. John Wiley & Sons: West Sussex.
Glover, T and Mitchell, K (2002). An Introduction to Biostatistics. McGraw-Hill: New York
McConway, KJ Jones, MC and Taylor, PC (1999). Statistical Modelling using GenStat. Arnold: London.
Mead, R, Curnow, RN and Hasted, AM (2003). Statistical Methods in Agriculture and Experimental Biology, 3rd ed. Chapman & Hall/CRC: Boca Raton.
Morris, TR (1999). Experimental Design and Analysis in Animal Sciences. Oxon: CABI Publishing

BIOM2001
Biometry 2

Credit points: 6 **Teacher/Coordinator:** Mrs Kathryn Aufflick **Session:** Semester 1 **Classes:** (2 lec, 1 prac & 1 tut)/wk **Prerequisites:** BIOM1003 or equivalent **Assessment:** Quizzes, assignments and exam. All open book

This unit of study extends the techniques considered in Biometry 1, and considers problems of statistical design and analysis encountered in research in the biological, agricultural, horticultural, animal and environmental sciences. In practical classes the computer packages Minitab, GenStat and Excel are used extensively to analyse experimental data. We commence with a revision of one and two sample t tests. We then consider the concepts of randomisation and replication; sampling and experimental units; controlling variability by blocking; analysis of variance for simple and factorial treatment designs; residual diagnostic techniques. Specific experimental designs studied include completely random and randomised complete block designs; Latin square designs; spilt-plot designs. Next we consider linear relationships (regression, correlation) between two biological measurements; multiple linear regression; stepwise regression; analysis of covariance. We finish with a review of non-parametric analyses and the analysis of two-way contingency tables

Textbooks
Reference book: Mead,R, Curnow, RN and Hasted, AM (2003) Statistical Methods in Agriculture and Experimental Biology, 2nd ed. London: Chapman & Hall.

BIOM3004
Biometry 3

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 1 **Classes:** (2 lec, 3 prac)/wk, individual research 1hr/wk **Prerequisites:** BIOM2001 or BIOM2002 **Prohibitions:** BIOM3005 **Assessment:** Reports (25%), assignment (20%), presentation (5%), theory/prac exam (50%). All open book

This unit is designed for students who are interested in majoring in Biometry, or for students from other disciplines with an interest in further developing their skills in experimental design and advanced statistical modelling. It builds on the topics introduced in Biometry 2, and aims to give students sufficient skills and confidence to complete the analysis of their own research data in Fourth Year with a high degree of competence. We start by learning how to determine the number of replicates to use in an experiment. We revise multiple regression and extend the linear model to a time series system. We then examine how normally distributed data from designed experiments can be analysed in a general linear model framework, and hence how to cope with missing or incomplete data. The difference between maximum likelihood and residual maximum likelihood (REML) is studied for a single sample. A REML analysis is obtained for complete

and incomplete factorial designs; for fixed, random and mixed models; for data collected from repeated observations on the same experimental unit. Next, we consider various techniques for the analysis of non-normal data, specifically: logistic regression for binary and proportion data; Poisson regression for count data; loglinear modelling for multi-way contingency tables; ordinal and nominal logistic regression for scores & ratings. The assignment is to design and analyse a 4th year experiment

BIOM3005
Environmetrics 3

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 1 **Classes:** (2 lec, 3 labs)/wk **Prerequisites:** BIOM2001 or BIOM2002 **Prohibitions:** BIOM 3004 **Assessment:** 50% assignments, 3 hr open book exam 50%

This unit is designed to give participants an opportunity to develop quantitative skills that are professionally relevant to the environmental sciences. Statistical computer packages, such as GenStat and Excel are used extensively to analyse environmental data sets. The unit commences with a revision of analysis of variance and regression; and an introduction to the ideas of sample size determination. Regression ideas are then extended to include the analysis of non-normal data via loglinear models and logistic regression. We next focus on environmental statistics, tackling the ideas of sampling strategies and environmental modeling. We also gain an introductory knowledge of matrix algebra before considering trends in time and space in environmental data. Next we extend the idea of trends and correlation to consider time series, repeated measures and spatial analyses techniques. The unit will be based around two environmental datasets which will be used in both the lectures and the practicals. As part of the learning outcomes of this unit the students completing this unit will have developed an understanding of the theory and techniques needed for the analysis and manipulation of environmental data; be able to develop a robust design for environmental sampling; have developed an understanding of the mathematics behind simulating processes in space and time; be able to use time series and spatial statistics to predict variables in time and space

Textbooks

No single text is recommended as extensive course notes are made available. Reference books:

Causton, D.R. (1977) A Biologist's Mathematics. Edward Arnold: London.
Healy, M.J.R. (2000) Matrices for Statistics, 2nd ed, Clarendon Press: Oxford.
Manly, B.F.J. (1992) The Design and Analysis of Research Studies. Cambridge University Press: Cambridge.
Manly, B.F.J. (1994) Multivariate Statistical Methods: A Primer, 2nd ed. Chapman & Hall: London.
Manly, B.F.J. (2001) Statistics for Environmental Science and Management. Chapman & Hall/CRC: Boca Raton FL.
McConway, K.J. Jones, M.C. and Taylor, P.C. (1999). Statistical Modelling using GenStat. Arnold: London.

BIOM4003
Matrix Algebra and Linear Models

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 1 **Classes:** 3 lec/wk; individual research 3 hr/wk **Prerequisites:** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent **Assessment:** Assignment (50%), theory/prac exam (50%). All open book

So far in biometry, we have avoided the use of matrices in developing and explaining statistical and mathematical concepts. However, with more advanced work, it becomes far more convenient to express certain results in matrix notation. Matrices are not just used in statistics: they find use in mathematical models in biology (e.g. age structured population growth models), engineering (e.g. structural perturbation analysis), and economic models (e.g. decision analysis). There are two aims to this course. Firstly, we will cover the basics of matrix algebra: matrix operations, special matrices (symmetric, orthogonal, idempotent), rank, determinants, inverses, eigenvalues and eigenvectors. Secondly we will see how we can apply these techniques to linear model problems - regression and ANOVA type situations, maximum likelihood and residual maximum likelihood. The course will also provide background for the multivariate analysis unit of study

Textbooks

Textbooks: None. Many reference books such as:

Draper, N.R., and Smith, H. (1981). Applied Regression Analysis. Second edition. N.Y.: Wiley.
Graybill, F.A. (1969). Introduction to Matrices with Applications in Statistics. Belmont: Wadsworth.
Harville, D.A. (1997). Matrix Algebra from a Statistician's Perspective. New York: Springer.
Healy, M.J.R. (1986). Matrices for Statistics. Oxford: Clarendon.
Mead, R. (1988). The Design of Experiments. Cambridge: Cambridge U.P.
Neter, J., Wasserman, W., and Kutner, M.H. (1985). Applied Linear Statistical Models. Homewood, Il.: Irwin.
Searle, S.R. (1982). Matrix Algebra Useful for Statistics. N.Y.: Wiley.

BIOM4004
Applied Multivariate Analysis

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 1 **Classes:** 3 lec/wk; individual research 3 hr/wk **Prerequisites:** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent **Assessment:** Assignment (50%), theory/prac exam (50%). All open book

This course will introduce you to the main multivariate statistical techniques in common usage. While there will be some theoretical development in the course, the main focus will be on interpreting the results of the analysis, particularly in terms of explaining complex multi-dimensional data in terms of fewer dimensions. Since multivariate analysis by definition involves a treatment of at least two variables, there will be heavy use of matrix theory. Topics covered include multivariate normality, the likelihood ratio tests for independence of data variables, principal component analysis, discriminant analysis and Hotelling's T2 for comparing two groups, multivariate analysis of variance (MANOVA), Canonical variate analysis, multivariate regression analysis, canonical correlations and correspondence analysis

BIOM4005
Biometrical Methods

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 1 **Classes:** 3 lec/wk; individual research 3 hr/wk **Prerequisites:** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent **Assessment:** Assignment (50%), Theory/Prac Examination (50%). All open book

This course introduces students to essential statistical and mathematical theory that should be at the fingertips of practising statisticians. Topics include a comprehensive review of statistical distributions and their properties; moments and moment generating functions; order statistics; bivariate and multivariate distribution theory; maximum and residual maximum likelihood estimation of parameters of these distributions; likelihood ratio tests; Taylor expansions and large sample variances. The theory is extended to regression and design problems: the mathematics of ANOVA, partitioning sums of squares, the theory of split plots and linear mixed models in general; log-linear modeling; Binomial, Poisson, ordinal and nominal logistic regression; spatial and nearest neighbour designs, intercropping experiments; meta analyses

Textbooks

None. Many reference books exist in various Libraries.

BIOM4006
Statistical Computing and Consulting

Credit points: 6 **Teacher/Coordinator:** A/Professor Mick O'Neill **Session:** Semester 2 **Classes:** Guided research 6 hr/wk **Prerequisites:** BIOM3002 or BIOM3003 or BIOM3004 or BIOM3005 or equivalent **Assessment:** Assignments (50%), Consulting Reports (50%).

This Unit trains Fourth Year Biometry students in the art of providing incisive statistical advice on the design, implementation and analysis of experiments in animal, agriculture, horticulture, and in environmental observational studies. In addition, students will gain expertise in a range of statistical and mathematical packages relevant to their consulting needs, including Excel (macros and Visual Basic), Fortran, Mathematica, S-Plus, GenStat and ASREML.

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, CHEM1909

Assumed knowledge: 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. **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

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:** CHEM (1001 or 1101) or equivalent **Prohibitions:** CHEM1102, CHEM1108, CHEM1902, CHEM1904, CHEM1908 **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

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: 6 credit points of Junior Mathematics **Prohibitions:** CHEM1001, CHEM1109, CHEM1901, CHEM1903, CHEM1909 **Assumed knowledge:** HSC Chemistry and Mathematics **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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. A brief revision of basic concepts of the high school course is given. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM1102
Chemistry 1B

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** One 3 hour lecture and 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. **Prerequisites:** CHEM (1101 or 1901) or a Distinction in CHEM1001 or equivalent **Corequisites:** Recommended concurrent units of study: 6 credit points of Junior Mathematics **Prohibitions:** CHEM1002, CHEM1108, CHEM1902, CHEM1904, CHEM1908 **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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. 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
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM1901
Chemistry 1A (Advanced)

Credit points: 6 **Session:** Semester 1 **Classes:** Three 1 hour lecture and one 1 hour tutorial per week; one 3 hour practical per week for 10 weeks. **Prerequisites:** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation **Corequisites:** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **Prohibitions:** CHEM1001, CHEM1101, CHEM1109, CHEM1903, CHEM1909 **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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 a very good HSC performance as well as a very good school record in chemistry or science. Students in this category are expected to do Chemistry 1A (Advanced) rather than Chemistry 1A. The theory and practical work syllabuses for Chemistry 1A and Chemistry 1A (Advanced) are similar, though the level of treatment in the latter unit of study is more advanced, presupposing a very good grounding in the subject at secondary level. Chemistry 1A (Advanced) covers chemical theory and physical chemistry. Lectures: A series of about 39 lectures, three per week throughout the semester.

Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM1902
Chemistry 1B (Advanced)

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:** CHEM (1901 or 1903) or Distinction in CHEM1101 or equivalent **Corequisites:** Recommended concurrent unit of study: 6 credit points of Junior Mathematics **Prohibitions:** CHEM1002, CHEM1102, CHEM1108, CHEM1904, CHEM1908 **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%) **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 1B (Advanced) is built on a satisfactory prior knowledge of Chemistry 1A (Advanced) and covers inorganic and organic chemistry. Chemistry 1B (Advanced) is an acceptable prerequisite for entry into Intermediate Chemistry units of study. Lectures: A series of about 39 lectures, three per week throughout the semester.

Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

Commercial Law units of study

For CLAW units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au /content.php?pageid=74).

CLAW1001
Commercial Transactions A

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** Two hours of lectures and one tutorial per week **Assessment:** Exam, Mid-Semester Test, Tutorial Assessment, Case Analysis

This unit of study is concerned with the fundamental elements of business law. It commences with an overview of the Australian legal system (sources of law, parliament, courts, statutory interpretation, doctrine of precedent), including an examination of those provisions in the Commonwealth Constitution relevant to business and commercial activities. The unit continues with a detailed study of those aspects of the law of contract that underlie all commercial transactions and are the essence of commercial law (formation of contract, terms of a contract, factors affecting the validity and enforcement of contracts, termination, remedies for breach of contract). Some aspects of the law of agency, criminal law and the law of torts (in particular, negligence and negligent misstatement) are introduced. The unit concludes with an examination of some of the key provisions of the Trade Practices Act 1974 (Cth) including those relating to misleading and deceptive conduct and manufacturers' liability.

CLAW1002
Commercial Transactions B

Credit points: 6 **Session:** Semester 2 **Classes:** Two hours of lectures and one tutorial per week **Prerequisites:** CLAW1001 **Assessment:** Final exam,

tutorial participation, optional mid semester exam, optional tutorial hand in, optional assignment

Commerce today covers a diverse range of items - from securities to patents and all forms of property in between. An understanding of what the forms of property are and how to gain or sell an interest is essential to everything from tax through marketing to e-commerce. This unit provides a detailed overview of the types of property found in standard commercial transactions and the methods for acquiring or divesting an entity with an interest in that property. The unit focuses on all forms of personal property including intellectual property and real property (land). . Students will gain both an understanding of the transactions and the property as well as analytical skills in assessing and working out problems and case studies to do with commercial property.

CROP1001
Agricultural Science 1A

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** (3 lec & 3 prac)/wk **Prohibitions:** HORT1001, LWSC1001 **Assumed knowledge:** HSC Chemistry **Assessment:** One 2hr exam, prac, assignments **Practical field work:** Field practical sessions allow 'hands-on' experience with some tillage, and sowing equipment

This unit of study introduces the principles and practices of modern agriculture and examines the relationships between plants, animals and natural resources that make up agricultural production systems. The concepts of environmental and economic sustainability of agricultural systems will be introduced. Topics covered include Australian farming systems, regional agricultural industries, farming operations and plant identification

Textbooks
Reference books
V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)
C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)
M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

CROP1002
Agricultural Science 1B

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 2 **Classes:** (3 lec & 3 prac)/wk **Corequisites:** CROP1001 **Prohibitions:** HORT1002, LWSC1002 **Assessment:** One 2 hr exam, prac, assignments **Practical field work:** Laboratory and field practical sessions allow 'hands-on' experience with the equipment used by Australian farmers and feature measurement of some aspects of physical principles applied to farming operations including solar cells

This unit of study develops the theme of environmental sustainability of agricultural production, and examines the physical principles which underpin agricultural systems. It examines the broad ecological relationships between the plants, animals and natural resources used in agriculture, and deals with some of the problems facing agriculture in the future. In addition, the static and dynamic forces involved in agricultural structures and equipment, the behaviour and properties of water in agricultural systems and the physical aspects of weather and the changing Australian climate will be discussed

Textbooks
Reference books
V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)
C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)
M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

Econometrics units of study

For ECMT units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au /content.php?pageid=74).

ECMT1010
Business and Economic Statistics A

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 3 hours per week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021 **Assessment:** Mid-semester examination; Exams; Assignment

This unit provides an introduction to basic statistics and its applications in economics and business disciplines. Topics include: methods for data management; analysis and interpretation of data; probability; the normal distribution; an introduction to sampling theory and hypothesis testing; and the concepts of regression analysis. A key component is the provision of instruction and experience in the use of computers and statistical software as an aid in the analysis of data. Students are expected to use data resources on the World Wide Web, retrieve data and analyse this data using Excel.

ECMT1020
Business and Economic Statistics B

Credit points: 6 **Session:** Semester 2 **Classes:** 3 hours per week **Corequisites:** ECMT1010 **Prohibitions:** ECMT1021, ECMT1022, ECMT1023 **Assessment:** Two quizzes; Tutorial questions; Mid-semester examination; Assignment; Final exam

Note: Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.

This unit broadens the knowledge gained in the unit, ECMT1010 Business and Economic Statistics A by introducing further tools (and their applications) for use in economics, finance, marketing and accounting. This unit features practical applications. Possible topics include: further aspects of hypothesis testing including goodness-of-fit models; regression analysis including a brief introduction to logit models, time series and its applications to economics and finance; input-output analysis; index numbers and mathematics of finance. The material is further complemented by mathematical topics including matrices and partial differentiation. In addition, students are expected to use data resources on the World Wide Web, retrieve data and analyse this data using Excel.

ECMT2110
Regression Modelling

Credit points: 6 **Session:** Semester 1 **Classes:** 3 hours per week **Prerequisites:** ECMT1010 **Prohibitions:** ECMT2010 **Assessment:** Workbooks; Project; Mid-semester exam; Final exam

Students undertaking this unit have some background in basic statistics including an introduction to regression analysis. Using this knowledge as a base, an extensive discussion of basic regression theory and some of its extensions is provided. The unit covers how linear regression models can be applied to data to estimate relationships, to forecast, and to test hypotheses that arise in economics and business. Guidelines for using econometric techniques effectively are discussed and students are introduced to the process of model building. It is essential that the discussion of regression modelling be complemented with practice in analysing data. An important task is the computing component using econometric software.

Economics units of study

For ECON and ECOS units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au/content.php?pageid=74).

ECON1001
Introductory Microeconomics

Credit points: 6 **Session:** Semester 1, Summer Main **Classes:** Two lectures and one tutorial per week **Assumed knowledge:** Mathematics **Assessment:** Online tests, mid semester exam, final exam

Introductory Microeconomics addresses the economic decisions of individual firms and households and how these interact in markets. It is a compulsory core unit for the Bachelor of Economics and Bachelor of Commerce and an alternative core unit for the Bachelor of Economic and Social Science. Economic issues are pervasive in contemporary Australian society. Introductory Microeconomics introduces students to the language and analytical framework adopted in Economics for the examination of social phenomena and public policy issues.

Whatever one's career intentions, coming to grips with economic ideas is essential for understanding society, business and government. Students are given a comprehensive introduction to these ideas and are prepared for the advanced study of microeconomics in subsequent years.

ECON1002
Introductory Macroeconomics

Credit points: 6 **Session:** Semester 2, Summer Main **Classes:** Two lectures and one tutorial per week **Assumed knowledge:** Mathematics **Assessment:** 2 in-class tests, Tutorial Assessment, Final Exam

Introductory Macroeconomics addresses the analysis of the level of employment and economic activity in the economy as a whole. It is a compulsory core unit for the Bachelor of Economics (BEc) and for the Bachelor of Commerce and an alternative core unit for the Bachelor of Economic and Social Science. Introductory Macroeconomics examines the main factors that determine the overall levels of production and employment in the economy, including the influence of government policy and international trade. This analysis enables an exploration of money, interest rates and financial markets, and a deeper examination of inflation, unemployment and economic policy.

ECOS2001
Intermediate Microeconomics

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** Two lectures and one tutorial per week **Prerequisites:** ECON1001 **Corequisites:** ECMT1010 **Prohibitions:** ECON2001, ECOS2901, ECON2901 **Assessment:** Tutorials, 2 in-class tests, project, Final Exam

Note: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.

The aim of Intermediate Microeconomics is the development of theoretical and applied skills in economics. It covers applications and extensions of the theory of consumer choice, firm behaviour and market structure. Emphasis is given to the economics of information and choice under uncertainty; industry structures other than monopoly and perfect competition; markets for factors of production; general equilibrium and economic efficiency; market failure and the role of government. This unit provides a basis for the more specialised options that comprise third year economics.

ECOS2002
Intermediate Macroeconomics

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** Two lectures and one tutorial per week **Prerequisites:** ECON1002 **Corequisites:** ECMT1010 **Prohibitions:** ECON2002, ECOS2902, ECON2902 **Assessment:** 1 Mid Semester exam, Final exam, Tutorial Paper and Performance

Note: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.

This unit of study develops models of the goods, money and labour markets, examines issues in macroeconomic policy. Macroeconomic relationships, covering consumption, investment, money and employment, are explored in detail. Macro-dynamic relationships, especially those linking inflation and unemployment, are also considered. Exchange rates and open economy macroeconomics are also addressed. In the last part of the unit, topics include the determinants and theories of economic growth, productivity and technology, the dynamics of the business cycle, counter-cyclical policy and the relationship between micro and macro policy in the context of recent Australian experience.

ECOS2901
Intermediate Microeconomics Honours

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures and one tutorial per week **Prerequisites:** ECON1001 and ECON1002 with a Credit average or better in the two units of study combined **Corequisites:** ECOS2903 and ECMT1010 **Prohibitions:** ECON2901, ECOS2001, ECON2001 **Assessment:** 2 mid semester exams, Final Exam

Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.

This unit is comprised of lectures based upon the curriculum for ECOS2001 Intermediate Microeconomics, supported by a seminar for one hour a week. The content of lectures reflect a more analytical and critical treatment of the topics than ECOS2001. The topics, which build on the theory of consumer and firm behaviour and market structure, include game theory, oligopoly, general equilibrium and welfare, externalities and public goods and the economics of information.

ECOS2902
Intermediate Macroeconomics Honours

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures and one tutorial per week **Prerequisites:** ECOS2901 **Corequisites:** ECMT1010 **Prohibitions:** ECON2902, ECOS2002, ECON2002 **Assessment:** 3 online quizzes, 7 problem sets, mid semester exam, Final Exam

Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.

This unit is comprised of lectures based upon the curriculum for ECOS2002 Intermediate Macroeconomics, supported by a seminar for one hour a week. The content of lectures reflects a more intensive treatment of the topics than ECOS2002. Topics covered include: models of the goods, money and labour markets; macro-economic relationships such as consumption, investment, demand for money and labour demand and supply; macro-dynamic relationships, especially those linking inflation and unemployment; exchange rates and open economy macroeconomics; theories of economic growth; productivity and technological change; the dynamics of the business cycle; and the relationship between micro- and macro-economic policy.

ECOS3002
Development Economics

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures per week **Prerequisites:** One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3002 **Assessment:** 2 in-class tests, Final Exam

This unit examines the role of the state, rationale for planning and market mechanisms in developing economies, and also the sociocultural preconditions and economic requirements for a market economy. It focuses on a wide range of developmental problems and issues from both microeconomic and macroeconomic points of view. It closely studies the integration process of the traditional segment of a developing society into its modern counterpart in countries selected from Asia, Africa, Latin America, the Caribbean, and the Pacific regions.

ECOS3003
Hierarchies, Incentives & Firm Structure

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures per week **Prerequisites:** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3003 **Assessment:** 2 mid-semester exams, Final Exam

This unit deals with the coordination and motivation problems faced by firms. More specifically this unit examines: whether firms use price or command mechanisms to allocate resources within firms; the problems associated with designing incentive contracts; the principles of efficient contract design and; the real world applications of those principles. The final section deals with the manner in which the coordination and motivation problems faced by firms determines their financial, vertical and horizontal structure.

ECOS3005
Industrial Organisation

Credit points: 6 **Session:** Semester 2, Summer Main **Classes:** Two lectures per week **Prerequisites:** One of (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3005, ECOS2201 **Assessment:** 1 Mid semester exam, final exam, problem sets

his unit of study examines the nature of inter-firm rivalry in industries with market power. It explores the various ways in which firms can increase their market power by: extracting more surplus from consumers, by colluding with rivals or by excluding entrants. The unit also analyses the international competitiveness of industries in the

context of industry assistance and the prevalence of foreign multinationals. Competition policy is also discussed.

ECOS3006
International Trade

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures per week **Prerequisites:** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3006 **Assessment:** 1 Mid semester exam, final exam

This unit of study provides a systematic analysis of the theory of international trade and trade policy. Initially differences between countries are emphasised as the source of trade and the gains from trade. Models that are examined include the Classical-Ricardian model, the Heckscher-Ohlin model and the Specific-Factors model. Next economics of scale and imperfect competition are introduced as sources of trade and gains from trade. The unit concludes with an examination of empirical studies aimed at testing trade theories. The analysis of trade policy begins with a discussion of the instruments of trade policy, in particular, tariffs and quotas and their effect on welfare. This discussion is then extended to the case of imperfect competition and strategic trade policy.

ECOS3007
International Macroeconomics

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures per week **Prerequisites:** One of (ECOS2002 or ECON2002) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3007 **Assessment:** Assignments; 1 Mid-semester exam; Final exam.

This unit studies macroeconomic theory and policy in a global trading world. The microfoundations of the various sectors are examined in the context of an open economy. The evolution of international money and capital markets is described, the operation of the foreign exchange market is examined, showing how its microstructure affects its macro performance. Theories and tests of the efficiency of international capital markets are surveyed, as well as core theories and tests of exchange rate and asset price determination. The unit develops the macroeconomic implications of monetary and fiscal policies for small and large open economies for different regimes.

ECOS3009
Markets, Regulation & Government Policy

This unit of study is not available in 2007

Credit points: 6 **Classes:** Two lectures per week **Prerequisites:** One of ECOS2001 (or ECON2001), ECOS2901 (or ECON2901), ECOP2011 (or ECOP2001), plus one of ECOS2002 (or ECON2002), ECOS2902 (or ECON2902), ECOP2012 (or ECOP2002). **Prohibitions:** ECON3009 **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.

Note: Department permission required for enrolment .
Note: Please Note. This unit of study is under review for Semester 2 2006. Please contact the Faculty of Economics and Business Student Information Office on +61 2 9351 3076 or email student@econ.usyd.edu.au for further details.

This unit addresses contemporary economic issues drawn from a particular area. The focus of the unit varies from year to year. Examples include housing economics, health economics, trade practices or economies in transition. The unit shows how economic analysis is used to provide an understanding of particular markets, emphasising the institutional setting and the economic rationales for government intervention.

ECOS3010
Monetary Economics

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures per week **Prerequisites:** one of (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) or (ECOS2002 or ECON2002) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3010 **Assessment:** 1 Multiple choice exam, written paper, final exam

This unit provides an overview of the main elements of monetary economics, with emphasis upon macroeconomic issues - analysis of economic processes in which money enters the picture in an essential manner. The content primarily concerns economic principles and theory, but there is also considerable focus on the Australian monetary system and monetary policy in particular. The particular topics covered include: functions of money; the concept of 'liquidity'; money demand; determinants of money supply changes; financial crises and the 'lender of last resort' function of central banking; the Reserve Bank of Australia and the Australian Prudential Regulation Authority; term and risk structures of interest rates; alternative theories of the level of the rate of interest; the monetary policy transmission mechanism; monetary policy instrument choice; central bank credibility; policy reaction functions; the global monetary system; and Reserve Bank market operations.

ECOS3011
Public Finance

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures per week **Prerequisites:** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3011 **Assessment:** 1 mid semester exam, 1 essay, final exam

Public Finance is about the taxing and spending decisions of governments. The unit covers a wide range of public finance topics. After an introduction to welfare economics and the role of government in the economy, the unit focuses on the revenue side of the budget: tax incidence, efficient and equitable taxation, the Australian system of revenue raising, issues of tax reform and the theory and practice of public utility pricing. It then focuses on the expenditure side of the government budget: public goods, externalities, and programs aimed at redistribution. It also introduces techniques of policy evaluation.

ECOS3012
Strategic Behaviour

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures per week **Prerequisites:** Either (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3012 **Assessment:** 1 mid semester exam, online quizzes, final exam

To think and act strategically, one needs to evaluate the effect of one's actions on the actions of others. As most economic decisions are strategic, such as the decision to lower a price or introduce a new tax, economics, if it is to avoid simplistic models, requires a theoretical framework capable of illuminating strategic behaviour. This unit offers a comprehensive, critical introduction to the theory which purports, not only to satisfy this theoretical need, but also potentially to unify the social sciences: game theory. After examining important concepts of game theory, the unit investigates the repercussions for the theory of bargaining and for the evolution of social institutions.

ENTO2001
Entomology

Credit points: 6 **Teacher/Coordinator:** Dr Sarah Mansfield **Session:** Semester 2 **Classes:** (2 x 1hour lecture, 1 x 3hour practical, 1 x 1hour insect collection)/week **Assessment:** 1 x 2hr exam (50%), 3 x lab quizzes (15%), 1x practical test (20%), 1 x insect collection (15%)

This unit is an introduction to insects, the most abundant group of organisms. The course begins with insect external and internal anatomy, feeding modes, life cycles and behaviour. Real world examples are used to demonstrate the ecological roles insects play in natural and agricultural ecosystems (e.g. pollinators, herbivores, predators, parasitoids, disease vectors). This knowledge is then linked to aspects of applied entomology: insecticides, biological control, habitat manipulation, integrated pest management, medical entomology and insect conservation. Practical sessions focus on insect morphology and taxonomy, so that students learn to identify common insect orders and families. Students must make a representative insect collection. This course forms the basis of students' entomological knowledge for BScAgr and BHortSc degrees and lays the foundation for future study in entomology

Textbooks

Required: 1) Laboratory manual, available from University Publishing Service.
2) Zborowski, P. & Storey, R. 1995. A field guide to insects in Australia. Reed New Holland, Sydney. 207 pp.
Recommended: Gullan, P.J. & Cranston, P.S. 2005. The Insects: an outline of entomology. 3rd edition, Blackwell Publishing, Malden, MA. 505 pp.

ENTO4003
Applied Entomology (Crops)

Credit points: 6 **Teacher/Coordinator:** Dr Sarah Mansfield **Session:** Semester 2 **Classes:** (1 x 2hour lecture/tutorial, 1 x 3hour practical, 1 x 1hour insect collection)/wk **Assumed knowledge:** ENTO2001 **Assessment:** 1 x 2hr exam (40%), 1 x oral presentation (20%), 1 x insect collection (20%), 1 x field diary (20%)

Applied entomology deals with the control of insect pests and the use of beneficial insects. The primary focus of this unit is the development and adoption of integrated pest management within Australian agriculture. The biology of major pest (herbivores and disease vectors) and beneficial (predators, parasitoids, pollinators) insect groups is covered in depth. The advantages and disadvantages of biological, cultural and chemical pest control methods are described using examples from Australian cropping systems. The role of host plant resistance and genetically modified crop varieties is also examined. Students will consider the relative importance of insect ecology, pest control methods and socio-economic factors to successful adoption of integrated pest management. The practical component of the course includes an individual insect collection, some laboratory sessions and day field trips. Students will work in small groups to prepare an oral presentation. Knowledge of ENTO 2001 or an equivalent introductory entomology course is assumed

Textbooks
Required: New, T.R. 2002. Insects and Pest Management in Australia Agriculture. Oxford University Press, Melbourne. 346 pp.
Recommended: Gullan, P.J. & Cranston, P.S. 2005. The Insects: an outline of entomology. 3rd edition, Blackwell Publishing, Malden, MA. 505 pp.

ENTO4004
Insect Taxonomy and Systematics

Credit points: 6 **Teacher/Coordinator:** Dr Sarah Mansfield **Session:** Semester 1 **Classes:** (1 x 2hr lecture/tutorial, 1 x 2hr museum project, 1 x 2hr insect collection)/week **Assumed knowledge:** ENTO2001 **Assessment:** 1 x 2hr exam (40%), 1 x museum project (30%), 1 x insect collection (30%)

Correct taxonomic identification of insect species is essential for all areas of entomological research. Knowledge of the evolutionary relationships between insect groups contributes to our understanding of insect biology and ecology. Key concepts that underpin the study of insect systematics, biogeography and phylogeny are described using examples from the evolutionary development of insects. The role of morphological, genetic and molecular studies in the classification of insects is examined including the use of specialist software for data analysis. This unit extends the student's knowledge of insect taxonomy through field collections and museum studies of a particular insect group (chosen by the student). Knowledge of ENTO 2001 or an equivalent introductory entomology course is assumed

Textbooks
Required: Gullan, P.J. & Cranston, P.S. 2005. The Insects: an outline of entomology. 3rd edition, Blackwell Publishing, Malden, MA. 505 pp.
Recommended: CSIRO Entomology. 1991. The Insects of Australia. 2nd edition, Melbourne University Press, Carlton, VIC. Two volumes, 1137 pp.

ENVI3111
Environmental Law and Ethics

Credit points: 6 **Teacher/Coordinator:** Dr Gerry Bates Dr Rachel Ankeny **Session:** Semester 1 **Classes:** Two 2 hour lectures per week. **Prerequisites:** 12 credit points of Intermediate Science or Agriculture units. **Prohibitions:** ENVI3001, ENVI3003. **Assumed knowledge:** Intermediate Environmental Science. **Assessment:** Essays, tutorial papers.

This unit of study covers topics in environmental law and ethics. The environmental law component provides an overview of all 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 Dr Scott Kable **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.

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. Moor 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.

GENE2001
Agricultural Genetics 2

Credit points: 6 **Teacher/Coordinator:** Dr Peter Sharp, Dr Norm Darvey, Prof Chris Moran, A/Prof Frank Nicholas **Session:** Semester 1 **Classes:** (3 lec, 1 tut & 2 prac)/wk **Prerequisites:** (BIOL1001 or BIOL1101 or BIOL1901) and (BIOL1002 or and BIOL1902) and (BIOM1001 or BIOM1003) **Assessment:** One 3hr exam, tests, assignments

This lecture and practical unit of study provides an introduction to the genetics and breeding of plants and animals. It provides an understanding for parallel and following courses. Lectures cover the basics of gene transmission and interaction, cytogenetics, molecular genetics, population and quantitative genetics, as well as the more applied aspects of plant and animal breeding and biotechnology. Practicals emphasise, with agricultural examples, the procedures of genetic and cytogenetic analysis, and the use of computers in simulation procedures in population genetics, quantitative inheritance and selection programs, and provide exposure to current plant and animal breeding and biotechnology

GENE4011
Plant Cytogenetics

Credit points: 6 **Teacher/Coordinator:** Dr Norm Darvey **Session:** Semester 2 **Classes:** (2 lec, 2 seminars/workshops, 1 lab)/wk **Prerequisites:** BIOM2001, GENE2001. **Assessment:** 2hr exam, assignments, practical reports, presentation

Lectures in cytology and cytogenetics, with special emphasis on cereals and the application of chromosome enginerring to plant breeding. The laboratory unit includes routine cytological procedures and tissue culture technology

GENE4012
Plant Breeding

Credit points: 6 **Teacher/Coordinator:** Dr Norm Darvey **Session:** Semester 2 **Classes:** (2 lec, 2 seminars/workshops, 1 lab)/wk **Prerequisites:** BIOM2001, GENE2001 **Assessment:** 2hr exam, assignments, practical reports, presentation

Lectures and practical work devoted to the theory, philosophy and practice of plant breeding, screening techniques conservation of genetic variability, breeding for disease resistance, the use of tissue culture in breeding, with examples from both field and horticultural crops

GENE4013
Molecular Genetics and Breeding

Credit points: 6 **Teacher/Coordinator:** Prof Peter Sharp **Session:** Semester 1 **Classes:** 3 lectures/tutorials per week and 6 3hr practical sessions for semester **Prerequisites:** BIOM2001, GENE2001, AGCH3016 **Assessment:** 3hr exam, assignments, practical reports, presentation

Lectures and laboratory work covering the structure and function of plant genomes and genes, the technology and results of DNA transformation and the analysis of plant traits by molecular techniques including by genetic mapping using molecular and other genetic markers

GENE4014
Population and Quantative Genetics

Credit points: 6 **Teacher/Coordinator:** Prof Chris Moran **Session:** Semester 1 **Classes:** (3 lec, 2 labs)/wk **Prerequisites:** BIOM2001, GENE2001 **Corequisites:** GENE4012 **Assessment:** 2hr exam, assignments, practical reports, presentation

Lectures and practical periods dealing with population genetic, quantitative inheritance and animal breeding given by the Faculty of Veterinary Science

Geography and Geology units of study

For GEOG and GEOS units of study not listed below please refer to the Faculty of Science Handbook (www.usyd.edu.au/handbooks /science/03_undergradunits.shtml).

GEOS1001
Earth, Environment and Society

Credit points: 6 **Teacher/Coordinator:** Dr Tom Hubble, Dr Mel Neave, Dr Bill Pritchard **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour practical per week. **Prohibitions:** GEOS1901, GEOG1001, GEOG1002, GEOL1001, GEOL1002, GEOL1902 **Assessment:** One 2 hour exam, 2000 word essay, field and prac reports

This Unit of Study examines interactions between the physical Earth and the activities of its growing population of human inhabitants. Several themes will be explored to provide students with an overview of the way that the earth's physical systems have come into being and how they function. Firstly, past geological events will be used illustrate how habitats and ecosystems respond to environmental crises. Secondly, models of environmental and climate change will be examined. Thirdly, the requirements of growing human populations and their ecological footprints will be investigated. These three themes will then be integrated to enable students to think critically about the key issues facing the future of the planet, and provide a foundation for future studies in Geography and Geology.

GEOS1002
Introductory Geography

Credit points: 6 **Teacher/Coordinator:** Dr Mel Neave, Dr Kurt Iveson **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 2 hour practical per week. **Prohibitions:** GEOS1902, GEOG1001, GEOG1002 **Assessment:** One 2 hour exam, one 2000 word essay, five practical reports

This unit of study provides an introductory geographical analysis of the ways in which places and landscapes are produced. The unit focuses on both the physical and human processes that generate spatial variation and difference, as well as tracing the interactions between these processes. The unit will begin with an investigation of Earth's surface features, exploring the distribution of landforms across Earth and interpreting their evolutionary histories. Several landscapes will be examined including those formed by rivers, wind, oceans 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 which shape contemporary global society. Each of these themes will be discussed with reference to key examples, in order to consider the ways in which the various processes (both physical and human) interact in the shaping of places. The unit of study will also include short field trips 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, A/Prof Clarke, Dr Julie Dickinson **Session:** Semester 2 **Classes:** Three 1 hour lectures and one 1 hour practical per week. **Prohibitions:** GEOS1903, GEOL1002, GEOL1902 **Assessment:** One 2 hour exam, practical reports, field report

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 two-day excursion to the western Blue Mountains and Lithgow to examine geological objects in their setting.

Textbooks
The recommended text is Hamblin & Christiansen (2001) Earth's Dynamic Systems, 9th Edition, Prentice Hall. This book can be purchased from the Co-op Bookshop.

GEOS2113
Making the Australian Landscape

Credit points: 6 **Teacher/Coordinator:** Associate Professor D. Dragovich Dr S.J. Gale **Session:** Semester 1 **Classes:** Two - three 1 hour lectures and one - two 1 hour practicals per week. **Prerequisites:** 24 credit points of Junior units of study, including GEOS1002 or GEOS1003 or GEOS1902 or GEOS1903 or GEOG1001 or ENVI1002 or GEOL1001 or GEOL1002 or GEOL1902 **Prohibitions:** GEOS2913 **Assessment:** One 2 hour examination, practical reports.

The shifts in the nature of the Earth's environment over time and the resultant changes in process regimes have had dramatic impacts on the way the Australian physical landscape has evolved. We consider here the effects of these changes on the broad pattern of the landscape, focusing particularly on slopes and soils. We follow this by investigating the environmental changes that have taken place since the end of the last glacial, the time when the continent's climates and environments first took on a recognisably modern form. We deal specifically with the impact of human activity on the Australian biophysical environment, emphasising both pre-European impacts and those changes that have taken place since European contact.

GEOG2321
Fluvial and Groundwater Geomorphology

Credit points: 6 **Teacher/Coordinator:** Dr Melissa Neave **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 2 hour practical per week. **Prerequisites:** GEOG(2311 or 2001) or 36 credit points of Junior study including GEOG1001 or ENVI (1001 or 1002) or GEOL (1001 or 1002 or 1501). Students in the Bachelor of Resource Economics should have 36 credit points of study in Biology (or Land and Water Science), Chemistry and Mathematics. Students in the Bachelor of Land and Water Science should have ENVI1002, 12 credit points of Chemistry, 6 credit points of Biology, BIOM1002. **Prohibitions:** GEOG (2002 or 2302 or 2303) or MARS2002 or MARS2006 **Assessment:** One 2 hr exam, one quiz, one field report, practical exercises

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
Recommended Textbooks: Fetter (2001) & Knighton (1998)

GEOS3018
Rivers: Science, Policy and Management

Credit points: 6 **Teacher/Coordinator:** Dr Mel Neave. **Session:** Semester 1 **Classes:** Two 1 hour lectures, one 1 hour tutorial, two 4 hour practicals per week; fieldwork **Prerequisites:** (24 credit points of Intermediate units of study including 6 credit points of Intermediate Geography units of study) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906)) **Prohibitions:** GEOS3918 **Assessment:** One 2 hour exam, two 1500 word essays

The unit of study is concerned with understanding the functioning of river catchments from both natural science and social science perspectives, at a variety of scales. The catchment as a morphodynamic process-response system is addressed with an emphasis on the relationships between processes and landform entities. Similarly, relationships within social, economic, and political systems are explored within the catchment context, with particular emphasis on the interactions between the social system and bio-physical system. Empirical context for the unit will primarily be drawn from the Murray-Darling, Mekong, and Hawkesbury-Nepean catchments. Fieldwork in the latter is integral to the unit of study.

Textbooks
Gordon, et al., 2004. Stream Hydrology: An Introduction for Ecologists.

Government units of study

For GOVT units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au /content.php?pageid=74).

GOVT1101
Australian Politics

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures and one tutorial per week **Assessment:** Essay; Exam; Participation; Paper

This unit introduces students to debates about the nature and limits of Australian democracy, to the major institutions of Australian politics, and to the distribution of power in Australian society. Major institutions and forces such as parliament, executive government, the federal system, political parties and the media are examined as arenas of power, conflict and consensus. Who rules? How? Which groups are excluded?

GOVT1104
Power in Society

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures and one tutorial per week **Assessment:** Critical Reading Exercises; Participation; Case Study; Exam

This unit provides an introduction to the study of politics through a focus on the key organising principle of political science: power. Different ways in which power is theorised and structured are considered, not with the intention of presenting a universal theory or theories, but rather to find some connections and extensions amongst a wide variety of experiences of political power. In particular this unit considers the way power operates in Australian society in relation to political decision making. The unit draws on case studies in order to combine the study of key political ideas and concepts with practical examples from our daily lives (e.g. diet, transport, drugs, clothing, etc.).

GOVT1105
Geopolitics

Credit points: 6 **Session:** Semester 2 **Classes:** Two lectures and one tutorial per week **Assessment:** Critical reading and bibliographic assignments; essay; exam; tutorial participation

This unit will examine how the contemporary international political order has emerged by focusing upon the interplay of diplomatic and strategic issues in the post-war world. It will begin with an analysis of the Cold War and its origins, tracing the development of Soviet-American rivalry, its manifestations in Europe, Asia, Africa and Latin America, and the different ways in which that rivalry was played out. The collapse of the Soviet Union as both a superpower and a state and the disappearance of the communist bloc will be analysed, before surveying the post-Cold War international scene. Among the issues reviewed in the post-Cold War era will be the question of US hegemony and unilateralism vs. multilateralism, nuclear proliferation, the continuing tension between the first and the third worlds, questions of civilisational conflict, non-state actors and terrorism, democratisation, and regional conflict.

GOVT1202
World Politics

Credit points: 6 **Session:** Semester 1 **Classes:** Two lectures and one tutorial per week **Assessment:** Assignment; Essay; Exam; Participation

This unit introduces the core content of the field of international relations. The first part of the unit presents the realist, liberal, Marxist and constructivist paradigms of international relations. The second part of the unit discusses the key actors and processes political scientists define in the field, including the state, decision makers, bureaucratic organisations, and classes. The final part of the unit focuses on international security, international political economy, and global problems.

GOVT1406
International Business and Politics

This unit of study is not available in 2007

Credit points: 6 **Classes:** Two lectures and one tutorial per week **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.

This unit introduces students to the international business environment, particularly those forces that shape international business relations and markets: international political relations, international trade, international financial markets, and the global economic and political architecture. The unit surveys issues associated with global marketplaces, trade and investment, culture, internationalisation, the international monetary system, foreign exchange, trade agreements, markets in Asia, international investment risk, risk analysis for international business, and risk mitigation. The unit is especially concerned with international business as it relates to international business and politics in Asia.

HORT1001
Horticultural Science 1A

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** (3 lec & 3 prac)/wk, excursion **Prohibitions:** CROP1001, LWSC1001 **Assumed knowledge:** HSC 2 unit Chemistry **Assessment:** One 2hr exam, prac, assignments **Practical field work:** Field and laboratoryl sessions allow 'hands-on' experience in plant identification, propagation and equipment used by horticulturalists and provide an overview of horticultural industries in the Sydney region

This unit of study introduces the principles and practices of modern horticulture and agriculture and examines the relationships between the plants, animals and natural resources which make up production systems. The concepts of environmental and economic sustainability of horticultural and agricultural systems will be introduced. Topics covered include Australian farming systems, regional horticultural and agricultural industries, farming operations and plant identification

Textbooks
Reference books
V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)
C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)
M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

HORT1002
Horticultural Science 1B

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 2 **Classes:** (3 lec & 3 prac)/wk **Corequisites:** HORT1001 **Prohibitions:** CROP1002, LWSC1002 **Assessment:** One 2 hr exam, prac, assignments

Practical field work: Laboratory and field practical sessions allow 'hands-on' experience with the equipment used by Australian farmers and feature measurement of some aspects of physical principles applied to farming operations including solar cells, the weather and tractor safety

This unit of study develops the theme of environmental sustainability of horticultural and agricultural production, and examines the physical principles which underpin these production systems and the broad ecological relationships between plants, animals and natural resources used in horticulture and agriculture. Current and future ecological issues facing horticulture and agriculture are discussed. In addition, the static and dynamic forces involved in horticultural and agricultural structures and equipment, the behaviour and properties of water, and the physical aspects of weather and the Australian climate will be discussed

Textbooks
See HORT1001 Horticultural Science 1A

HORT2002
Horticultural Science 2

Credit points: 6 **Teacher/Coordinator:** Dr Jenny Jobling **Session:** Semester 2 **Classes:** (2 lec, 3hr lab)/wk **Prerequisites:** (BIOL1001or BIOL1101 or BIOL1901) and (BIOL1002 or BIOL1902 or BIOL1003 or BIOL1903) **Assumed knowledge:** HORT1001, HORT1002 **Assessment:** Exam 3 hr (55%), assignments (45%).

The unit of study covers topics on perennial fruit production, nursery management and plant identification. Topics in fruit production cover crop physiology and growth with special emphasis on management activities during winter/spring. Nursery management includes a discussion of the major aspects of pot plant production, including protected cropping and environmental auditing. Plant identification will provide students with a detailed foundation of plant use in ornamental horticulture, based around plant families

HORT3004
Postharvest Biology and Technology

Credit points: 6 **Teacher/Coordinator:** Dr Robyn McConchie **Session:** Semester 2 **Classes:** (2 lec, 3-4 labs/seminars/workshops)/wk **Prerequisites:** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903. **Assumed knowledge:** HORT1001, HORT1002 and HORT2002. **Assessment:** Exam 2 hr (60%), laboratory reports (25%), assignment (10%), seminar (5%)

The unit develops understanding and skills relevant to the maintenance of quality during the harvesting, handling, storage and marketing of fresh plants and plant parts. The subject integrates the postharvest physiology of products that are handled or marketed in a living state, with the technological and economic challenges associated with delivering them from the field to the consumer. Supply chain analysis of crops will be examined via case study examples, drawn from fruits, vegetables, cut flowers, nursery and foliage crops, turf and edible fungi. Students will study all operations from harvesting to consumer evaluation

Textbooks
Wills, R., McGlasson, B., Graham, D. and Joyce, D. "Postharvest: An Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals." UNSW Press 4th Edition

HORT3005
Production Horticulture

Credit points: 6 **Teacher/Coordinator:** Dr Jenny Jobling **Session:** Semester 1 **Classes:** (2 lec, 3 labs/seminars/workshops)/wk **Prerequisites:** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903. **Assumed knowledge:** HORT1001, HORT1002 and HORT2002. **Assessment:** One 3 hr exam (55%), assignments (45%) ie fruit crops 15%, vegetables 15%, tropical and environmental horticulture 15%.

Emphasis is given to the scientific basis for fruit and winegrape production and to sustainable vegetable crop production and tropical horticultural crops. Concepts underlying the establishment of and management of urban plants and use are addressed. The unit develops skills in the evaluation of technical and environmental status of established orchards, vineyards, vegetable crops and urban plantings

HORT4004
Issues in Horticultural Science 4A

Credit points: 6 **Teacher/Coordinator:** Dr Robyn McConchie **Session:** Semester 1 **Classes:** 2 lectures per week for 13 weeks & 6 prac per 13 weeks **Prerequisites:** HORT3001 or HORT3004 **Assessment:** Exam (2 hr) (25%), plant ID practical quizzes (15%), consulting report (45%), seminar presentation (15%)

Students attend a series of discussion workshops on minimising the environmental impact of horticultural enterprises. It introduces students to current themes and thinking in sustainable practices in horticultural science, covering issues such as efficient water management, sustainable use of fertilizers, salinity, heavy metal pollution, disposal of plastics, integrated pest management and organic practices. Students also undertake an industry based case study analysis of a horticultural supply chain, designed to provide them with skills in data analysis and interpretation, problem identification and problem solving. In addition, students will add to their general knowledge of important horticultural plants and their uses through plant identification workshops

HORT4005
Research and Practice in Hort Science

Credit points: 6 **Teacher/Coordinator:** Prof David Guest **Session:** Semester 2 **Classes:** 2 hours per week for 6 weeks, 6 3-hour practical classes and a 5-day excursion **Prerequisites:** HORT3005 **Assessment:** Critical essay and presentation 50%, plant identification 50%

This unit introduces students to current themes and thinking in horticultural science research and practice. Through prescribed readings, seminar attendance presentations, discussion workshops, excursions and practicals, students will integrate the knowledge they have acquired during their undergraduate course, and develop critical analysis skills essential for a professional career in horticultural science research and management. Emphasis will be placed on identifying sustainable horticultural practices that meet the environmental, human and financial challenges facing horticulture. Issues to be covered selected from sustainable water and soil management, organic horticulture, the impact of methyl bromide withdrawal, biosecurity, biotechnology, agroforestry, intellectual property, WTO and trade, urban horticulture and quality of life, horticulture and human nutrition, food safety, supply chain analysis

Information Systems units of study

For INFS units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au /content.php?pageid=74).

INFS1000
Business Information Systems Foundations

Credit points: 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** Three hours per week **Prohibitions:** ISYS1003, INFO1000, INFO1003, INFO1903 **Assessment:** Tutorial work/ participation; Individual project; Group project; Final examination

The Information Age, with its focus on information as a key business resource, has changed the way Business Information Systems (BIS) are viewed in organisations. In previous years, people approached BIS primarily as a tool to increase efficiency, either by cutting costs, time or energy spent. In the information age, however, the role of BIS is different it is an enabler of innovation and a tool for getting the right information into the hands of the right people at the right time. This unit focuses on how businesses operate and shows how business information systems support business operations and management. Students are provided with an introduction to BIS theories, frameworks and models to assist in understanding the nature and contribution of BIS in a range of organisational contexts including private, public and not for profit.

LWSC1001
Land and Water Science 1A

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** (3 lec & 3 prac)/wk **Prohibitions:** CROP1001, HORT1001 **Assessment:** One 2 hr exam, assignments, weekly class practical tests **Practical field work:** Field practical sessions allow 'hands-on' experience with

the tillage, sowing and harvesting equipment used in primary production in Australia and include visits to sites of relevance to the management of land and water resources

This unit of study introduces the principles and practices of modern primary industries and examines the relationships between the plants, animals and natural resources that make up production systems. The concepts of environmental and economic sustainability of production systems will be introduced. Topics covered include introduction to ecological systems, regional resources and primary industries, technology and ecosystem disturbance and plant identification

Textbooks

V Squires and P Tow (eds) Dryland farming: a systems approach (Sydney University Press), 1992
SCARM (1998) Sustainable agriculture: assessing Australia's recent performance (CSIRO)

LWSC1002
Land and Water Science 1B

Credit points: 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 2 **Classes:** (3 lec & 3 prac)/wk **Corequisites:** LWSC1001 Land and Water Science 1A **Prohibitions:** CROP1002, HORT1002 **Assessment:** One 2 hr exam, assignments, weekly class practical tests **Practical field work:** Field practical sessions allow "hands-on" experience with the tillage, sowing and harvesting equipment used in primary production in Australia and feature measurement of some aspects of the physical principles as applied to production systems including solar cells, the weather and vehicle safety

This unit of study develops the theme of environmental sustainbility of primary production and examines the physical principles that underpin production systems. It examines the broad ecological relationships between the plants, animals and natural resources used in production systems, and deals with some of the problems facing primary production in the future. In addition the static and dynamic forces involved in structures and equipment, the behaviour and properties of water in biological systems and the physical aspects of weather and the changing Australian climate will be discussed. Topics covered include climatology, environmental physics, ecosystems management, global issues of ecological significance and plant identification

Textbooks

Reference Books
V.Squires and P.Tow (eds) Dryland farming: a systems approach
(Sydney University Press), 1992
SCARM (1998) Sustainable agriculture;assessing Australia's recent performance (CSIRO)
M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press), 1993

LWSC2002
Sustainable Land and Water Management

Credit points: 6 **Teacher/Coordinator:** Dr Dhia Al Bakri (Coordinator), Dr Willem Vervoort. **Session:** Semester 2 **Classes:** 2 hrs lectures, 4 hrs (practical/fieldwork)/wk **Prerequisites:** LWSC1001, LWSC1002. **Assessment:** Practical reports 20%, field report 30%, 3hr exam 50% **Practical field work:** 1 week field trip

This unit introduces students to the principles and practices of sustainable development and integrated catchment management. Students' appreciation of the principles will be facilitated through theoretical and practical case studies focusing on problems and issues facing land and water users and managers in Australia. This unit builds on knowledge gained in LWSC 1001, LWSC 1002 and SOIL 2001 and establishes the foundation for LWSC 3001 (Limnology and Water Quality) and GEOG 2303 (Groundwater Hydrology). The unit provides one of the essential building blocks for developing the conceptual framework for, and linking the other units to the central themes of, the Bachelor of Land and Water Science. The unit consists of two parts. The first part will involve a series of lectures and practical exercises. The second part of the unit is a 5-day field trip traveling from Sydney to Orange and through the Lachlan valley to the Jemalong irrigation district. During the fieldtrip, students will examine the interactions between the socio-economic and biophysical systems of the landscape, undertake data gathering and perform practical exercises in relation to a wide range of land and water issues and problems. After completion of this unit, the students should be able to: Explain the principles underlying the concepts of sustainable development and ICM, identify main land and water degradation issues in Australia and define relevant causes, effects and management options, describe the relevance of the landscape Genesis model to sustainable catchment and resource management, and explain how the salt balance and water balance are linked and their implications in relation to secondary dryland and irrigated salinity, perform techniques and procedures to estimate water/salt balances and catchment loading

Textbooks

Al Bakri D 2002. Geoscience and sustainable catchment and resource management: The Ben Chifley Catchment case study, Environmental Geology, 42, 588-596.
Al Bakri D 2001. Towards developing a geoscientific approach to sustainable agricultural and rural development, Journal of Environmental Geology ,40 (4-5), 543-556.
Heathcote IW 1998. Integrated watershed management, principles and practices, John Wiley and Sons, New York.

LWSC3004
Limnology and Water Quality

Credit points: 6 **Teacher/Coordinator:** Dr Dhia Al-Bakri (Coordinator), Prof Ivan Kennedy, Dr Robert Caldwell **Session:** Semester 1 **Classes:** (2x1 hour lectures, 1x3 hour practical/fieldwork)/wk **Prerequisites:** LWSC2002 or AGCH2003 **Prohibitions:** AGCH3030 **Assessment:** Practical reports and oral presentation 30%, field trip report 20%, 3hr exam 50%

This unit of study focuses on understanding causes and management of the main water quality problems and related limnological processes. The unit builds on knowledge gained in LWSC2002, AGCH2003 and GEOG 2303. It commences with a field trip to the productive Namoi and the Macquarie Valleys, where irrigation-based agriculture has been developed; to assess environmental impacts on vegetation, soil and water of agricultural enterprises such as cotton farming and human settlements. Field observations on water quality, pesticide contamination, and microbial content will be made on water and sediment, with samples returned for more detailed laboratory analysis at the University. The unit will also investigate sources and pathways of contaminants entering streams, lakes and reservoirs, determine interaction between runoff and water quality, and identify pollution control measures within the context of integrated catchment management (ICM). The unit will cover aspects of freshwater ecology with particular emphasis on wetlands ecosystem, riparian vegetation, phytoplankton and cyanobacteria. A research-based project will be carried out by the students in the South Creek catchment to assess common water quality issues and pollution problems in Australian freshwater system using a range of field and monitoring techniques. Appropriate catchment management options to combat pollution and improve the aquatic ecosystem health in South Creek will be identified and assessed

Textbooks

Wetzel R G 2001. Limnology: Lake and reservoir ecosystems, 3rd edn, Academic Press London.
Goldman C R and Horne A J 1983. Limnology. McGraw-Hill Book Company, New York.

LWSC4003
Landscape Hydrology and Management

Credit points: 6 **Teacher/Coordinator:** Dr Willem Vervoort (Coordinator), Dr Dhia Al Bakri **Session:** Semester 1 **Classes:** (2x1hour lecture and 1x2-3hour practical/fieldwork)/wk **Prerequisites:** GEOG2321 or LWSC3004. **Assessment:** On-line discussion postings (10%) 2 x practical reports (50%), presentation (10%), 2hr exam (30%)

This unit of study is designed to give students insight into the use of hydrological modelling in surface and groundwater management, river restoration and policy making at the catchment level. The unit builds on the theoretical knowledge gained in LWSC 3004 and GEOG 2321. In the first part, the unit uses a problem based learning approach to explore several ways to simulate catchment-scale hydrological processes and the translation of model outcomes into management. In particular, the unit tries to stimulate discussion on the possibilities and impossibilities of using hydrological models to assess the impact of management and policies in a catchment. The second part of the unit will focus on discussing and using hydro-geochemical methods to explain processes and chemical reactions controlling groundwater

quality and salinity at the catchment level. The students will complete a research-based project including field and laboratory investigations in the South Creek catchment, western Sydney. By the end of this unit the students should be able to apply catchment-scale hydrological simulation models to predict management and policy impact, and identify appropriate technological solutions and management practices to control water quality problems and remediate stressed surface and groundwater resources

Textbooks

Beven, K.J. Rainfall-Runoff modeling, The Primer, John Wiley and Sons, Chichester, 2001

Kumagai. M. and Warwick, W. F. 2003. Freshwater management: Global versus local perspectives, Springer-Verlag, Tokyo.

Mathematics units of study

For MATH units of study not listed below please refer to the Faculty of Science Handbook (www.usyd.edu.au/handbooks/science /03_undergradunits.shtml).

MATH1001
Differential Calculus

Credit points: 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1011, MATH1901, MATH1906, MATH1111 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH1001 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 looks at complex numbers, functions of a single variable, limits and continuity, vector functions and functions of two variables. Differential calculus is extended to functions of two variables. Taylor's theorem as a higher order mean value theorem.

Textbooks

As set out in the Junior Mathematics Handbook.

MATH1002
Linear Algebra

Credit points: 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1902, MATH1012, MATH1014 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes.

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:** MATH1013, MATH1903, MATH1907 **Assumed knowledge:** HSC Mathematics Extension 2 or MATH1001 or MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes.

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 forms 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

MATH1005
Statistics

Credit points: 3 **Session:** Semester 2, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1905, MATH1015, ECMT Junior units of study, STAT1021, STAT1022 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes.

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

MATH1011
Life Sciences 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 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes.

This unit is designed to provide calculus for students of the life sciences who do not intend to undertake higher year mathematics and statistics. It includes the fitting of data to various functions, introduces finite difference methods, and it 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
Differential and Difference Equations

Credit points: 3 **Session:** Semester 2 **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.

MATH1013 is designed to provide the theory of difference and differential equations for students of the life sciences who do not intend to undertake higher year mathematics and statistics. This unit of study looks at the solution of equations by bisection and iteration, first and second order difference equations where chaos is met, and examples of modelling using simple first and second order differential equations.

Textbooks

As set out in the Junior Mathematics Handbook

MATH1901
Differential Calculus (Advanced)

Credit points: 3 **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1111, MATH1011, MATH1001, MATH1906 **Assumed knowledge:** HSC Mathematics Extension 2 **Assessment:** One 1.5 hour examination, assignments and quizzes.

Note: Department permission required for enrolment .

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 MATH1001 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. **Prohibitions:** MATH1002, MATH1012, MATH1014 **Assumed knowledge:** HSC Mathematics Extension 2 **Assessment:** One 1.5 hour examination, assignments and quizzes.

Note: Department permission required for enrolment .

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 MATH1002 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. **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.

Note: Department permission required for enrolment .

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 MATH1003 but goes more deeply into the subject matter and requires more mathematical sophisticaton.

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. **Prohibitions:** MATH1005, MATH1015, ECMT Junior units of study, STAT1021, STAT1022 **Assumed knowledge:** HSC Mathematics Extension 2 **Assessment:** One 1.5 hour examination, assignments and quizzes.

Note: Department permission required for enrolment .

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 MATH1005 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks
As set out in the Junior Mathematics Handbook

MICR2022
Microbes in Society

Credit points: 6 **Teacher/Coordinator:** Dr Nick Coleman **Session:** Semester 2 **Classes:** Two 1 hour lectures per week, plus an additional six 1 hour lectures or tutorials per semester. Eleven 3 hour practicals per semester. **Prerequisites:** 6 credit points of Junior Biology and (6 credit points of MBLG1001 or PLNT2001 or PLNT2911) and 6 credit points of Junior Chemistry **Prohibitions:** MICR2922, MICR2002, MICR2902, MICR2004, MICR2008, MICR2012, MICR2909 **Assumed knowledge:** MICR (2021 or 2921 or 2024) **Assessment:** One 2 hour exam, continuous assessment in prac, 2 assignments, prac exam

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 MBLG1001 or PLNT (2001 or 2901).

Microorganisms have a large impact on human society, and are particularly notorious as the causative agents of infectious diseases. However, microbes also have many beneficial roles in agricultural, industrial, biotechnological, and environmental processes. Understanding the biology of microorganisms and their relationship to human society is critical to fighting the 'bad' microbes, and harnessing the activities of the 'good' microbes. MICR2022 will build on the skills and knowledge gained in MICR2021/2921. An extensive set of Medical Microbiology lectures will cover bacterial, viral, and fungal pathogens, and will introduce key concepts including epidemiology and disease transmission, pathogenicity and virulence factors, host/parasite relationships, host defences, prevention of disease, and antibiotic types and functions. Lecture topics in other areas include Food Microbiology (microbial ecology of food, fermentation and production, spoilage and food poisoning), Agricultural Microbiology (plant/microbe associations), Microbial Evolution and Genomics (incl. structural and functional genomics), and Industrial Microbiology (large-scale fermentation, traditional and recombinant products, biosensors and biocontrol agents, biodeterioration and bioremediation). The laboratory sessions are integrated with the lecture series and are designed to give students practical experience in isolating, identifying and manipulating microorganisms. Work Experience - students who have completed MICR2021/2921 and MICR2022/2922 and are enrolled in the BSc or BSc (Advanced) may be offered the opportunity to undertake work experience for approximately one month in a local microbiology laboratory (hospital, food, research, environmental, etc) subject to availability of places.

Textbooks
Prescott L M et al. Microbiology. 6th edn, WCB/McGraw-Hill, 2005

MICR2024
Microbes in the Environment

Credit points: 6 **Teacher/Coordinator:** Dr Andrew Holmes **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour practical per week. **Prerequisites:** 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. **Prohibitions:** MICR2021, MICR2921, MICR2001, MICR2901, MICR2003, MICR2007, MICR2011, MICR2909 **Assessment:** One 2 hour exam, fortnightly practical quiz, project report and continuous practical assessment.

Note: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).

This unit introduces the diversity of microbes found in soil, water, air, plants and animal 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 introduce techniques and skills in isolating, quantifying and culturing microbes, designing and interpreting experiments to study microbial growth, and in preparing and presenting data.

Textbooks
Atlas RM and Bartha R (1997) Microbial Ecology: Fundamentals and applications. 4th Edition. Benjamin/Cummings Scientific Publishing, Menlo Park, CA

MICR3022
Microbial Biotechnology

Credit points: 6 **Teacher/Coordinator:** Dr A Holmes **Session:** Semester 2 **Classes:** Two 1 hour lectures per week and six 5 hour practicals. **Prerequisites:** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **Prohibitions:** MICR3922, MICR3002, MICR3902 **Assessment:** One 2 hour exam, continuous assessment, practical work, practical reports

This unit of study will cover both traditional microbial biotechnologies and the impact of new technologies on the emergence of new industries. Existing applications are based on empirical management of a remarkably small proportion of microbial diversity. The past ten years have seen dramatic advances in the capacity to explore microbial diversity and actively manage microbial communities. This course will focus on how these new techniques are creating new opportunities in biotechnology. General applications to be covered include production of metabolites or small molecules by microbial cultures (alcohols and antibiotics), production of macromolecules in microorganisms (protein expression and DNA manipulations), and management of microbial communities in biotechnology (gastrointestinal health, waste treatment and prospecting). Specific new techniques covered will include gene discovery via environmental metagenomics; microarrays and high throughput screening for isolation and recovery of producers of novel bioactive compounds.

Textbooks
To be advised

Marketing units of study

For MKTG units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au /content.php?pageid=74).

MKTG1001
Marketing Principles

Credit points: 6 **Session:** Semester 1, Semester 2 **Classes:** One lecture and one tutorial per week **Prohibitions:** MKTG2001 **Assessment:** Marketing plan; Group presentation; Tutorial assignment ; Two exams

This unit examines the relationships among marketing organisations and final consumers in terms of production-distribution channels or value chains. It focuses on consumer responses to various marketing decisions (product mixes, price levels, distribution channels, promotions, etc.) made by private and public organisations to create, develop, defend, and sometimes eliminate, product markets. Emphasis is placed on identifying new ways of satisfying the needs and wants, and creating value for consumers. While this unit is heavily based on theory, practical application of the concepts to "real world" situations is also essential. Specific topics of study include: market segmentation strategies; market planning; product decisions; new product development; branding strategies; channels of distribution; promotion and advertising; pricing strategies; and customer database management.

MKTG1002
Marketing Research 1

Credit points: 6 **Session:** Semester 2 **Classes:** One lecture and one tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001) **Prohibitions:** MKTG2003 **Assessment:** Group project; Tutorial participation portfolio; Individual critique; Exams (mid-semester and final)

Fundamental to marketing is a requirement to understand who your customers are and what they want. Marketing research is the essential activity of discovering information and presenting it in a useful format to marketing decision makers. This unit introduces the skills and knowledge necessary to allow students to accurately formulate research questions and then discover answers ensuring that these are accurate, reliable and timely. Particular focus is given to different approaches to and aspects of data collection, including: qualitative research; secondary data collection; questionnaire design; sampling; experimental design; validity and basic data analysis.

PLNT2001
Plant Biochemistry and Molecular Biology

Credit points: 6 **Teacher/Coordinator:** Prof Les Copeland (Coordinator), Dr Rosanne Quinnell **Session:** Semester 1 **Classes:** (2 hr lec, 3 hr prac)/wk **Prerequisites:** 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **Prohibitions:** PLNT2901, AGCH2001 **Assessment:** Quizzes + theory of prac test (25%), laboratory reports (25%), final examination (50%)

This unit of study explores the fundamentals of plant biochemistry, from what plants are made of to how plants regulate their metabolic processes. The specialised nature of these metabolic processes, which enable plants to respond to different biotic and abiotic environmental influences, is featured as is their relationship to food, feed and fibres. The unit covers basic chemistry and metabolic reactions of the main plant constituents, how storage reserves are mobilized to provide energy and substrates for growth and development, and how metabolic pathways are controlled and respond to influences from the plant environment. Special attention is given to these processes in economic plants, and their relevance to foods and fibres. The unit of study complements intermediate units of study in plant science, molecular and cell biology, genetics and biotechnology, and leads on to senior plant modules offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources. Learning in the unit is by lectures and laboratory work, augmented by self-directed learning related to the lecture and practical classes and discussions to provide insights into how molecular and biochemical approaches lead to understanding of plant functions. Students will be expected to access the WebCT site regularly for information

Textbooks

A Study Guide for the unit will be available for purchase from the Copy Centre at a cost of $10 during the first week of Semester

PLNT2002
Aust Flora: Ecology and Conservation

Credit points: 6 **Teacher/Coordinator:** Dr Glenda Wardle & Dr Murray Henwood. **Session:** Semester 1 **Classes:** (2 hrs lec & 3 hrs prac)/wk, audiovisual. **Prerequisites:** 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above). **Prohibitions:** PLNT2902, BIOL2004, BIOL2904 **Assumed knowledge:** The contents of BIOL (1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL (1003 or 1903) will need to do some preparatory reading. **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 (or production systems at Camden), the Royal Botanic Gardens Sydney and the construction of student herbaria. The unit of study complements intermediate units of study in plant science, zoology, molecular and cell biology, genetics and biotechnology, and leads on to advanced plant and ecology modules offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources.

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 Bruce Sutton, A/Prof Robyn Overall **Session:** Semester 2 **Classes:** 2 lectures, 1hr tutorial and 1 prac, A/V session (2-3hr) or field trip (6hr) per wk **Prerequisites:** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 **Prohibitions:** PLNT2903, BIOL2003, BIOL2903, CROP2001 **Assumed knowledge:** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **Assessment:** One 2hr theory exam (40%), prac exam (20%), anatomy project (10%), quizzes (5%), physiology report (10%), field report (15%)

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 Applied Plant Biochemistry, 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

Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer

Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT2901
Plant Biochem & Molecular Biology (Adv)

Credit points: 6 **Teacher/Coordinator:** Prof Les Copeland (Coordinator), Dr Rosanne Quinnell **Session:** Semester 1 **Classes:** (3 lec or tut; 3 prac or sem)/wk **Prerequisites:** A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) **Prohibitions:** PLNT2001, AGCH2001 **Assessment:** One 2-hr exam (50%), laboratory reports (10%) independent research project presentation and report (25%), self-directed learning exercises (15%)

The content will be based on PLNT2001 but qualified students will participate in alternative components at a more advanced level

Textbooks
A Study Guide for the unit will be available for purchase from the Copy Centre at a cost of $10 during the first week of Semester.

PLNT2902
Aust Flora: Ecology & Conservation (Adv)

Credit points: 6 **Teacher/Coordinator:** Dr Glenda Wardle, Dr Murray Henwood **Session:** Semester 1 **Classes:** (2 lec & 3 prac)/wk, audiovisual **Prerequisites:** Distinction average in 12 credit points from a combination of Junior BIOL or LWSC units of study including two of BIOL (1001, 1901, 1002, 1902, 1003, 1903) LWSC1002, MBLG1001 (or with the Dean's permission BIOL1201 and BIOL1202).These requirements may be varied and students with lower averages should consult the unit Executive Officer **Prohibitions:** PLNT2002, BIOL2004, BIOL2904 **Assumed knowledge:** The contents of BIOL(1002 or 1902) is assumed knowledge. Students wishing to enroll in Intermediate Biology (BIOL) and Plant Science (PLNT) units of study using BIOL(1003 or 1903) 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%)

Qualifed 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

PLNT2903
Plant Form and Function (Advanced)

Credit points: 6 **Teacher/Coordinator:** A/Prof Bruce Sutton and A/Prof Robyn Overall **Session:** Semester 2 **Classes:** 2 lectures, 1hr tutorial and 1 prac, A/V session (2-3hr) or field trip (6hr) per wk **Prerequisites:** Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) **Prohibitions:** PLNT2003, BIOL2003, BIOL2903, CROP2001 **Assumed knowledge:** The content of BIOL(1002 or 1902) is assumed knowledge and students entering from BIOL(1003 or 1903) will need to do some preparatory reading **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
Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer
Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT3001
Plant, Cell and Environment

Credit points: 6 **Teacher/Coordinator:** Dr Rosanne Quinnell and A/Prof Bruce Sutton **Session:** Semester 2 **Classes:** (2-3 workshops, 2-3 prac)/wk **Prerequisites:** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **Prohibitions:** PLNT3901 **Assessment:** One 2hr exam (50%), 2 lab reports (50%)

Plant Cell and Environment comprises discussion and practical sessions that are guided by current research directions in Australian plant sciences. Several broad themes in Plant Science research will be identified at the start of the semester and these will provide the framework for discussions for the remainder of the semester. Theme areas will consider the Australian flora and areas currently under investigation at the University of Sydney including rising atmospheric carbon dioxide levels, post-harvest physiology, symbiotic systems and advances in plant cell and molecular biology. Students will be required to examine and critique the current published literature and to articulate how newly published findings have informed the field. Students will be required to draw on knowledge from their previous studies in biology, which may include Intermediate Biology, Plant Science, Molecular and Microbial Biology, Agriculture and Horticulture units of study. The practical component of this unit of study has sufficient flexibility for students to design their own group experiments and to answer questions raised during the discussions of the published literature. A range of equipment for student experiments will be available including: pulse amplitude modulated (PAM) fluorometers; oxygen electrodes; Scholander bomb, gel electrophoresis (PAGE).

PLNT3002
Plant Growth and Development

Credit points: 6 **Teacher/Coordinator:** A/Prof Robyn Overall **Session:** Semester 2 **Classes:** (3 lec, 0-3 hr prac)/wk **Prerequisites:** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, PLNT2903, BIOL2016, BIOL2916, BIOL2003, BIOL2903, BIOL2006, BIOL2906, CROP2001, AGCH2002 or equivalent **Prohibitions:** 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 to 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
Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer
Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT3901
Plant, Cell and Environment (Advanced)

Credit points: 6 **Teacher/Coordinator:** Dr Rosanne Quinnell and A/Prof Bruce Sutton **Session:** Semester 2 **Classes:** (2-3 workshops; 2-3 prac)/wk **Prerequisites:** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent **Prohibitions:** PLNT3001 **Assessment:** One 2-hr exam (50%), 1 research report (50%)

Note: Department permission required for enrolment .
Note: Entry is restricted and is based on a combination of a high WAM and student motivation

Plant Cell and Environment comprises discussion and practical sessions that are guided by current research directions in Australian plant sciences. Several broad themes in Plant Science research will be identified at the start of the semester and these will provide the

framework for discussions for the remainder of the semester. Theme areas will consider the Australian flora and areas currently under investigation at the University of Sydney including rising atmospheric carbon dioxide levels, post-harvest physiology, symbiotic systems and advances in plant cell and molecular biology. Students will be required to examine and critique the current published literature and to articulate how newly published findings have informed the field. Students will be required to draw on knowledge from their previous studies in biology, which may include Intermediate Biology, Plant Science, Molecular and Microbial Biology, Agriculture and Horticulture units of study. The practical component of this unit of study has sufficient flexibility for students to design their own group experiments and to answer questions raised during the discussions of the published literature. A range of equipment for student experiments will be available including: pulse amplitude modulated (PAM) fluorometers; oxygen electrodes; Scholander bomb, gel electrophoresis (PAGE).

PLNT3902
Plant Growth and Development (Advanced)

Credit points: 6 **Teacher/Coordinator:** A/Prof Robyn Overall **Session:** Semester 2 **Classes:** (3 lec, 0-3 hr prac)/wk **Prerequisites:** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT2001, PLNT2901, PLNT2003, 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 coordinator **Prohibitions:** PLNT3002, BIOL3021, BIOL3931 **Assessment:** One 2 hr exam (60%), project presentation and report (30%), laboratory quizzes and book (10%)

Qualified students will participate in alternative components of PLNT3002 Plant Growth and Development, representing 30% of the total assessment. The students will be exempt from one standard laboratory report and the standard independent group project. Instead, the students will conduct an advanced independent 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
Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer
Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PPAT3003
Plant Disease

Credit points: 6 **Teacher/Coordinator:** Prof Lester Burgess and Prof David Guest **Session:** Semester 1 **Classes:** (2 lec, 3 hr prac)/wk **Prerequisites:** Two of PLNT2001, PLNT2901, PLNT2002, PLNT2902, PLNT2003, PLNT2903, MICR2024, MICR2026 or MICR2101 **Assessment:** Written exam 2 hr (60%), 12 quizzes (15%), group project report (25%)

This unit introduces fungi and other microbes as causes of plant disease that limit agricultural and horticultural production. The practical component introduces techniques used in handling and identifying fungi, and in studying plant disease. Emphasis is placed on the design of experiments and interpretation of experimental data. Topics include symptoms and 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

Textbooks
Brown JF and Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications.
Agrios GN. 2005. Plant Pathology (5th ed). Academic Press, London.

PPAT4004
Adv Mycology & Diagnostic Plant Path'ogy

Credit points: 6 **Teacher/Coordinator:** Prof Lester Burgess, Dr Edward Liew, Prof David Guest, Dr Nerida Donovan **Session:** Semester 1 **Classes:** (2 lec, 1 lab, 1 seminar)/wk **Prerequisites:** PPAT3003 or equivalent. **Assessment:** One 3hr theory exam, lab and fieldwork reports, two essay assignments

Mycology Module - includes lectures, tutorials and seminars in taxonomic mycology, fungal biology and sexual compatibility studies. Students learn to use morphological keys for identification and their limitations. Diagnostic Plant Pathology Module - this module is concerned with the diagnosis of plant disease in crops and natural ecosystems including molecular detection. It will include at least one excursion as well as laboratory classes. Molecular Plant Pathology Module - In this module students are introduced to fundamental concepts in molecular techniques in plant pathology, plant-pathogen interactions, pathogen populations and molecular phylogenetics. The practical classes cover basic molecular techniques commonly used in studying plant pathogens. Modules run in parallel and involve integrated activities

Textbooks
Kendrick, B. (2001). The Fifth Kingdom. www.mycolog.com.MycologuePublication, Ontario 3rd Edition.
Carlile, M.J. et al. (2001). The Fungi (2nd Ed) Academic Press.
Agrios G.N. 2005. Plant Pathology (5th ed.). Academic Press, London.
Brown JF & Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications. Chapters 16 & 17
Forey P.L., Humphries, C.J., Kitching, I.L., Scotland, R.W., Siebert, D.J. and Williams, D.M. 1992. Cladistics: A Practical Course in Systematics. Clarendon Press, Oxford.
Hoelzel, AR & Dover, GA. 1991. Molecular Genetic Ecology. IRL Press, Oxford.
Lewin, B. 1997. Genes VI. Oxford University Press, Oxford. (Or later editions)
McDonald, BA. 1997. The Population Genetics of Fungi: tools and techniques. Phytopathology 87:448-453
Taylor, J.W. Jacobson, D.J. Kroken, S. Kasuga, T. Geiser, D.M. Hibbett, D.S. Fisher, M.C. 2000. Phylogenetic species recognition and species concepts in fungi. Fungal Genetics & Biology: 31:21-32

PPAT4005
Soil Biology and Biodiversity

Credit points: 6 **Teacher/Coordinator:** Prof Lester Burgess **Session:** Semester 1 **Classes:** 23 lectures/tutorial, 24 hr of labs, 9 hr of fieldwork **Assessment:** One 2 hr theory exam, lab and field reports, essay assignment and oral presentation

An introduction to the diversity of organisms found in the soil, and the ecological principles governing their activities and interactions. Practical applications are illustrated with particular reference to soilborne plant diseases. Topics covered include the nature of the soil biota; isolation, identification and quantification of soil organisms; pathogenic and mutualistic interactions between fungi and roots; mycorrhizae; food webs and soil health; the nature and control of soilborne plant diseases; effects of water potential and temperature on the activity and survival of soil fungi; temporal and spatial distribution of soil fungi and soilborne diseases; and the soil biology of conservation farming. Practical classes demonstrate important concepts as well as techniques for working with soil organisms and soilborne diseases, and for controlling the soil environment, especially soil water, to manipulate biological activity

Textbooks
Burgess, L. et al. (2000). Biology of Diseases Caused by Soilborne Fungal Plant Pathogens.
Crawford Fund Master Class Lecture Series.
University of Sydney/Royal Botanic Gardens and Domain Trust.
Schjonning, P. et al. (2004). Managing Soil Quality CAB International
Summerell, B.A. et al. (2001). Fusarium: Paul E. Nelson Memorial Symposium, APS Press, St Paul, Minnesota
Erwin, D.C. and Ribeiro, O.K.(1996). Phytophthora Diseases Worldwide. APS Press, St Paul, Minnesota.

Psychology units of study

For PSYC units of study not listed below please refer to the Faculty of Science Handbook (www.usyd.edu.au/handbooks/science /03_undergradunits.shtml).

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.

Psychology 1001 is a general introduction to the main topics and methods of psychology, and is the basis for advanced work as well

as being of use to those not proceeding with the subject. Psychology 1001 covers the following areas: subject matter and methods of psychology; basic statistics and measurement; behavioural neuroscience; applied psychology; social psychology; personality theory. This unit is offered in the Sydney Summer School. Consult the web site: http://www.usyd.edu.au/summerschool/ for more information.

Textbooks
Psychology 1001 Handbook,
Texts under review - See School website

PSYC1002
Psychology 1002

Credit points: 6 **Session:** Semester 2, 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 2.5 hour exam, one 1250 word research report, multiple tutorial tests, experimental participation.

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 development; human mental abilities; learning, motivation and emotion; visual perception; cognitive processes. This unit is offered in the Sydney Summer School. Consult the web site: http://www.usyd.edu.au/summerschool/ for more information.

Textbooks
Psychology 1002 Handbook
Texts under review - See School website

RSEC1031
Resource Economics 1

Credit points: 6 **Teacher/Coordinator:** A/Prof Fredoun Ahmadi Esfahani **Session:** Semester 2 **Classes:** (2 lec & 1 tut)/wk **Prohibitions:** AGEC1031 **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), tutorial papers, assignments

This unit provides a comprehensive introduction to resource and environmental economics, and how particular concepts in economics are used to provide insights into efficient and sustainable natural resource management. Some descriptive content regarding Australia's natural resource assets and industries is included, but the primary focus is analytical. Emphasis is placed on the importance of property rights structures, cost-effective regulations and dynamic considerations in managing natural resource stocks and environmental assets. Some material on economic valuation of environmental assets and benefit-cost analysis is included

RSEC4131
Benefit-Cost Analysis

Credit points: 6 **Teacher/Coordinator:** A/Prof Fredoun Ahmadi-Esfahani **Session:** Semester 1 **Classes:** (2 lec & 1 tut)/wk **Prerequisites:** ECON2001 and (AGEC2103 or AGEC2003) **Prohibitions:** AGEC4037 **Assessment:** 20% written essay, 20% mid semester exam, 60% final exam

This unit provides a detailed treatment of benefit-cost analysis and its use in public sector decision making and project evaluation. The underpinning concepts in welfare economics are analysed in detail, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures. Procedures of undertaking a benefit-cost analysis are presented, and tools of non-market valuation for environmental assets are covered in detail. These techniques include both stated and revealed preference techniques, including contingent valuation, choice modeling, hedonic pricing and travel cost methods

RSEC4132
Environmental Economics

Credit points: 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 1 **Classes:** (2 lec & 1 tut)/wk **Prerequisites:** ECON2001 and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** ECON2002, AGEC3001, AGEC2101 and (AGEC2105 or AGEC2005 or ECMT2010 or ECMT2110) **Assessment:** One 1hr midterm exam, an essay paper, one 2 hr end of semester exam

Note: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator

The unit provides theoretical and empirical background related to economic aspects of a range of environmental issues. The unit exemplifies the studied concepts with environmental problems related to agriculture (soil salinity, algal blooms, overgrazing etc.) as well as with environmental problems typical to Australia. The guiding economic themes are externalities, market failure, the importance of property rights, optimal allocation of pollution abatement, and the processes for making choices relating to non-market goods. Various policies (standards, taxes, subsidies, tradable permits) designed to alleviate environmental problems are studied in detail. Some social issues related to environmental impacts are studied through exploration of the problems of population size and distribution, economic growth, and environmental regulation. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3113 with permission from the unit coordinator

Textbooks
Dodo Thampapillai, Environmental Economics: Concepts, Methods and Policies, Oxford University Press, 2002.
Perman, R., Y. Ma, J. McGilvray and M. Common, Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
Charles D. Kolstad, Environmental Economics, Oxford University Press, 2000.
Tom Tietenberg, Environmental and Natural Resource Economics, 6th Edition, Addison-Wesley, 2003.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC4133
Economics of Mineral & Energy Industries

Credit points: 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 2 **Classes:** (2 lec & 1 tut)/wk **Prerequisites:** ECON2001 and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** ECON2002, AGEC3001, AGEC2101, AGEC2105 **Assessment:** One 1hr midterm exam, an essay paper, one 2 hr end of semester exam

Note: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator

The unit provides theoretical and empirical background in the economics of minerals exploration, extraction and marketing and in the economics of energy generation, distribution and use. The economics of minerals and energy commodity markets will be discussed and analyzed. The interactions of mineral extraction and energy generation activities with other natural resources and the environment will be of particular interest (e.g. mine site remediation, land use conflicts). Sustainability and prospects for long term efficient use of these resources, as well as the development and use of alternative technologies will also be discussed. In addition, institutional and policy issues (e.g. regulatory reform), will be analyzed. The unit will discuss the main aspects of the markets for minerals and energy, market structure, business environment and price movements. The unit will also provide an introductory discussion on the markets for derivatives (options, futures, forward, swaps) on minerals and energy commodities. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3113 with permission from the unit coordinator

Textbooks
Brennan, T.J., Palmer, L.K. and Martinez, A.S., Alternating Currents: Electricity Markets and Public Policy, Resources for the Future Press, Washington D.C., 2002.
Tilton, J.E., On Borrowed Time? Assessing the Threat of Mineral Depletion, Resources for the Future Press, Washington D.C., 2003.
Perman, R., Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
Tom Tietenberg, Environmental and Natural Resource Economics, 6th Edition, Addison-Wesley, 2003.
Ferdinand E. Banks, Energy Economics: A Modern Introduction, Kluwer Academic Publishers, 2000.
Stephen E. Kesler, Mineral Resources, Economics and the Environment, Maxwell Macmillan International, 1994.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC4134
Economics of Water & Bio-resources

Credit points: 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 2 **Classes:** (2 lec & 1 tut)/wk **Prerequisites:** ECON2001 and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** ECON2002, AGEC3001, AGEC2101, AGEC2105 **Assessment:** One 1hr midterm exam, an essay paper, one 2 hr end of semester exam

Note: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3013 with permission from the unit coordinator

The unit consists of two complementary parts: water economics and economics of biological resources (fisheries, forestry, other wildlife). The main objective of the water economic component is to investigate the economic aspects of water use and water quality. In particular approaches toward efficient use of the water resource over time, optimal allocation of water among competing uses and achievement of the socially optimal level of water quality will be discussed. The demand for water from various sectors will be analysed in both static and dynamic settings. Issues considered include the selection and construction of water storages, aquifer water extraction and alternative water sources. The issues of waste water disposal and water quality, changing water technologies, and water pollution will be also discussed. Particular attention will be devoted to the economic mechanisms for managing the water resources including property rights, water allocation and water markets. The key policy instruments (taxes, quotas, standards) in these areas will be analyzed and discussed. The institutional and policy aspects will also be considered through analysis of water policy reform in Australia and elsewhere. The main objective of the economics of biological resources will be to introduce students to the bio-economic modelling of the resources that experience biological growth. This will be prominently exemplified through various aspects of fishery economics. The unit will also discuss the economics of wildlife preservation and protection, as well as the economics of biodiversity. Available to 3rd year students in the FEB. Available to students that have completed RSEC1031 or ENVI3113 with permission from the unit coordinator

Textbooks
Bergstrom, Boule and Poe (Eds.), The Economic Value of Water Quality, Edward Elgar Pub., 2001.
Easter, Rosegrant and Dinar (Eds.), Markets for Water: Potential and Performance, Kluwer Academic Pub., 1998.
David Smith, Water in Australia, Oxford University Press, 1999.
Perman, R., Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
John M. Hartwick and Nancy D. Olewiler, The Economics of Natural Resource Use, 2nd Ed. , Addison-Wesley, 1998.
Conrad, J.M. (1999), Resource Economics, Cambridge University Press, Cambridge.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC4141
Resource Economics Project A

Credit points: 9 **Teacher/Coordinator:** A/Prof Fredoun Ahmadi-Esfahani **Session:** Semester 1 **Classes:** (2 hr sem)/wk **Prerequisites:** AGEC3104 or AGEC3004 or AGEC4041 **Corequisites:** RSEC4142 **Prohibitions:** AGEC4012, AGEC4112 **Assessment:** Research thesis; presentations

Note: Department permission required for enrolment .

In this unit of study, students develop skills in economic research by designing, undertaking and reporting on a single research study (thesis). Students undertake research on an approved topic under the supervision of a member of staff and prepare a report of approximately 25,000 words in length

Textbooks
Not applicable as this is a research unit

RSEC4142
Resource Economics Project B

Credit points: 9 **Teacher/Coordinator:** A/Prof Fredoun Ahmadi-Esfahani **Session:** Semester 2 **Classes:** (2 hr sem)/wk **Prerequisites:** AGEC3104 or AGEC3004 or AGEC4041 **Corequisites:** RSEC4141 **Prohibitions:** AGEC4013, AGEC4113 **Assessment:** Research thesis; presentations

In this unit of study, students develop skills in economic research by designing, undertaking and reporting on a single research study (thesis). Students undertake research on an approved topic under the supervision of a member of staff and prepare a report of approximately 25,000 words in length

Textbooks
Not applicable as this is a research unit

SOIL2003
Soil Properties and Processes

Credit points: 6 **Teacher/Coordinator:** Dr Cattle, Prof McBratney, Dr Singh **Session:** Semester 1 **Classes:** (3 lec & 3hr prac)/wk **Assessment:** One 2hr theory exam, one 2hr prac exam, quizzes and prac book

This unit of study is concerned with the fundamental properties of soil, the factors of soil formation, and the processes that operate in the soil system. The components of the unit of study are: pedology; soil physics and soil chemistry. These components are synthesised by reference to common soil profiles. The study of soil in the field starts with field description and assessment of essential characteristics. The physics of water and gas movement, temperature, density, swelling and strength are considered. Soil chemistry includes properties of organic matter, cation exchange capacity, nitrogen, phosphorus, potassium and acidity. Common soil types of N.S.W. are studied in relation to their formation, properties and classification.

Textbooks
Reference books
N.C. Brady The Nature and Properties of Soils 10th edn (Macmillan, 1990)
K.O. Campbell and J.W. Bowyer (eds) The Scientific Basis of Modern Agriculture (Sydney U.P., 1988)
D.L. Rowell, Soil Science: Methods and Applications (Longman, 1994)
R.E. White Introduction to the Principles and Practice of Soil Science 3rd edn (Blackwells Scientific, 1997)
A. Wild (ed.) Russell's Soil Conditions and Plant Growth 11th edn (Wiley, 1988)

SOIL3004
The Soil Resource

Credit points: 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Prof Alex McBratney, Dr Stephen Cattle **Session:** Semester 2 **Classes:** (2 lec, 2 hr prac)/wk **Prerequisites:** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001 **Assessment:** Field exercise participation (5%), soil mapping report (25%), laboratory report (20%), 2 hr examination (50%). N.B. Participation in the field exercise held in the Hunter Valley on the Monday to Friday of the week prior to the commencement of Semester 2 is a compulsory part of this unit

This unit is based around a 5-day field exercise held in the Hunter valley in the week prior to the commencement of Semester 2. This exercise will give students field skills in soil sampling, description and recognition and soil-landscape mapping. The unit of study is designed to provide a detailed knowledge of the important features and problems of Australian soils. By the end of this unit of study, students will develop skills in describing and interpreting soil profile features in the field. They will become familiar with cutting-edge quantitative soil data handling procedures and be able do quantitative soil mapping; and measure common soil properties in the laboratory. They will also learn to work in a team environment and write a report on soil mapping and laboratory analysis

Textbooks
A laboratory manual will made be available to the students.
Brady NC & Weil RR, The Nature and Properties of Soils. 13th ed. (or any later edition) Prentice Hall, New Jersey, 2002
Grunwald, S (ed.) Environmental Soil-Landscape Modeling. CRC Press, Boca Raton, 2006
Isbell RF McDonald WS & Ashton LJ, Concepts and Rationale of the Australian Soil Classification. Australian Collaborative Land Evaluation Program, CSIRO Publishing, Canberra, 1997
McKenzie N, Jacquier D, Isbell, R & Brown K, Australian Soils and Landscapes: An Illustrated Compendium. CSIRO publishing, Melbourne, 2004
White RE, Principles and Practice of Soil Science: the Soil as a Natural Resource. 4th ed., Blackwell Science, Oxford, 2006
A more comprehensive reading list will be provided in the laboratory manual

SOIL3008
Rural Spatial Information Systems

Credit points: 6 **Teacher/Coordinator:** Dr Odeh **Session:** Semester 2 **Classes:** 2 lec & 2hr prac/wk (wks 1-13), four-day field trip in AVCC common break **Assessment:** One 2 hr exam, field excursion and lab prac reports, presentation and essay topic

The lecture material will present several themes: i) Principles of Geographical Information Science (GISc): brief history of GISc, ontology and epistemology of spatial phenomena, basic Geographical Information Systems (GIS) structure, coordinate systems and map projections and datums; ii) Fundamentals of remote sensing and geo-image analysis; iii) Geospatial data sources and acquisition methods, including existing maps and their digitisation, remote sensing images, digital elevation models (DEM) and global positioning systems (GPSs); iv) Processing of geospatial data: spatial data in the computer, building and accessing an entity in the database and continuous fields, data analysis using entities and continuous fields for decision support, etc.; v) Spatial statistics: quality of spatial data, spatial analysis of geospatial data, geostatistics, introduction to spatial-temporal modelling. Software packages for geographical information systems will be reviewed. Practical exercises will focus on applications to land-cover assessment, subcatchment and regional hydrology, and soil quality assessment for decisions regarding sustainable rural land use planning and management. Two of the 4 days of the mid-Semester field excursion will be spent in Canberra visiting various government agencies which research and maintain GIS coverages of major rural environments. The remaining fieldwork will be at University farms at Camden or Arthursleigh, and will involve training in the field use of low and high- resolution GPS for geo-rectification, for ground truthing satellite-derived land cover maps and for the creation of digital elevation models and landform attributes.

Textbooks

Burrough PA, McDonnell RA. Principles of Geographic Information Systems. Oxford University Press, 2000
Clarke KC. Getting started with geographic information systems. Prentice Hall, 2003.
Lillesand T, Kiefer RW. Remote Sensing and Image Interpretation. John Wiley & Sons Inc. 1999.

SOIL4005
Field and Laboratory Soil Physics

Credit points: 6 **Teacher/Coordinator:** Prof Alex McBratney **Session:** Semester 1 **Classes:** (3 lec & 5hr prac)/6 wks (wks1-6), 5 days in the field (prior to beginning of February semester) **Prerequisites:** SOIL3004 **Assessment:** One 2hr exam, field report in form of webpage, lab report, presentation

The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area. The emphasis is to examine the quantitative aspects of soil physics particularly in relation to the transfer of energy, gas, water, solids and solutes in soil. Lecture and lab topics include heat flow, gas movement, soil water energetics, saturated and unsaturated flow of soil water, infiltration, solute movement, water and wind erosion as well as the electrical properties of soil and fundamentals of numerical computer modelling of soil physical processes. Five days' field-work, in the week prior to the beginning of February Semester, involves field measurement of soil physical properties such as shear and compressive strength, electrical conductivity, temperature, evaporation, hydraulic conductivity and infiltration rates and moisture content

Textbooks

Reference books
Hillel D. Environmental Soil Physics : Fundamentals, Applications, and Environmental Considerations. Academic Press, 1998
Jury WA & Horton R. Soil Physics. John Wiley, 2004
Warrick AW. Soil Water Dynamics. Oxford, 2003

SOIL4006
Field and Laboratory Pedology

Credit points: 6 **Teacher/Coordinator:** Dr Stephen Cattle **Session:** Semester 1 **Classes:** (2x1 hour lectures, 1x2hour prac)/week. 5 days in the field (prior to beginning of February semester). **Prerequisites:** SOIL 3004 **Assessment:** One 2hr exam, field report, lab report, presentation.

The main part of this unit of study is the pedological characterization of a number of contrasting soil profiles sampled during the pre-semester field trip. This 5 day field-trip begins 10 days before the beginning of the February semester and involves the study and sampling of soil through central and northern NSW. Students become acquainted with soil types in a variety of landscape, geologic, climatic and landuse settings and develop an understanding of the importance of different soil parent materials. Linkages are made between soil formation processes and resultant soil properties, and the role of soil in various environmental and agricultural ecosystems. Field skills acquired during this trip include a proficiency in soil profile description and an ability to classify soil type according to the Australian Soil Classification scheme. Laboratory analyses of soil samples collected during the field trip include particle-size analysis and extraction of fine-sand fraction for optical identification and quantification of the mineral species present. X-Ray diffraction is used to identify the clay minerals and elucidate mineralogical transformations in these samples. Scanning electron microscopy is also used to examine surface features and mineral composition. Thin sections of some typical NSW soil types are examined and the main features are identified and quantified. The data from these micromorphological investigations are used to provide an understanding of the pedogenesis of soil profiles in specific locations. The lecture series for this unit of study focuses on the main soil-forming (pedogenetic) processes operating both in Australia and abroad. Rock and soil mineral transformations and mechanisms for soil horizon development are addressed. Case studies and recent pedological research publications are used to highlight these topics. A detailed study, including exercises, is also made of two main international soil classification schemes, Soil Taxonomy and the World Reference Base for Soil Resources (WRB), and the Australian Soil Classification system.

Textbooks

Reference books
Buol S, Walker M, Southard R. Soil Genesis and Classification. Iowa State University. 2003
Isbell R. The Australian Soil Classification. CSIRO, 1996
Jenny H. Factors of Soil Formation: A System of Quantitative Pedology. Dover. 1994
McKenzie N, Jacquier D, Isbell R & Brown K. Australian Soils and Landscapes. CSIRO, 2004
Van Breeman, N & Buurman, P. Soil Formation. 2nd Edition. Kluwer Academic, 2002
Young A & Young R. Soils in the Australian Landscape. Oxford University Press, 2001.

SOIL4007
Environmental Soil Chemistry

Credit points: 6 **Teacher/Coordinator:** A/Prof Balwant Singh **Session:** Semester 2 **Classes:** (2 lec,1 tut & 3 hr prac)/wk **Prerequisites:** SOIL3004 **Assessment:** One 3hr exam, 4 lab reports and one oral presentation on a given topic

The main objective of the unit is to develop an understanding of the common chemical properties and processes in soil environment. By the end of this unit of study, students will become familiar with soil chemical composition and develop skills in describing chemical processes in soil environment. They will be able to measure various chemical properties of soil and soil solution in the laboratory; and perform chemical speciation of ions in soil solution. Students will also learn to work in a team environment and develop communication and writing skills. Syllabus summary: The lecture topics include the structure and chemistry of inorganic components in soil, surface charge of soil minerals, chemistry and general properties of soil organic matter, important functional groups of soil organic matter, role of organic matter in soil, cation exchange in soil, selectivity of cations on soil colloids, cation exchange reactions and selectivity coefficients, adsorption reactions of environmentally important ions, surface functional groups, adsorption isotherms, equilibrium based adsorption models, point of zero charge, diffuse double layer-theory and models, surface complexation models, soil solution-importance, methods of obtaining soil solutions, models to determine activity coefficients, speciation, dissolution and solubility processes in soil environment, soil chemical equilibria, geochemical speciation models and redox chemistry of soil

Textbooks

Evangelou VP, Environmental Soil and Water Chemistry: John Wiley & Sons, New York, 1998
Lindsay WL, Chemical Equilibria in Soils. John Wiley & Sons, New York, 1979
McBride MB, Environmental Chemistry of Soils. Oxford University Press, New York, 1994.
Sparks DL, Environmental Soil Chemistry. Second Edition, Academic Press, San Diego, 2003
Sposito G, The Chemistry of Soils. Oxford University Press, New York, 1989

VIRO3001
Virology

Credit points: 6 **Teacher/Coordinator:** Mrs Helen Agus **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 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 BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. **Prohibitions:** VIRO3901 **Assumed knowledge:** MICR (2021 or 2921 or 2022 or 2922) **Assessment:** One 2 hour exam, practical work, group presentations

Note: Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.

This unit of study is designed to introduce students who have a basic understanding of molecular biology to the field of virology. Through an examination of virus structure, genomes, replication and gene expression, viral infection in plant and animal cells is covered, progressing to examine host-virus interactions, pathogenesis, cell injury and prevention and control of infection in both eukaryotic and prokaryotic cells. Bacteriophage structure and infection of prokaryotic cells is also covered. The structure and replication of sub-viral agents: viroids and prions, and their role in disease and significance in the context of transmission via blood products are discussed. Detection of viral illness by serology and molecular techniques such as ELISA, Western blotting, PCR and sequencing will also be covered. The hands-on practical component is designed to enhance students' practical skills and to complement the lecture series by introducing students to cell culture, cytopathic effect, serology and molecular detection techniques. Tutorials and case studies will cover specific themes and problems.

Textbooks
To be advised

Industrial Relations and Human Resource Management units of study

For Industrial Relations and Human Resource Management (WORK) units of study not listed below please refer to the Faculty of Economics and Business Handbook (www.econ.usyd.edu.au/content.php ?pageid=74).

WORK1003
Foundations of Work and Employment

Credit points: 6 **Session:** Semester 1, Semester 2 **Classes:** Two lectures and one seminar per week **Assessment:** Participation, short essay, major essay, exam

Note: This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.

This unit draws on concepts from industrial relations and human resource management to examine the interests and strategies of workers, unions, managers, employers and the state. It explores the relationships between these parties as they seek to manage their environments and workplaces and to exercise control over each other. The unit enables students to understand how and why the organisation, regulation and management of work are changing in Australia and globally. As well as providing an introduction to all aspects of the study of the employment relationship, this is the foundation unit for a major in industrial relations and human resource management.

6. Undergraduate degree resolutions and policies

Resolutions of the Faculty

These resolutions relate to bachelor degrees in the Faculty of Agriculture, Food and Natural Resources. They must be read in conjunction with the University of Sydney (Coursework) Rule 2000 (as amended), which sets out the requirements for all coursework courses, and with the relevant Resolutions of the Senate.

[Section 1]

1. To qualify for a degree, candidates must complete units of study making a total of 192 credit points and Professional Experience specified for individual degree courses. In a full-time program the normal load will be 48 credit points in each year for four years. The degree program must be completed within 10 calendar years of the first enrolment or readmission without credit. If a candidate is admitted or readmitted with credit, the Faculty will determine a reduced time limit for completion of the degree.
2. Candidates for the degrees of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor of Science in Agriculture shall complete the units of study listed for each degree in the Faculty Handbook.

3. **Restrictions on units**

3.1 A candidate may choose elective units of study for which there is no prerequisite unit of study or for which the prerequisite/corequisite has been satisfied, provided that the timetable permits attendance at all scheduled classes.

3.2 Variations permitted to the requirements specified in Resolutions 1 and 2 include:

3.3 *Talented students*

3.3.1 Some variation in units of study required for completion of the degree may be approved by the Dean for exceptionally talented students.

3.4 *Summer School*

3.4.1 Units of study completed at the University of Sydney Summer School which correspond to units of study listed for the undergraduate degrees in the Faculty Handbook may be credited towards the course requirements.

3.5 *Cross-institutional enrolment*

3.5.1 Provided that permission has been obtained in advance, the Dean may permit a student to complete a unit of study at another institution and have that unit credited to his/her course requirements provided that either:

3.5.1.1 the unit of study content is material not taught in any corresponding unit of study in the University, or

3.5.1.2 the student is unable for good reason to attend a corresponding unit of study at the University.

3.6 *Additional units*

3.6.1 A student may enrol in units of study additional to the requirements in an academic year, only with the permission of the Dean.

3.7 *Timetable clashes*

3.7.1 A student must obtain written permission of the Discipline Leader(s) concerned, and the permission of the Dean, all of whom may impose conditions of attendance, to enrol in units of study which have timetable clashes.

3.8 *Restriction on enrolment*

3.8.1 A student must obtain the written permission of the Dean to enrol in level 3000 units of study unless he/she has successfully completed all required level 1000 units of study and has successfully completed or is concurrently enrolled in compulsory level 2000 units of study.

3.9 *Credit Transfer*

3.9.1 Graduates or students in other faculties or other degrees within the Faculty or of other institutions who are admitted to candidature for the degree of bachelor in the Faculty may be granted credit for units of study required for the various degrees of the Faculty as specified in Resolution 2, as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 credit points.

3.9.2 The Dean may approve credit for a maximum of 36 unspecified credit points for units of study successfully completed elsewhere, but not comparable to units listed in Resolution 2, as part of the 96 credit point maximum credit transfer permitted.

[Section 2]

4. **Assessment policy**

4.1 Assessment methods for units of study offered in the Faculty will be included in unit details in the Faculty Handbook and made available to students enrolled in the units at the beginning of the semester.

4.2 *Examinations*

4.2.1 Completion of unit of study

4.2.1.1 A student who has been absent from more than 10 per cent of classes in a unit may be deemed to have failed to complete the requirements specified by the Faculty for the unit and may be excluded by the Dean from admission to examinations in that unit.

4.2.2 Further Testing

4.2.2.1 A Discipline Leader may arrange for further testing of students in addition to scheduled assessments and examinations, in accordance with Academic Board policy.

4.2.2.2 Further tests may be awarded where the candidate has been prevented by sufficient and duly certified illness or misadventure from completing the assessment for a unit of study. The full range of common result grades is available for these candidates.

4.2.2.3 Further tests may be awarded in a unit of study where the examiner requires further evidence to reach a final assessment of a candidate who has failed a unit of study and whose performance is borderline (e.g. a final mark in the range 45-49 per cent). The highest grade of award available is Pass.

4.2.2.4 Where possible and practicable, all further tests will be administered and results finalised no later than two weeks after the end of the examination period.

4.2.2.5 The Discipline Leader is responsible for the awarding, timetabling and conduct of further tests, which may take such form as the Discipline Leader directs. Students in a unit of study must be given notice of the proposed date for conducting further tests no later than the date of publication of the final University Examinations Timetable.

4.2.2.6 Individual students granted a further test should wherever possible be given at least three days prior notice. A candidate who is absent from a further test without sufficient reason will be deemed to have failed the test.

4.2.2.7 In respect to the notification of students referred to above, students will be deemed to have been notified by the Discipline Leader as a result of the posting of information by the due date on one or more noticeboards as advised by the Discipline Leader concerned and posting an email to the student/s official University email address.

4.2.2.8 It is the responsibility of the student to provide written evidence of illness or misadventure to the appropriate Discipline Leader as soon as possible and practicable and in any case before the close of the relevant examination period. Where such evidence is not presented in time for the student to be offered a further test on the advertised date, the evidence will only be considered by the Discipline Leader where there is sufficient reason why it has not been presented by that date.

5. **Honours and University Medal**

5.1 First Class or Second Class Honours, Division One or Division Two may be awarded at graduation.

5.2 First Class Honours candidates whose work is of sufficient merit, in the opinion of the Faculty Committee to Award Prizes, Honours and the University Medal, shall receive a bronze medal.

5.3 Award of honours at graduation

5.3.1 Honours are awarded in Agriculture and not in an individual subject.

5.3.2 Details of the fourth year work and determination of marks for fourth year are the responsibility of the Discipline Leader and sections concerned.

5.3.3.1 All candidates who have completed an independent research project as part of the final year degree program are formally eligible to be considered for honours.

5.3.3.2 Except with the special permission of the Faculty, honours shall not be awarded to any candidate for the degree of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics or Bachelor of Science in Agriculture unless the candidate has completed the course in the minimum time.

5.3.3.3 Notwithstanding the previous condition, candidates who complete the first three years of the course in four years, and who by virtue of their weighted average marks would otherwise qualify for the award of honours, will be so considered.

5.3.3.4 Such candidates may however be disadvantaged in terms of honours grading and ranking.

For the Bachelor of Agricultural Economics and Bachelor of Resource Economics:

5.3.4.1 For the assessment of an aggregate mark for the award of honours at the end of the fourth year:

5.3.4.1.1 Each of the units of study at level 2 and level 3 provided for in the resolutions shall be weighted according to credit point value and a weighted average mark (WAM) obtained.

5.3.4.1.2 Each of the units of study at level 4 provided for in the resolutions shall be weighted according to credit point value and a weighted average mark (WAM) obtained.

5.3.4.1.3 The overall aggregate honours mark shall be the average of the level 2/3 WAM and the level 4 WAM.

For the Bachelor of Horticultural Science, Bachelor of Land and Water Science and Bachelor of Science in Agriculture:

5.3.4.2 For the determination of the overall honours mark for the award of honours at the end of the fourth year:

5.3.4.2.1 Each of the units of study provided for in the resolutions in second and third years shall be weighted according to credit point value and a weighted average mark (WAM) obtained.

5.3.4.2.2 The overall honours mark shall be the average of the second and third year WAM and the fourth year mark.

5.3.5 In computing the aggregate marks of students, the mark achieved on the occasion of the first attempt at a unit of study shall be the mark used.

For the Bachelor of Agricultural Economics and Bachelor of Resource Economics:

5.3.6.1 For the award of a particular level of honours a candidate, except in special circumstances, must obtain the relevant minimum aggregate honours mark and the minimum WAM in second and third year units of study set out in the following table:

Level of honours	Minimum overall honours mark	Minimum WAM Years 2/3
First Class	75	70
Second Class, Division 1	70	65
Second Class, Division 2	65	62

For the Bachelor of Horticultural Science, Bachelor of Land and Water Science and Bachelor of Science in Agriculture:

5.3.6.2 For the award of a particular level of honours, a candidate, except in special circumstances, must obtain the relevant minimum marks as set out in the following table:

Level of honours	Minimum overall honours mark	Minimum WAM Years 2/3
First Class	75	70
Second Class, Division 1	70	65
Second Class, Division 2	65	62

5.3.6.3 In the event of a recommendation for the award of honours that departs from these standards, it shall be incumbent upon the Discipline Leader and section concerned to make out a substantial case for such a departure.

5.3.6.4 Admissible grounds for departure would include medical disability or misadventure early in the course, and the existence of consistently lower standards of grading in units of study undertaken outside the Faculty of Agriculture, Food and Natural Resources.

5.3.7 The Committee to Award Prizes, Honours and the University Medal shall be responsible for the award of the university medal and the award of honours. Achievement of the minimum standards referred to elsewhere in these resolutions is not in itself sufficient justification for these awards.

5.3.8.1 For the Bachelor of Agricultural Economics and Bachelor of Resource Economics, a university medal may be awarded, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to a student who has a Level 4 WAM of at least 85, an aggregate honours mark of at least 80 and a Second/Third Year WAM of at least 75.

5.3.8.2 For the Bachelor of Horticultural Science, Bachelor of Land and Water Science and Bachelor of Science in Agriculture, a university medal may be awarded, on the recommendation of the Sciences Discipline Leader, to a student who has a Level 4 WAM of at least 85, an overall honours mark of at least 80 and a Second/Third Year WAM of at least 75.

6. **Suspension, withdrawal and discontinuation, re-enrolment and satisfactory progress**

6.1 *Suspension of candidature*

6.1.1 A student, who has enrolled for the degree and who wishes to suspend candidature for more than two semesters, must seek approval of the Dean, who, where appropriate, may consult Discipline Leaders concerned and having considered advice, may determine any conditions for re-enrolment.

6.1.2 A student, who has not obtained written permission to suspend candidature for more than two semesters, will be required to apply for re-admission in accordance with procedures determined by the Dean.

6.2 *Withdrawal and Discontinuation of enrolment*

6.2.1 Withdrawal from Semester 1 units of study

6.2.1.1 A candidate for a degree of bachelor who discontinues enrolment in a March Semester unit of study on or before 31 March in that year shall be recorded as having withdrawn from that unit.

6.2.2 Withdrawal from Semester 2 units of study

6.2.2.1 A candidate for a degree of bachelor who discontinues enrolment in a July Semester unit of study on or before 31 August in that year shall be recorded as having withdrawn from that unit.

6.2.3 Discontinuation

6.2.3.1 A student who wishes to discontinue enrolment in a course or a unit of study must apply to the Dean or the Dean's nominee.

6.2.3.2 *Discontinued - Not to count as failure*: A candidate for the degree of bachelor who discontinues enrolment in a unit of study after the relevant withdrawal period and up to the last day of the seventh week of teaching in a one semester unit of study, shall be recorded as Discontinued - Not to count as failure (DNF).

6.2.3.3 *Discontinued - Fail*: A candidate for the degree of bachelor who discontinues enrolment in a unit of study after the last day of the seventh week of teaching in a one semester unit of study, shall be recorded as Discontinued - Fail (DF).

6.2.3.4 The Dean, Pro-Dean or an Associate Dean of the Faculty may determine that a discontinuation of enrolment should be recorded as "Discontinued - Not to count as failure" on the grounds of serious ill health or misadventure.

6.3 *Re-enrolment after an absence*

6.3.1 A student who wishes to re-enrol after an absence must contact the Dean in writing no less than six weeks prior to the commencement of the semester to allow administrative processes to be carried out.

6.4 *Satisfactory progress - exclusion and re-admission*

6.4.1 There are certain circumstances in which a student may be asked to show good cause why he/she should be permitted to repeat any previously attempted study, if, in the opinion of the Faculty Exclusions and Re-admission Committee, he/she has not made satisfactory progress towards fulfilling the requirements of the degree or the unit.

6.4.2 Satisfactory progress cannot be defined in all cases in advance but a student who has failed more than 50% of the credit points for which enrolled in the most recent two semesters of enrolment shall be deemed not to have made satisfactory progress.

6.4.3 In cases where the Faculty permits the re-enrolment of a student whose progress has been deemed unsatisfactory, the Faculty may require the completion of specified units of study in a specified time, and if the student does not comply with these conditions the student may again be called upon to show good cause why he/she should be allowed to re-enrol in the Faculty of Agriculture, Food and Natural Resources.

6.4.4.1 It is not possible to define in advance all the reasons that constitute 'good cause' but serious ill health, or misadventure properly attested, will be considered.

6.4.4.2 In addition your general record, for example in other courses, would be taken into account. In particular if you were transferring from another faculty your record in your previous faculty would be considered.

6.4.4.3 Not usually acceptable as good cause are such matters as demands of employers, pressure of employment, time devoted to non-university activities and so on, except as they may be relevant to any serious ill health or misadventure.

7. **Professional experience**

7.1 Students are required to undertake professional experience in university vacations as an integral and essential part of their overall training in the degrees of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor of Science in Agriculture.

7.2 *The aims of professional experience are to:*

7.2.1 Familiarise students with agricultural, horticultural or natural resource industries;

7.2.2 Provide the opportunity to experience agricultural and horticultural production and natural resource management across a range of environments and managerial systems;

7.2.3 Provide experience with business organisations involved in finance, marketing, research and development and other aspects of the rural industries;

7.2.4 Train students to collect, collate, analyse and report.

7.3 **For all degrees**

7.3.1 Please note: Students enrolled in the Bachelor of Land and Water Science who commenced their enrolment in 2004 need to attend one Faculty excursion only to satisfy their professional experience requirements.

7.4 For all other students:

7.4.1 Candidates must complete a minimum of 60 days of professional experience.

7.4.1.1 Each component of the experience must be approved on behalf of the Dean before credit is granted. A minimum of 30 days must be completed as on-farm/field experience with the minimum on any enterprise being 10 days.

7.4.1.2 A maximum of 20 days may be credited on property which is owned by the candidate's parents or the University.

7.4.1.3 The farms concerned must be commercial farms not hobby farms. Commercial farms are defined as those having a gross income of at least $25,000.

7.4.1.4 Field experience relates to work undertaken in practical settings for example Landcare, survey work etc.

7.4.1.5 In addition, candidates must complete a minimum of 30 days 'graduate placement' (minimum 10 days at any one enterprise). Graduate placement is non-farm experience, typically with organisations with whom graduates find employment e.g. NSW Department of Primary Industries, finance organisations, experiencing the kind of work they will find as a graduate.

7.4.2 A separate professional experience report must be submitted following each visit to a farm or organisation.

7.4.2.1 Credit is subject to a satisfactory and timely report.

7.4.2.2 Late reports normally are not credited. Time penalties are applied to resubmitted and incomplete reports.

7.4.3 In addition to the 60 days minimum professional experience, students must attend one of the North Western, Central or South Western New South Wales excursions arranged by the Faculty.

7.4.4 Final year students wishing to graduate must complete all practical work requirements by 31 January of the year of graduation. Reports from graduands submitted after 31 January will not be marked until the July semester.

8. **Faculty excursions**

8.1 All students must attend at least one Faculty NSW excursion. The excursions are normally held each year as follows:

8.1.1 Central West - at Easter, from Easter Monday

8.1.2 South West Excursion - in the second semester mid-semester break (the end of September, just before the October long weekend).

8.1.3 North West Excursion - during Orientation Week.

8.2 The Faculty arranges all local transport, food and accommodation. Students are required to meet reasonable living costs.

7. Undergraduate scholarships and prizes

For information about financial assistance go to http://www.usyd.edu.au/stuserv/finances/financial_assistance_office/

Prize or scholarship	$Value	Qualification
ABARE Scholarship	9750	See details at 'Undergraduate Merit Scholarships'
James S Ashton Memorial Scholarship	3000	See details at 'Undergraduate Merit Scholarships'
Commonwealth Bank Scholarship	6000	See details at 'Undergraduate Merit Scholarships'
Native Cockroach Research Scholarship	3000	See details at 'Undergraduate Merit Scholarships'
Oasis Horticulture P/L Scholarship in Horticulture	6000	See details at 'Undergraduate Merit Scholarships'
Faculty Scholarships for HSC entrants	7000 pa	See details at 'Faculty Scholarships'
Value Added Wheat CRC Plant Breeding Scholarship	5000	See details at 'Undergraduate Merit Scholarships'
Belmore Scholarships	500	Proficiency in First Year
	500	Proficiency in First Year Chemistry
	500	Proficiency in Second Year
	500	Proficiency in Soil Properties and Processes and either Plant Biochemistry and Molecular Biology or Rural Environmental Chemistry
Brian G Davey Memorial Scholarships in Soil Science	400	Proficiency in Soil Properties and Processes and the Soil Resource
Golden Jubilee Scholarship in Agri Science	500	Proficiency in Third Year
Martin McIlrath Scholarships[1]	490	Proficiency in HSC and First, Second and Third Years (men only). Preference to sons of ex-servicemen
John Mercer Bursary	1000	See details listed before the prize details
ABARE Prizes	300	Highest honours aggregate at graduation in BAgrEc and highest honours aggregate at graduation in BResEc
John Arthur Cran	100	Proficiency in HSC
Bruce Davidson Prize in Resource Economics	300	Proficiency in an essay or thesis in natural resource economics
Bruce R Davidson Memorial Prize in Resource Economics	200	Proficiency in First Year Examinations
Clifford Dawson Holliday	200	Proficiency in Third Year Examinations
John Neil Downing Memorial	550	Proficiency in professional experience
John and Beatrice Froggatt	1000	Proficiency in Second Year Entomology and the Fourth Year Agricultural Entomology specialisation
WW Froggatt Memorial	200	Proficiency in Agricultural Entomology project in Fourth Year
Goodman Fielder Prize in Plant Nutrition	250	Proficiency in Crop and Pasture Agronomy and Sustainable Farming Systems
DL Jackson	400	Proficiency in Agricultural Science I or Horticultural Science 1 or Land and Water Science 1
FC McCleery Memorial Award	200	Fellowship and Leadership in the Faculty (Third Year students)
Theresa G Makinson	100	Proficiency in the specialisation of Horticultural Science in Fourth Year
Warren F Musgrave Prize in Resource Economics	200	Proficiency in Second Year Examinations
Sibella Macarthur Onslow	200	Proficiency in the specialisation of Agronomy in Fourth Year
FL Partridge[1]	400	For students in Third and Fourth Years in need of financial assistance
Alan Randall Prize in Resource Economics	200	Proficiency in Third Year Examinations
Joyce Winifred Rouse	40	Proficiency in the specialisations of Food Science or Environmental Chemistry in Fourth Year
SUAGA Prize	n.a.	President, AGSOC
GW Walker Memorial Essay	100	Most proficient essay or report in the unit Agricultural Marketing Analysis
Professor WL Waterhouse	80	Proficiency in Agricultural Genetics 2 and Plant Disease
Sir Robert Watt Memorial Prize	80	Proficiency in Agronomy 3
Weed Society of NSW Prize	100	Proficiency in Weed Science
NH White Memorial Prize	100	Proficiency in the specialisation of Plant Pathology in Fourth Year
AR Woodhill Prize in Entomology	300	Proficiency in Entomology in Second Year
Arthur Yates and Co Pty Ltd (2 prizes)	100	Proficiency in the specialisation of Agricultural Genetics in Fourth Year
	100	Proficiency in the specialisation of Horticultural Science in Fourth Year
[1] Applicant required to submit an application to the Scholarships Office.		

Faculty scholarships for first year students

Scholarships valued at $7,000 per year are available for students entering the Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor Science in Agriculture. The scholarships are valid for the duration of a degree (usually four years).

To be eligible, you need a minimum UAI of 94 and will be asked to attend an interview.

A small number of entry scholarships valued at $3000 for one year only will be awarded to applicants who just miss out on full Faculty Scholarships.

If you apply for the University of Sydney Scholarships and nominate the Faculty of Agriculture, Food and Natural Resources, your application will be considered for a Faculty scholarship. Applications close on the 30 September and forms are available from your careers adviser or the University of Sydney website (www.usyd.edu.au/scholarships)

University of Sydney scholarships

The University offers scholarships worth $5000 each to students completing their HSC (or equivalent) in 2006. These scholarships have a minimum UAI requirement of 95 and are between one and five years in length. These scholarships are available across all undergraduate degrees within the University.

Access scholarships

Access scholarships are for students who have suffered some form of educational disadvantage – usually disability, living in a rural/remote area or low socio-economic background. They are awarded on the basis of equity and merit and valued at $4000 per year for up to five years. Applications close in September each year.

University bursaries

Bursaries are awarded on the combined grounds of financial need and academic merit and application may be made in March to the Financial Assistance Office (open Monday to Friday from 9.30am to 4.30pm; phone +61 2 9351 2416, email fao@stuserv.usyd.edu.au).

In addition interest-free loans are available to students who are able to demonstrate financial need.

Other scholarships

These include the Council of Education Scholarship, the Freemasons' Scholarship and the Spero Gravas Scholarship. Information on these scholarships is available from the Scholarships website (www.usyd.edu.au/scholarships) and applications close end of April.

Undergraduate merit scholarships

Scholarships for continuing undergraduate students

Scholarships of $5000 for one year only are awarded to continuing students (2nd year or higher) on the basis or merit. No application is required.

James S Ashton Memorial Scholarship

Established in 1995 by donations through the initiative of Professor Fred and Claire Hilmer with the assistance of Susan and James W Ashton in memory of their son James S Ashton (BScAgr 1993), to encourage and assist outstanding undergraduate students in Agriculture. The scholarship may be awarded annually, on the recommendation of the Dean on the advice of a Faculty Selection Committee, to a student who enrols full-time in the fourth year of the BAnimVetBio or BScAgr degree, provided the student's work is of sufficient merit. The student will show potential for making a significant contribution to the application of science and technology to the animal industries. While the student's overall academic record must be of sufficient merit it is not intended that the scholarship be limited to the applicant with the strongest academic record. Additional criteria will include performance in project work and work experience in animal science and related areas and participation in community and University activities which would demonstrate evidence of integrity of character, diligence and regard for fellow students. At the time of award, the recipient may not be in receipt of any other substantial scholarship award. Value $3000. Application forms are available at the Faculty of Agriculture, Food and Natural Resources Office.

The Australian Bureau of Agricultural and Resource Economics (ABARE) Scholarship

ABARE offers a two-year undergraduate scholarship. Scholarships were first awarded in 2001 to Third Year BAgrEc students. The total value of each scholarship is $9750.

Terms and conditions

1. The Faculty awards the ABARE Scholarship to one third year full-time Bachelor of Agricultural Economics or Bachelor of Resource Economics student.
2. The Scholarship is available only to Australian citizens.
3. The scholarship will be awarded on the basis of the recipients' career aspirations, interpersonal and communication skills, initiative, level of self motivation and academic performance in first and second year. The Faculty of Agriculture, Food and Natural Resources will prepare a short-list of University of Sydney applicants, based normally on a minimum WAM of 65 (credit level), for joint interview by ABARE staff and one or more nominated members of the Faculty of Agriculture, Food and Natural Resources. (An applicant who did not have a minimum WAM of 65, but who provided evidence that they met all other criteria, would be eligible for short-listing).
4. The scholarships comprise three payments, the first payable on award of the scholarship, which is usually in the July Semester of third year. The second and third payments are made early in the February and July Semesters of fourth year, subject to continued satisfactory academic progress.
5. The value of the scholarship shall reflect the value of the Faculty of Agriculture, Food and Natural Resources undergraduate scholarship scheme.
6. The scholarship holder will forward semester results to the ABARE Officer appointed as soon as they become available.
7. The scholarship holder will consult with the Faculty prior to selection of any substantial elective component of the coursework.
8. There shall be no bonding or other commitment to employment between ABARE and a scholar, but scholarship holders may be encouraged to undertake paid vacation employment with ABARE between the third and fourth academic years. Such work may be credited towards the student's Professional Experience requirements subject to the usual guidelines.
9. A scholarship is intended for continuous progress between third and fourth year, but ABARE may consider a request for an interruption in a scholar's progress towards the degree for some exceptional purpose, and if such request is approved, the scholarship shall be suspended during such interruption.
10. The Faculty of Agriculture, Food and Natural Resources reserves the right to revoke a scholarship at any time, following consultation with ABARE, if a scholarship holder does not maintain a credit average or if there is a substantive change in enrolment which affects the basis of eligibility.
11. A scholarship holder may be required to relinquish the scholarship, if they accept any other scholarship of comparable or greater value without prior permission from the Faculty and ABARE.

Application forms are available at the Faculty Office.

Commonwealth Bank Scholarship

This scholarship was established by the Commonwealth Bank to allow industry to contribute to the tertiary education of students destined for a career in business and finance and with relevance to the agricultural sector. Scholarship holders will have the opportunity to work for a major Australian Bank with a rich history in serving the agricultural segment and as a result will gain significant insight into the rural industry and a jump start to their chosen career path.

A candidate is expected to:

- have elected to study units in years 3 and 4 of the BAgrEc which will provide them with a well rounded academic base from which to launch their career
- have a strong desire to work at a regional location in the banking/finance industry
  display career aspirations which are relevant to the Premium Business Services division of the Commonwealth Bank
- normally have completed Years 1 and 2 in minimum time, have a minimum WAM of 65 and be strong enough academically to complete the degree over a four year period (however an applicant who did not have a minimum WAM of 65, but met all other criteria, would be eligible for consideration)
- be majoring in banking, finance, business, commerce, economics, accounting, agricultural economics or management related units of study
- have a strong customer focus.

The scholarship is awarded on the basis of the applicant's:

- career aspirations
- interpersonal and communication skills
- initiative, level of self-motivation and self confidence
- academic performance in Years 1 and 2 and the first semester of Year 3.

An interview of short-listed candidates is part of the selection process.
Value: $6000
Closing Date: September

The EJ Holtsbaum University of Sydney Faculty of Agriculture, Food and Natural Resources Scholarship

The EJ Holtsbaum Agricultural Research Institute was established in 2003 following the gift by Mr EJ Holtsbaum to the University of his property "Nowley". Mr Holtsbaum, whose family owned Nowley since 1964, made the gift with the view that the farm would continue to prosper under the University's stewardship, and serve as a centre on the Liverpool Plains for the creation and dissemination of innovative technology for agricultural production and natural resource management. Surplus profits from the operation of "Nowley" are to be allocated for scholarships. Recipients shall be of high academic merit and show the intention to establish a career in agriculture (in whatever form). The intention of the scholarships is to help students fund their studies, and to encourage in recipients a sense of giving something back to the land through their degree, should they have the opportunity to do so.

Native Cockroach Research Scholarship

Established by Dr HA Rose in 1996 for Entomology research to encourage and assist students interested in Australian native cockroaches. The scholarship will be awarded on the basis of the applicant's career aspirations, written communication skills, initiative, level of self motivation, commitment to the area and academic performance.

A candidate is expected to:

- enrol full-time in the fourth year of the BScAgr degree;
- specialise in Agricultural Entomology;
- undertake his/her project on some aspect of the biology of native cockroaches;
- normally have completed the first three years in minimum time, have a minimum Second/Third year WAM of 65 (credit level) and be strong enough academically to complete the degree over the four year period. (An applicant who did not have a minimum WAM of 65, but met all other criteria, would be eligible for consideration.)

An interview will be conducted, if necessary, for ranking. Application forms are available at the Faculty Office.

Oasis Horticulture Pty Ltd Scholarship in Horticulture

Oasis Horticulture Pty Ltd offers two-year undergraduate scholarships. The first was awarded in 1998. Assuming a high calibre of applicants, it is envisaged that there would be a new scholarship commencing each year. The linking of the scholarship to paid vacation employment, which can count as professional experience, is a particularly attractive aspect of the scholarship.

Oasis Horticulture, situated at Winmalee in the foothills of the Blue Mountains, is one of Australia's largest wholesale nurseries. The company is well known for Flower and Vegetable seedlings as well as potted lines. Oasis Horticulture has an intensive Research and Development Department. Its Propagation Department is responsible for the vegetative propagation of several million young plants annually.

Terms and conditions

1. The Faculty of Agriculture, Food and Natural Resources awards the Oasis Horticulture Scholarship in Horticulture to a third year full-time Bachelor of Horticultural Science or Bachelor of Science in Agriculture student of the University of Sydney.
2. The scholarship will be awarded on the basis of the applicant's demonstrated commitment to horticulture, career aspirations, interpersonal and communication skills, initiative, level of self motivation and academic performance in the first three semesters of enrolment. The Faculty of Agriculture, Food and Natural Resources will prepare a short-list of applicants, based normally on a minimum WAM of 65 (credit level), for joint interview by Oasis Horticulture representatives and one or more nominated members of the Faculty. (Applicants who do not have a minimum WAM of 65, but who provided evidence that they meet all other criteria, will be eligible for short-listing).
3. The scholarship comprises four payments of $1500 payable at the beginning and middle of the scholarship holder's third and fourth years of study (March and September).
4. The scholarship holder will forward semester results to Oasis Horticulture as soon as they become available.
5. The scholarship holder will consult with the Faculty and Oasis Horticulture prior to selection of any substantial elective component of the coursework.
6. The scholarship holder must undertake paid vacation employment with Oasis Horticulture between the second and third (4–8 weeks) and the third and fourth (4–8 weeks) academic years or 8–16 weeks at some vacation time mutually agreeable to Oasis Horticulture and the student.
7. During vacation employment the scholarship holder will be employed as a full-time staff member of Oasis Horticulture, at a location selected by the company following consultation with the scholarship holder.
8. The Faculty and Oasis Horticulture expect the scholarship holder to undertake limited extracurricular activities and training, particularly public speaking and presentation skills, and develop a network of contacts in the horticultural industry and in particular in the nursery and related sectors.
9. The Faculty reserves the right to revoke the scholarship at any time, following consultation with Oasis Horticulture, if the scholarship holder does not maintain a credit average and/or performance is unsatisfactory during vacation employment or if there is a substantive change in enrolment which affects the basis of eligibility.
10. The scholarship holder will not accept any other scholarship without prior permission from the Faculty and Oasis Horticulture.

Value Added Wheat CRC Plant Breeding Scholarship

The Value Added Wheat CRC (VAWCRC) offers a scholarship to an outstanding Year 4 student. The VAWCRC, building on the achievements of the Quality Wheat CRC (which produced commercial wheat varieties, diagnostics and applied genetic and agronomic knowledge) is integrating advanced bioscience, food science and agronomic and genetic investigations. Further information is available at www.wheat-research.com.au

A candidate is expected to:

- enrol full-time in Year 4 of the BScAgr;
- undertake a project in plant breeding, cytogenetics or molecular marker technologies. Preference is given to projects that address a problem of interest to the Australian grains industry.

The scholarship is awarded on the basis of the applicant's:

- career aspirations;
- interpersonal and communication skills, self motivation and initiative;
- academic record.

An interview of short-listed candidates is part of the selection process.
Value: $5000
Closing Date: September

More undergraduate scholarships

Belmore Scholarships

In 1871 the Earl of Belmore made a gift for the purpose of providing a gold medal for proficiency in geology and practical chemistry with special reference to agriculture. His Lordship stated that should additional branches connected with agriculture be thereafter taught in the University, the examination for the medal might be made to embrace them. Upon the establishment of a Chair of Agriculture in 1910, it was decided to award the income of the fund as a scholarship. Four scholarships of $500 each are awarded annually on the recommendation of the Dean of the Faculty to students in the Faculty. Two are tenable by students enrolling in the second year of the BHortSc, BLWSc, BResEc or BScAgr degree, the first being awarded to the student showing greatest proficiency in the first-year examinations and the second awarded for greatest proficiency in the first-year Chemistry units of study. A further two are tenable by students enrolling in the third year of the BHortSc, BLWSc or BScAgr degree, the first being awarded to the student showing greatest proficiency at the second year examinations and the second awarded for greatest proficiency in Soil Properties and Processes and either Plant Biochemistry and Molecular Biology or Rural Environmental Chemistry. A student enrolling in the third year of the BResEc degree is also eligible for the second-year general proficiency scholarship. In each case the student's work must be of sufficient merit. Two scholarships may not be awarded to the same person in any one year.

Brian G Davey Memorial Scholarships in Soil Science

Established in 1989 at the request of Mrs Leith Davey in memory of her husband Dr Brian G Davey, Senior Lecturer in Soil Science until his death in 1989. Two scholarships may be awarded annually on the recommendation of the Sciences Discipline Leader. One may be awarded to the most proficient student who achieves the highest aggregate mark in the units of study Soil Properties and Processes and the Soil Resource in the Faculty of Agriculture, Food and Natural Resources and who enrols in the fourth year Soil Science specialisation for a Bachelor of Science in Agriculture or a Bachelor of Land and Water Science degree, provided the student's work is of sufficient merit. The other scholarship may be awarded to the most proficient student who achieves the highest aggregate mark in the units of study Soil Properties and Processes and the Soil Resource in the Faculty of Science who enrols in Soil Science Honours for a Bachelor of Science degree, provided the student's work is of sufficient merit. The scholarships may be shared. If sufficient funds are available more than two scholarships may be awarded in any one year.
Value: $400 per annum each

Golden Jubilee Scholarship in Agricultural Science

In 1960, which was the golden jubilee year of the foundation of the School of Agriculture in this University and of the Australian Institute of Agricultural Science, a committee was formed to raise a fund to endow an annual scholarship in agricultural science. The scholarship was established in 1961 by the gift of £1574 18s 0d from the Jubilee Scholarship Fund Appeal. Awarded annually for the study of agricultural science in the fourth year to a student at the end of third year, on the basis of academic achievement, application to the course of study and aptitude for agricultural science.
Value: $500

Martin McIlrath Scholarships for Undergraduates in Veterinary Science and Agriculture

The scholarships tenable in the first year are awarded on the results of the HSC examination and those in higher years on the results of the annual examinations of the preceding years. In the award of the scholarships preference is given to ex-servicemen and male descendants of ex-servicemen. Women are eligible to apply if they are current or ex-members of the armed forces. Each scholarship is tenable for one year. The scholarships are awarded by the Trustees on the recommendation of the Faculty concerned and after consideration of the question of preferred eligibility. Please note that these scholarships will only be awarded in any one year when there are eligible applicants in both the Faculties of Agriculture, Food and Natural Resources and Veterinary Science.
Value: Approximately $2000, tenable for 1 year
The application form is available from
www.usyd.edu.au/study/scholarships

John Mercer Bursary (Agriculture)

This bursary has been created by donation of the family, friends, colleagues and students of the late John R Mercer, Senior Lecturer in Animal Nutrition at the University. The bursary is available to one or more students enrolled in animal science units of study in third or fourth years of the Bachelor of Science in Agriculture or the Bachelor of Animal and Veterinary Bioscience who have demonstrated sufficient academic merit and are in financial need. Preference may be given to students with a demonstrable interest in Animal Nutrition. The award will be made on the recommendation of the Dean of the Faculty of Veterinary Science. A total of $1000 is available annually.

For further information see:
www.usyd.edu/stuserv/finances/financial_assistance_office/scholarships.shtml

NSW Farmers Association Tertiary Scholarships

You may apply directly to the Association for one of five competitive scholarships available across NSW. To be eligible for a scholarship, you, your partner or your parents must have been full members of the Association for at least the two consecutive years before the date on which you apply. Applicants must be full time students, in the second or subsequent year of full time study.

Applicants will be assessed on the basis of:

- academic record and status;
- all round ability including leadership qualities,
- communication skills and practical application;
- commitment to agriculture and rural communities.

Applications close in January each year and forms are available from:
www.nswfarmers.org.au
Value: $5000

Undergraduate prizes

ABARE Prize

Established in 1995 by ABARE for a prize in support of academic excellence in the field of agricultural economics. Two prizes are awarded annually on the recommendation of the Agricultural and Resource Economics Discipline Leader. One prize is awarded to the

student who attains the highest honours aggregate on graduation in the degree of Bachelor of Agricultural Economics and another to the student who attains the highest honours aggregate on graduation in the degree of Bachelor of Resource Economics.
Value: $600

John Arthur Cran Prize

Established in 1959 by the offer of an annual donation by Mrs Esther Cran in memory of her husband John Arthur Cran. In 1983 the University received a bequest of $1000 from Mrs Cran with the intent that the prize be awarded in perpetuity. The prize may be awarded annually on the recommendation of the Dean of the Faculty of Agriculture, Food and Natural Resources to the most proficient candidate at the Higher School Certificate or equivalent examination who enrols full-time in the first year of candidature for one of the following degrees Bachelor of Science in Agriculture, Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science or Bachelor of Resource Economics provided that the student's work is of sufficient merit.
Value: $100

Bruce Davidson Prize in Resource Economics

Established in 1995 by donations from the family of Bruce Robinson Davidson and former students and colleagues in recognition of his pioneering research in water resource economics in Australia, and as a tribute to his outstanding contributions as a teacher and researcher in agriculture and agricultural economics. Awarded annually, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to an undergraduate student enrolled in the Faculty of Agriculture, Food and Natural Resources who submits the best essay or thesis in the area of natural resource economics.
Value: $300

Bruce R Davidson Memorial Prize in Resource Economics

Established in 2002 by a donation from Dr David Godden in recognition of Dr Davidson, a former member of this Faculty, for his extensive research in resource economics in Australia. Awarded annually, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to the Bachelor of Resource Economics student showing the greatest proficiency at the first year examinations.
Value: $200

Clifford Dawson Holliday Prize

Founded in 1954 by a bequest of £1000 from Andrew Holliday for a prize to be known as the Clifford Dawson Holliday Prize in Agriculture. Awarded annually to the most proficient candidate at the third year annual examinations in the Faculty of Agriculture, Food and Natural Resources.
Value: $200

John Neil Downing Memorial Prize

Established by RG Downing BSc(Agr), by gifts of £25 in 1948 and £500 in 1949, for a prize in memory of his son, Lieutenant John Neil Downing, who was killed in action. The prize, which may be shared, is awarded annually on the recommendation of the Dean of the Faculty of Agriculture, Food and Natural Resources to the student in the Faculty of Agriculture, Food and Natural Resources who shows greatest proficiency in the professional experience requirement, provided the student's work is of sufficient merit.
Value: $550

John and Beatrice Froggatt Prize

Established in 1986 by a bequest of $10,000 from the estate of Mrs Beatrice E Froggatt of Killara who died in 1985. Awarded annually on the recommendation of the Sciences Discipline Leader to the student with the highest aggregate in the second year unit of study Entomology and fourth year Entomology specialisation, provided that the student's work is of sufficient merit. The prize may be shared.
Value: $1000

WW Froggatt Memorial Prize

Established in 1979 by a bequest of $1000 from the estate of Joyce Chiosso Froggatt in memory of her father. Awarded annually on the recommendation of the Sciences Discipline Leader to the student in fourth year Agricultural Entomology who shows the greatest proficiency in a research project in entomology, if the student's work is of sufficient merit.
Value: $200

Goodman Fielder Prize in Plant Nutrition

Established in 2006 by Goodman Fielder - Uncle Tobys for a prize in support of academic excellence in the field of plant nutrition. Awarded annually to the student who demonstrates the greatest proficiency in the units of study Crop and Pasture Agronomy (AGRO 4003) and Sustainable Farming Systems (AGRO 4004), provided the work is of sufficient merit.
Value: $250

DL Jackson Memorial Prize

Established in 1975 by public subscription in memory of DL Jackson, Senior Lecturer in the Department of Agronomy and Horticultural Science. To be awarded annually on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned to the most proficient student in the unit of study Agricultural Science1, Horticultural Science 1 or Land and Water Science 1 provided that the candidate's work is of sufficient merit.
Value: $400

FC McCleery Memorial Award

Established in 1979 by a series of donations over a number of years by the Reverend AB Catley, a graduate of the Faculty of Agriculture, for an award in that Faculty. The award honours the memory of FC McCleery, BScAgr (1925), the former Chief Biometrician in the NSW Department of Agriculture. FC McCleery was judged by his peers, both when a student at this University and in his later professional career, to be a man of great integrity who contributed greatly in both fields by his leadership and fellowship. Throughout his professional career he remained interested in a wide range of subjects from classical Greek literature to modern theology.

The award is made annually after a ballot, conducted by the Dean, of third year students in the Faculty of Agriculture, Food and Natural Resources to the person amongst their number who they judge at that ballot to have contributed most to the life of the Faculty by way of leadership and fellowship. Only those students who have completed the first two years of their degree course in minimum time shall be eligible for nomination.
Value: $200

Theresa G Makinson Prize

Established in 1972 by the donation of $500 from Miss KJ Laurence, to establish a prize in memory of her aunt, Theresa Genevieve Makinson, 1885–1939. Awarded annually, on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned, to the most proficient student in fourth year specialisation Horticulture, provided that the candidate's work is of sufficient merit.

Value: $100

Warren F Musgrave Prize in Resource Economics

Established in 2002 by a donation from Dr David Godden in recognition of Professor Musgrave, a former student of this Faculty, for his extensive research in resource economics in Australia. Awarded annually, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to the Bachelor of Resource Economics student showing the greatest proficiency at the second year examinations.
Value: $200

Sibella Macarthur Onslow Memorial Prize

Established in 1944 by a gift of £360 from members of the Victorian League of New South Wales and other friends of Miss Sibella Macarthur Onslow. Awarded annually on the recommendation of the Sciences Discipline Leader, after consulting academic staff most concerned, for greatest proficiency in the Fourth year specialisation Agronomy, provided the student's work is of sufficient merit.
Value: $200

FL Partridge Prize

Founded in 1928 by a gift of shares from an anonymous donor to establish the "FL Partridge Endowment" in memory of FL Partridge. The endowment is used to provide a prize in the Faculty of Agriculture, Food and Natural Resources in accordance with the following conditions:

- The FL Partridge Prize shall be awarded to undergraduates in the Faculty of Agriculture, Food and Natural Resources who have passed the second year examination in that Faculty.
- The prize shall be of the annual value of $400 and shall be tenable in the third and fourth years of the agricultural curriculum, provided the holder is diligent and of good conduct and passes creditably all the examinations of the course.
- The prize will only be awarded to students in such necessitous circumstances that they would have difficulty in completing the agricultural curriculum without some financial assistance.
- Where there are two or more candidates who fulfil the last condition the prize will be awarded to the student who at the end of the second or third year has the best academic record.
- Any unexpended income shall be used to create a fund for the carrying out of such research work within the Faculty as the Faculty may determine.
- Applications for the FL Partridge Prize must reach the Registrar before the end of March in each year.

Alan Randall Prize in Resource Economics

Established in 2002 by a donation from Dr David Godden in recognition of Professor Randall, a former student of this Faculty, for his research in international resource economics. Awarded annually, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to the Bachelor of Resource Economics student showing the greatest proficiency at the third year examinations.
Value: $200

Joyce Winifred Rouse Prize

The prize was established in 1987 by a donation from Randolph G Rouse on behalf of his wife. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in fourth year specialisation Food Science or Environmental Chemistry in the BScAgr degree or the BSc degree provided that the candidate's work is of sufficient merit.
Value: $40

Sydney University Agricultural Graduates' Association Prize

Established in 1994 by an offer of an annual donation from the Sydney University Agricultural Graduates' Association to recognise undergraduates who contribute time and effort to the leadership and fellowship of agricultural students. The prize shall be awarded annually to the student elected as President of the Sydney University Agricultural Society.
The prize shall be a commemorative object selected by SUAGA

GW Walker Memorial Essay Prize

Founded in 1944 and 1945 by amounts of £50 each received from the New South Wales Council of Agriculture Associations, Lindley Walker Wheat Coy Ltd, and the Flour Mill-Owners' Association of New South Wales, as a memorial to George W Walker. Awarded annually on the recommendation of the Agricultural and Resource Economics Discipline Leader to the student who presents the best essay in the unit of study Agricultural Marketing Analysis, provided the essay is of sufficient merit.
Value: $100

Professor WL Waterhouse Prize

In 1953 a sum of £150 was handed to the Senate by the Sydney University Agricultural Graduates' Association as part of subscriptions received in making a presentation to Professor WL Waterhouse on his retirement. The money was used to establish a prize to perpetuate the name and work of Professor Waterhouse. Awarded annually to the most proficient student in the units of study Agricultural Genetics 2 and Plant Disease, provided that the candidate's work is of sufficient merit.
Value: $80

Sir Robert Watt Memorial Prize

Established in 1966 by the gift of $500 from Lady Madge Watt and her daughter in memory of Emeritus Professor Sir Robert Watt, the first Professor of Agriculture at this University. Awarded annually on the recommendation of the Sciences Discipline Leader, after consulting the professor most concerned, to the most proficient student in Agronomy 3, provided the candidate's work is of sufficient merit.
Value: $80

Weed Society of New South Wales Prize

Founded in 1971 by the offer of an annual gift from the Weed Society of New South Wales. Awarded annually on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned to the most proficient undergraduate student in the area of Weed Science, provided that the candidate's work is of sufficient merit.
Value: $100

NH White Memorial Prize

Established in 1995 by donations from the former students and colleagues of Neville Hewlett White as a tribute to his outstanding contributions as a teacher and researcher in Plant Pathology. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in the specialisation of Plant Pathology within the fourth year of the BScAgr program.
Value: $100

AR Woodhill Prize in Entomology

Established in 1966 by the gift of $1000 from Mrs Woodhill and the colleagues and students of Dr AR Woodhill. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in the second year unit of study Entomology provided

that the candidate's work is of sufficient merit. The prize may be shared.
Value: $300

Arthur Yates and Co Pty Ltd Prize

Established in 1977. Two prizes of $100 each are awarded annually, the first on the recommendation of the Sciences Discipline Leader after consulting academic staff most concerned to the most proficient student in the specialisation of Horticulture in fourth year, provided that the candidate's work is of sufficient merit, and the second on the recommendation of the Director of the Plant Breeding Institute after consulting academic staff most concerned to the most proficient student in the specialisation of Agricultural Genetics in Fourth Year, provided that the candidate's work is of sufficient merit.

Prize compositions

These are prizes for best essays in a variety of fields. Entries usually open around April and close at the end of August. See the Scholarships website (www.usyd.edu.au/scholarships) for more information.

Faculty resolutions

A candidate who presents for re-examination in any unit of study shall not normally be eligible for any prize or scholarship awarded in connection with such examination.

Regulations for undergraduate scholarships in Agriculture, Food and Natural Resources

Established in 1991, by funding from companies, organisations and individuals, referred to hereafter as 'cooperating companies', to encourage and assist candidates for the degrees of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics or Bachelor of Science in Agriculture.

1. The scholarship shall be awarded under the following conditions:
1.1 Each scholarship shall be named an Undergraduate Scholarship in Agriculture, Food and Natural Resources, except where a cooperating company requests that its name be used as an identifier within the scheme.
1.2 The scholarships shall be open to citizens and permanent residents of Australia who qualify in the final year of secondary schooling to enter the Faculty of Agriculture, Food and Natural Resources at the University of Sydney.
2. Tenure
2.1 Each scholarship shall be tenable for the specific agricultural degree for which it is offered, where applicable, and shall not be transferable to another degree except in exceptional circumstances.
2.2 The scholarships shall be tenable for the duration of each recipient's degree program, provided that the scholar meets all the obligations of the program and maintains satisfactory academic progress.
3. Advisory Committee
3.1 There shall be an Advisory Committee consisting of the following persons:
3.1.1 no fewer than five representatives of separate cooperating companies;
3.1.2 no fewer than two heads of disciplines in the Faculty including the Agricultural and Resource Economics Discipline Leader (or nominees);
3.1.3 no more than three members of the Institute of Advanced Studies within the Faculty;
3.1.4 the Dean of the Faculty; and
3.1.5 the Executive Director of the Undergraduate Scholarships in Agriculture, Food and Natural Resources Program.
3.2 The Advisory Committee shall elect its own chairperson.
3.3 The Advisory Committee shall advise the Faculty on the conduct and management of the program, including scholar selection, the nature and organisation of the professional experience component, and such other matters as it considers pertinent to the effective operation of the program.
3.4 The Executive Director of the program shall be a member of the Faculty, nominated by the Dean, appointed by the Advisory Committee.
3.5 The Executive Officer of the program shall be a member of the University's administrative staff, nominated by the Dean, and shall attend meetings of the Advisory Committee.
4. Annual meeting of cooperating companies
4.1 There shall be an annual general meeting of cooperating companies during the first semester of each academic year, when:
4.1.1 the Advisory Committee shall report on the operation of the program over the previous year;
4.1.2 the membership of the Advisory Committee for the coming year shall be determined; and
4.1.3 any matters relating to the program may be raised and decisions thereon made for implementation by the Advisory Committee.
5. Awarding of the scholarships
5.1 The scholarships shall be awarded on the basis of academic merit (as indicated by the applicants' performance at the NSW Higher School Certificate Examination, or equivalent), leadership potential and personal qualities.
5.2 The scholarships shall be awarded on the recommendation of selection panels consisting of at least one representative from cooperating companies and at least one member of the Faculty appointed by the Dean.
6. There shall be no bonding or other commitment to employment between a cooperating company and any scholar.
7. A scholarship is intended for a continuous four-year degree program, but the Advisory Committee may consider a request for an interruption in a scholar's progress towards the bachelor degree for some exceptional purpose, and, if such request is approved, the scholarship shall be suspended during such interruption.
8. Cost
8.1 Cooperating companies shall make a donation to The University of Sydney Undergraduate Scholarship in Agriculture Program, for each year and for each scholarship place supported, comprising the annual scholarship stipend together with an administration levy of $600 + GST.
8.2 Transfers of funds from cooperating companies to the University shall be made by 31 January in the year to which the scholarship place applies.
8.3 The administrative levy will be reviewed each year.
9. Benefits to cooperating companies
9.1 Each current cooperating company shall be entitled to:
9.1.1 access to the whole pool of Undergraduate Scholars in Agriculture, Food and Natural Resources for professional work experience in the cohort or cohorts contemporaneous with the year or years of its support; and
9.1.2 inclusion of the company's name on a roll of cooperating companies to be set up in the Faculty Office.
10. Value and payments
10.1 The value of the scholarship stipend in 2006 was $7000 per annum.
10.2 The value of the scholarship stipend shall be adjusted annually by the Advisory Committee after considering movements in the consumer price index.
10.3 A scholarship shall run from 1 March to the following 30 November.
10.4 The scholarship payments shall be made at regular intervals.

8. Postgraduate course requirements

The higher degrees and qualifications in the Faculty are:
DAgrEc: Doctor of Agricultural Economics
DScAgr: Doctor of Science in Agriculture
PhD: Doctor of Philosophy
MAgrEc: Master of Agricultural Economics
MScAgr: Master of Science in Agriculture
MAgr: Master of Agriculture
GradDipAgr: Graduate Diploma in Agriculture
GradCertAgr: Graduate Certificate in Agriculture

The regulations governing the award of these degrees are printed in the Calendar and in this Handbook. Prospective candidates should consult with the Discipline Leader concerned before submitting an application for admission to candidature.

All candidates would normally begin in Semester 1 (near the end of February). In some cases candidates may be able to commence in Semester 2 (late July). Teaching in postgraduate courses in the Faculty develops skills and graduate attributes. A Statement of Generic Graduate Attributes can be found in this Handbook at Section 7 (Other Faculty information). The following statements summarise part only of the regulations governing the award of these degrees.

Doctor of Agricultural Economics and Doctor of Science in Agriculture

The degrees of Doctor of Agricultural Economics and Doctor of Science in Agriculture shall not be conferred until the candidate is a graduate of eight years' standing from the degree which qualified him or her for candidature. The degree may be awarded for published work which, in the opinion of the examiners, has been generally recognised by scholars in the field concerned as a distinguished contribution to knowledge.

Doctor of Philosophy

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.

Applicants should normally hold a master's degree or a bachelor's degree with first or high second class honours of the University of Sydney, or an equivalent qualification from another university or institution.

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 is two years for candidates holding a master's degree or equivalent, or 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. The first 12 months of candidature is normally on probation.

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. They should be able to devote at least 20 hours per week to candidature including at least one day per week during each year of candidature or an equivalent annual period made up in blocks. Normally the minimum period of candidature will be determined on the recommendation of the Faculty but in any case will not be less than 3 years; the maximum period of candidature is normally 8 years.

Master of Agricultural Economics and Master of Science in Agriculture

Graduates of the University of Sydney who have completed units of study acceptable to the Faculty of Agriculture, Food and Natural Resources or persons who, in the opinion of the Faculty, have qualifications equivalent to those required of a graduate of the University of Sydney, may apply for admission as candidates for the degree of master.

Candidates engage in research culminating in a thesis for two to three years full-time or pro rata part-time. Some honours graduates (or equivalent) may be eligible for a minimum candidature of one year full-time. A candidate may be required to serve a period of probation for not more than one year and to complete such work during the period as may be prescribed.

Master of Agriculture, Graduate Diploma in Agriculture and Graduate Certificate in Agriculture

Postgraduate studies are available towards a Master of Agriculture, Graduate Diploma in Agriculture and Graduate Certificate in Agriculture.

Admission requirements for the Master of Agriculture, Graduate Diploma in Agriculture and Graduate Certificate in Agriculture are normally a bachelor's degree or an equivalent qualification. In some instances the admission requirements may be met by evidence of general or professional qualifications and appropriate work experience to indicate that the student has the academic preparation and capacity to complete the course in question. With the approval of the Dean, students may be granted admission with advanced standing if they have completed relevant prior learning at an equivalent level elsewhere.

Students may transfer between courses and receive credit for any completed units, provided they have not taken out the award from which they are transferring.

The Graduate Certificate, Graduate Diploma and the Master of Agriculture testamur will specify the area of specialisation: Agribusiness, Agricultural Economics, Agricultural Technologies, Natural Resource Management, Resource Economics; Sustainable Agriculture or Turf Management.

To achieve the objectives of the courses, especially for students seeking training in a new discipline, some classes may be taught in conjunction with advanced undergraduate units. However, postgraduate coursework students will engage in additional consultation and more advanced assignment work than their undergraduate counterparts. They will also be assessed against a higher standard. Some students may need to acquire basic knowledge and skills in subject areas before they are able to undertake postgraduate coursework.

Graduate Certificate in Agriculture

Candidates for the Graduate Certificate complete a total of 24 credit points (cp) made up of 12 cp from their selected specialisation as specified in TABLE A and the balance from elective units chosen from any other units listed in TABLE D (subject to meeting prior learning requirements and timetabling). Students who have completed relevant prior learning at an equivalent level may be given up to 6cp advanced standing.

Table A

Program	Core units
Agribusiness	At least two of AGEC5301, AGEC5401, AGEC5403, AGEC5404
Agricultural Economics	At least two AGEC54XX units
Agricultural Technologies	At least two AFNR51XX, AFNR52XX, AFNR53XX, AFNR55XX units
Natural Resource Management	At least two of RSEC5431, RSEC5432, AFNR5501, AFNR5502, AFNR5503, AFNR5504, AFNR5505, AFNR5506, AFNR5507
Resource Economics	At least two of RSEC5431, RSEC5432, RSEC5433, RSEC5434
Sustainable Agriculture	At least two of RSEC5431, RSEC5432, AFNR5201, AFNR5202, AFNR5204, AFNR5205, AFNR5206, AFNR5207, AFNR5208
Turf Management	At least two AFNR56XX units

Graduate Diploma in Agriculture

Candidates for the Graduate Diploma complete a total of 36cp made up of 18cp from their selected specialisation as specified in TABLE B and the balance from elective units chosen from any other units listed in TABLE D (subject to meeting prior learning requirements and timetabling). Students who have completed relevant prior learning at an equivalent level may be given up to 12cp advanced standing.

Table B

Program	Core units
Agribusiness	At least three of AGEC5301, AGEC5401, AGEC5403, AGEC5404
Agricultural Economics	At least three AGEC54XX units
Agricultural Technologies	At least three AFNR51XX, AFNR52XX, AFNR53XX, AFNR55XX units
Natural Resource Management	At least three of RSEC5431, RSEC5432, AFNR5501, AFNR5502, AFNR5503, AFNR5504, AFNR5505, AFNR5506, AFNR5507
Resource Economics	At least three of RSEC5431, RSEC5432, RSEC5433, RSEC5434
Sustainable Agriculture	At least three of RSEC5431, RSEC5432, AFNR5201, AFNR5202, AFNR5204, AFNR5205, AFNR5206, AFNR5207, AFNR5208
Turf Management	At least three AFNR56XX units

Master of Agriculture

Candidates for the Master of Agriculture complete a total of 48cp made up of 24cp from their selected specialisation as specified in TABLE C and the balance from elective units chosen from any other units listed in TABLE D (subject to meeting prior learning requirements and timetabling). Students who have completed relevant prior learning at an equivalent level may be given up to 12cp advanced standing.

Table C

Program	Core units
Agribusiness	AGEC5301, AGEC5401, AGEC5403, AGEC5404
Agricultural Economics	At least four AGEC54XX units
Agricultural Technologies	At least four AFNR51XX, AFNR52XX, AFNR53XX, AFNR55XX units
Natural Resource Management	At least four of RSEC5431, RSEC5432, AFNR5501, AFNR5502, AFNR5503, AFNR5504, AFNR5505, AFNR5506, AFNR5507
Resource Economics	RSEC5431, RSEC5432, RSEC5433, RSEC5434
Sustainable Agriculture	At least four of RSEC5431, RSEC5432, AFNR5201, AFNR5202, AFNR5204, AFNR5205, AFNR5206, AFNR5207, AFNR5208
Turf Management	All four AFNR56XX units

Table D

Code	Unit	Sem
AFNR5003	Biometry	1
AFNR5101	Plant Agricultural Biotechnology	2
AFNR5102	Food Science A	1
AFNR5103	Food Science B	1
AFNR5104	Environmental Chemistry A	1
AFNR5105	Environmental Chemistry B	2
AFNR5107	Analytical Chemistry A	1
AFNR5108	Plant Cytogenetics	2
AFNR5109	Plant Breeding	1
AFNR5201	Crop Agronomy	1
AFNR5202	Professional Practice in Agronomy	1
AFNR5204	Crop Water Management	2
AFNR5205	Production Horticulture	1
AFNR5206	Postharvest Biology and Technology	1
AFNR5207	Issues in Horticultural Science	1
AFNR5208	Research and Practice in Horticultural Science	2
AFNR5209	Sustainable Cropping Systems	1
AFNR5301	Plant Disease	2
AFNR5302	Molecular & Physiological Plant Path	1
AFNR5303	Adv Mycology & Diagnostic Plant Path	1
AFNR5304	Soil Biology and Biodiversity	1
AFNR5305	Applied Entomology (Crops)	1
AFNR5306	Insect Taxonomy	1
AFNR5501	The Soil Resource	2
AFNR5502	Remote Sensing, GIS and Land Management	1
AFNR5503	Field and Laboratory Soil Physics	1
AFNR5504	Field and Laboratory Pedology	1
AFNR5505	Environmental Soil Chemistry	2
AFNR5506	Limnology and Water Quality	1
AFNR5507	Catchment Hydrology and Management	1
AFNR5601	Turf Management	1
AFNR5602	Advanced Turf Management	2
AFNR5603	Turf Species and Varieties	1
AFNR5604	Diagnostic Methods in Turf Management	1
AFNR5605	Applied Plant Ecology	2
AFNR5901*	Research Review	1 or 2
AFNR5902*	Research Study (12 credit points)	1 or 2
AFNR5903*	Research Project (24 credit points)	1 or 2
AGEC5300**	Business Topics in Amenity Horticulture	1
AGEC5301	Agribusiness Management	1
AGEC5302	Agricultural and Resource Policy	1
AGEC5303	Applied Optimisation	2
AGEC5304	Research Methods	1
AGEC5401	Agricultural Marketing Analysis	2
AGEC5402	Agricultural Development Economics	2
AGEC5403	International Agricultural Trade	1
AGEC5404	Agribusiness Analysis	1
AGEC5405	Quantitative Planning Methods	1
AGEC5406	Agricultural Finance and Risk	2
AGEC5407	Professional Skills (3 credit points)	1
AGEC5408	Contemporary Issues (3 credit points)	2
RSEC5431	Benefit-Cost Analysis	1
RSEC5432	Environmental Economics	1
RSEC5433	Economics of Mineral & Energy Industries	2
RSEC5434	Economics of Water and Bio-resources	2

* AFNR5901, AFNR5902 and AFNR5903 are mutually exclusive
** AGEC5300 is not available in the Agribusiness, Agricultural Economics or Resource Economics streams

9. Postgraduate units of study

AFNR5003
Biometry

Credit points: 6 **Teacher/Coordinator:** A/Prof Mick O'Neill **Session:** Semester 1 **Classes:** 5 hrs workshops/wk, individual consultation and research 1 hr/wk **Assumed knowledge:** BIOM2001 or equivalent **Assessment:** Reports (25%), assignment (20%), presentation (5%), exam (50%). All open book.

This unit is an elective available to students enrolled in either the GradCertAgr, GradDipAgr or MAgr degrees. It is designed for students who are interested in research and is intended to further develop your skills in experimental design and statistical modeling. It builds on the topics introduced in the undergraduate unit Biometry 2, and aims to give students sufficient skills and confidence to complete the analysis of their own research data. As such it is particularly useful for MAgr students completing the Research Project, AFNR5903. We start by learning how to determine the number of replicates to use in an experiment. We revise multiple regression and extend the linear model to a time series system. We then examine how normally distributed data from designed experiments can be analysed in a general linear model framework, and hence how to cope with missing or incomplete data. The difference between maximum likelihood and residual maximum likelihood (REML) is studied for a single sample. A REML analysis is obtained for complete and incomplete factorial designs; for fixed, random and mixed models; for data collected from repeated observations on the same experimental unit. Next, we consider various techniques for the analysis of non-normal data, specifically: logistic regression for binary and proportion data; Poisson regression for count data; loglinear modelling for multi-way contingency tables; ordinal and nominal logistic regression for scores & ratings. The assignment is to design and analyse data from either an undergraduate 4th year or postgraduate coursework student research project.

Textbooks

Clewer, A.G. and Scarisbrick, D.H. (2001). Practical Statistics and Experimental Design for Plant and Crop Science. West Sussex: John Wiley & Sons.
Dytham, C. (2003). Choosing and Using Statistics: A Biologist's Guide. Oxford: Blackwell.
Mead, R., Curnow, R.N. and Hasted, A.M. (2003). Statistical Methods in Agriculture and Experimental Biology, 3rd ed. Boca Raton: Chapman & Hall/CRC.

AFNR5101
Plant Agricultural Biotechnology

Credit points: 6 **Teacher/Coordinator:** Prof Peter Sharp, Dr Neil Howes **Session:** Semester 2 **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars) **Prohibitions:** GENE4013 **Assessment:** 3hr exam, reports, assignment

Lectures and other work covering the structure and function of plant genomes and genes, the technology and results of DNA transformation and the analysis of plant traits by molecular techniques including by genetic mapping using molecular and other genetic markers

AFNR5102
Food Science A

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell, (Coordinator), Dr Meredith Wilkes, A/Prof Neil Howes, Prof Les Copeland **Session:** Semester 1 **Classes:** 24 hrs of lectures and 36 hrs of laboratory during the semester **Prohibitions:** AGCH3025 **Assessment:** One 2hr exam, laboratory reports, assignment, theory of laboratory test

This unit of study aims to give students an understanding of the constituents of foods and fibres. The lecture topics cover the chemistry, biochemistry and processing behaviour of major food constituents - oligosaccharides, polysaccharides, lipids and proteins; the relationship between molecular structure of constituents and their functionality in foods; anti-nutritional and toxic constituents of plants and foods; chemistry of dietary fibre; wheat flour doughs and protein chemistry during baking and cooking; foams and emulsions, thickening agents; enzymes in foods and food processing. The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include analysis of carbohydrates including starch; wheat flour swelling volume and the RVA; analysis of edible oils; spectroscopic and enzymic methods

AFNR5103
Food Science B

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell (Coordinator), Dr Meredith Wilkes, A/Prof Neil Howes, Prof Les Copeland **Session:** Semester 1 **Classes:** 18 hrs of lectures and 25 hrs of laboratory during the semester **Prohibitions:** AGCH3026 **Assessment:** Essays, laboratory reports, poster and oral presentation; theory of laboratory test

This unit of study aims to give students an understanding of global food systems and global food security. In the lecture/seminar/workshop component topics covered will include the sustainable production of major food crops; the role of genetically modified crops in food sustainability and quality; principles and methods in food quality control and assessment; chemical and biochemical aspects of food quality in relation to food processing and nutritional values. The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include analysis and examination of protein functionality in foods; spectroscopic, enzymic, and chromatographic methods

AFNR5104
Environmental Chemistry A

Credit points: 6 **Teacher/Coordinator:** Prof Ivan Kennedy (Coordinator), Dr Robert Caldwell, Prof Les Copeland **Session:** Semester 1 **Classes:** 18 hrs of lectures/tutorials and 18 hrs of laboratory during the semester, 6 day field trip **Prohibitions:** AGCH3030 **Assessment:** One 2hr exam, field trip reports, laboratory reports and special exercises

This unit commences with a field trip to the Namoi and the Macquarie Valleys, where agriculture largely based on irrigation has developed. Environmental impacts on soil and water of agricultural enterprises such as cotton farming and human settlement will be assessed. Field observations on pH, nutrient and salt content, pesticide and heavy metal content will be made on water, sediment, soils and in constructed wetlands, with samples returned for more detailed laboratory analysis at the University. Lectures will complement the field trip, including topics such as environmental chemistry of heavy metals, their effects on organisms, 2; mechanisms of tolerance and phytoremediation, 2; risk assessment of pesticides including herbicides, their mode of action and environmental fate, 4; analysis and monitoring of pesticide residues by GC, GC-MS and immunoassay (ELISA), 3; maximum residue limits (MRLs) and residue surveys, 2; remediation of pesticides in ecosystems, 2; design of new pesticides and means of pest control, 3. Laboratory sessions will be related to these lecture topics, including six sessions on atomic absorption analysis for nutrients and heavy metals, mercury analysis, pesticide analysis by GLC, GC-MS, HPLC and ELISA

AFNR5105
Environmental Chemistry B

Credit points: 6 **Teacher/Coordinator:** Prof Ivan Kennedy (Coordinator), Dr Robert Caldwell, Prof Les Copeland **Session:** Semester 2 **Classes:** 5-day field trip in AVCC common break; 18 hr lectures/tutorials; 24 hr laboratory classes and project during semester **Prohibitions:** AGCH3031 **Assessment:** One 2 hr exam, field trip report and presentation, prac and project reports

This is a field-oriented unit in the environmental chemistry relevant to global warming/climate change to (i) provide students with an understanding of chemical and biochemical processes in rural

ecosystems and their sustainability, using case studies of causes and possible remedies for environmental impacts (ii) to undertake a field trip to illustrate case studies related to climate change, including work at research centres and field sites in eastern Australia (Canberra, Snowy Mountains, and the Murray and Murrumbidgee catchments) (iii) laboratory sessions and one group research project selected to study such a problem and to recommend solutions in a professional setting. This unit of study will focus on chemical and biological factors involved in the generation of the enhanced greenhouse effect and its impact on rural ecosystems. Practical solutions will be sought by students, based on a field theory relating the generation of molecular and biological action in ecosystems to the dissipation of solar energy to outer space. Lectures will include the environmental carbon cycle, nitrogen and sulphur cycles, covering bioenergetics and production of greenhouse gases; detailed pH and charge balancing on nutrient uptake; acidification of ecosystems and effects on plants and animals; remediation and control of greenhouse emissions; remediation of acidification and salinisation in rural environments. The laboratory sessions and the group project will illustrate these environmental processes, including measurement of greenhouse gas production, NOx, photosynthesis and nitrogen fixation, monitoring of endocrine-disrupting compounds using GLC, HPLC and ELISA

AFNR5107
Analytical Chemistry A

Credit points: 6 **Teacher/Coordinator:** Dr Robert Caldwell (Coordinator) **Session:** Semester 1 **Classes:** 22 hrs of lectures and 32 hrs of laboratory during the semester **Prohibitions:** AGCH4007 **Assessment:** One 2-hr exam (30%), laboratory reports (30%), major assignment (40%)

Lecture, reading list and laboratory topics will cover the theory and fundamentals of both common and advanced instrumentation used in analytical chemistry. Topics will cover ion selective electrode technology, pH meters, and other electrochemical devices; centrifuge and ultracentrifuge instrumentation, maintenance and applications, instrumentation in atomic and molecular spectrophotometry, gas and liquid chromatography, gel and capillary electrophoresis; automated derivatization methods; mass spectrometry, and immuno-analytical technology

AFNR5108
Plant Cytogenetics

Credit points: 6 **Teacher/Coordinator:** Dr Norm Darvey **Session:** Semester 2 **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars) **Prohibitions:** GENE4011 **Assessment:** 3hr exam, reports, assignment

Lectures in cytology and cytogenetics, with special emphasis on cereals and the application of chromosome engineering to plant breeding. The laboratory unit includes routine cytological procedures and tissue culture technology

AFNR5109
Plant Breeding

Credit points: 6 **Teacher/Coordinator:** Dr Norm Darvey **Session:** Semester 1 **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars) **Prohibitions:** GENE4012 **Assessment:** 3hr exam, reports, assignment

Lectures and practical work devoted to the theory, philosophy and practice of plant breeding, screening techniques, conservation of genetic variability, breeding for disease resistance, the use of tissue culture in breeding, with examples from both field and horticultural crops

AFNR5201
Crop Agronomy

Credit points: 6 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 1 **Classes:** Block intensives/workshops, excursion **Assumed knowledge:** (AGRO3001 Agronomy 3 or AGRO3002 Agronomy 3) and (PLNT2003 Plant Form and Function or PLNT2903 Plant Form and Function (Advanced)) **Assessment:** Report, oral presentations and exam

This unit examines agronomy as the discipline that underpins agricultural production. Two industries are studied to gain appreciation of the main agronomic principles of crop production. Most principles can be applied to dryland crops even though the emphasis in this unit is on irrigated crops. As a case study, the cotton industry is examined in detail to understand the end-user and social demands on agricultural production, the technical issues that challenge the farmer and the diversity of other specialist information from relevant disciplines such as entomology, pathology and soil science that must be integrated into the farming system. Likewise the rice industry provides a contrasting farming system as another case study. The unit includes a one-week excursion to cotton growing areas in northern NSW, specialist intensive instruction provided by the Cotton CRC and a series of workshops) tutorials that provides analysis and synthesis of the major farming systems in this industry

AFNR5202
Professional Practice in Agronomy

Credit points: 6 **Teacher/Coordinator:** Dr Lindsay Campbell **Session:** Semester 1 **Classes:** Pracs, workshops as advised, field work **Assumed knowledge:** Equivalent of BIOM2001 Biometry 2 and (AGRO3001 Agronomy 3 or AGRO3002 Agronomy 3). Students should have a grasp of experimental design and analysis **Assessment:** Reports

This unit provides training in the professional skills specific to the practice of agronomy. Students will design and execute field experiments for a sustainable agricultural system. A challenge is to undertake experiments within the field constraints eg soil, previous cropping history etc. Several case studies involving client-driven experimental or R&D projects both in the field and laboratory will be used to illuminate sound professional practice, including budget management, in field and laboratory experimental design and methodology, data acquisition and assimilation and compilation of professional reports. Assessment will be based on professional involvement in the case studies and on the final reports. Students participate in a long-term experiment that involves planning, decision making and management of a farming system

AFNR5204
Crop Water Management

Credit points: 6 **Teacher/Coordinator:** A/Prof Bruce Sutton **Session:** Semester 2 **Classes:** (3 tut, 2hr prac)/wk **Assumed knowledge:** PLNT2003 or PLNT2903 **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%)

This unit of study provides a scientific understanding and practical working knowledge of water management in dryland and irrigated agricultural systems, with most of the emphasis at the field scale. The first section of the unit examines the mechanisms underlying a crop water balance, its calculation and measurement and management options for using rainfall as effectively as possible. The second section examines the major forms of irrigation, the scientific principles involved in each, their benefits and shortcomings and management to maximize water use efficiency. The practical classes will develop key skills appropriate to irrigation system management and use of current decision support systems. Postgraduate students will be expected to understand the details of the scientific concepts that underpin this unit at a greater depth than undergraduates pursuing AGRO 4005 and should be able to reflect this in a more sophisticated and richer and hence significantly longer consultancy report and a demonstration of greater grasp of knowledge in the examination

Textbooks

M.E. Jensen (1980). Design and Operation of Farm Irrigation Systems (ASAE).
Allen, R.G, Periera, L.S., Raes, D. and Smith, M. (1998). Crop Evapotranspiration. Guidelines for computing crop water requirements. FAO Irrigation and Drainage Paper 56.
Hillel, D. (2004). Introduction to Environmental Soil Physics. Elsevier Academic Press.

AFNR5205
Production Horticulture

Credit points: 6 **Teacher/Coordinator:** Dr Jenny Jobling **Session:** Semester 1 **Classes:** (2 lec, 4 hr prac)/wk or a field trip **Assumed knowledge:** HORT1001, HORT1002, HORT2002 or equivalent. **Assessment:** 3hr exam (55%), Assignments x 3 (45%)

Emphasis is given to the scientific basis for fruit and winegrape production and to sustainable vegetable crop production and tropical horticultural crops. Concepts underlying the establishment of and management of urban plants and use are addressed. The unit develops skills in the evaluation of technical and environmental status of established orchards, vineyards, vegetable crops and urban plantings

AFNR5206
Postharvest Biology and Technology

Credit points: 6 **Teacher/Coordinator:** Dr Robyn McConchie **Session:** Semester 1 **Classes:** (2 lec & 4 prac)/wk **Assumed knowledge:** HORT1001, HORT1002, HORT2002 **Assessment:** Exam 2 hr (60%), laboratory reports (25%), assignment (10%), seminar (5%)

The unit develops understanding and skills relevant to the maintenance of quality during the harvesting, handling, storage and marketing of fresh plants and plant parts. The subject integrates the postharvest physiology of products that are handled or marketed in a living state, with the technological and economic challenges associated with delivering them from the field to the consumer. Supply chain analysis of crops will be examined via case study examples, drawn from fruits, vegetables, cut flowers, nursery and foliage crops, turf and edible fungi. Students will study all operations from harvesting to consumer evaluation

Textbooks

Wills, R., McGlasson, B., Graham, D. and Joyce, D. "Postharvest: An Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals." UNSW Press 4th Edition

AFNR5207
Issues in Horticultural Science

Credit points: 6 **Teacher/Coordinator:** Dr Robyn McConchie **Session:** Semester 1 **Classes:** 2 lectures per week for 13 weeks & 6 prac per 13 weeks **Assumed knowledge:** HORT3004 or equivalent. **Assessment:** Exam (2 hr) (25%), plant ID practical quizzes (15%), consulting report (45%), seminar presentation (15%)

Students attend a series of discussion workshops on minimising the environmental impact of horticultural enterprises. It introduces students to current themes and thinking in sustainable practices in horticultural science, covering issues such as efficient water management, sustainable use of fertilizers, salinity, heavy metal pollution, disposal of plastics, integrated pest management and organic practices. Students also undertake an industry based case study analysis of a horticultural supply chain, designed to provide them with skills in data analysis and interpretation, problem identification and problem solving. In addition, students will add to their general knowledge of important horticultural plants and their uses through plant identification workshops

AFNR5208
Research and Practice in Hort Science

Credit points: 6 **Teacher/Coordinator:** Prof David Guest **Session:** Semester 2 **Classes:** 2 lec/wk for 6 weeks, 6 x 3 hour practical classes and a 5-day excursion **Assumed knowledge:** HORT4004, HORT4005 or equivalent. **Assessment:** Critical essay and presentation 40%, journal presentation 10%, plant ID quizzes 20%, plant ID exam 30%

This unit introduces students to current themes and thinking in horticultural science research and practice. Through prescribed readings, seminar attendance presentations, discussion workshops, excursions and practicals, students will integrate the knowledge they have acquired during their undergraduate course, and develop critical analysis skills essential for a professional career in horticultural science research and management. Emphasis will be placed on identifying sustainable horticultural practices that meet the environmental, human and financial challenges facing horticulture. Issues to be covered include sustainable water and soil management, organic horticulture, the impact of methyl bromide withdrawal, biosecurity, biotechnology, agroforestry, intellectual property, WTO and trade, urban horticulture and quality of life, horticulture and human nutrition, food safety, supply chain analysis

AFNR5209
Sustainable Cropping Systems

Credit points: 6 **Teacher/Coordinator:** A/Prof Bruce Sutton, Dr Daniel Tan, Dr Brett Whelan **Session:** Semester 1 **Classes:** (3 tut, 2hr prac)/wk **Assumed knowledge:** PLNT2003 or PLNT2903 or equivalent. **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%)

Agronomy studies the practices and underlying concepts of sustainable crop and pasture production. The scientific basis of modern practices used in crop production, particularly those relevant to New South Wales, is explored. This knowledge is used to appreciate the scale of future problems such as climate change, soil degradation and increased costs of petrochemical-based inputs like fuel and fertilizer. Possible responses to these problems that will help maintain productivity will be examined. The relationship between agricultural production and natural resource management is also considered as part of a modern production environment, with the impact of recent legislation supporting Ecologically Sustainable Development on agriculture and the agricultural response to it as the focus of discussion. The practical classes will develop key skills appropriate to precision agriculture and use of current decision support systems. Postgraduate students will be expected to understand the details of the scientific concepts that underpin this unit at a greater depth than undergraduates pursuing AGRO 4005 and should be able to reflect this in a more sophisticated and richer and hence significantly longer consultancy report and a demonstration of greater grasp of knowledge in the examination

AFNR5301
Plant Disease

Credit points: 6 **Session:** Semester 2 **Classes:** (2 lec, 3 labs)/wk **Assumed knowledge:** MICR2024 or equivalent. **Assessment:** Weekly quiz (15%), group research project (30%), assignment (20%) two hour written exam at the end of semester (35%)

This unit introduces fungi and other microbes as causes of plant disease that limit agricultural and horticultural production. The practical component introduces techniques used in handling and identifying fungi, and in studying plant disease. Emphasis is placed on the design of experiments and interpretation of experimental data. Topics include symptoms and 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

AFNR5302
Molecular and Physiological Plant Path

Credit points: 6 **Teacher/Coordinator:** Coordinators: Prof Lester Burgess, Dr Edward Liew. Other teaching staff: Prof David Guest, Dr Jillian Smith-White, Dr Robyn McConchie, Dr Kerrie McDonald **Session:** Semester 1 **Classes:** 34 hr lectures/tutorials, 20 hr laboratory **Assumed knowledge:** PPAT3002 or equivalent. **Assessment:** One 2 hr theory exam and 3 assignments

This course focuses on various aspects of plant pathology and mycology involving cellular biology and molecular technologies. Students are introduced to fundamental concepts in molecular techniques in plant pathology, plant-pathogen interactions, pathogen populations, molecular diagnostics and molecular phylogenetics. The practical classes cover basic molecular techniques commonly used in studying plant pathogens and complement the theoretical and conceptual understanding of some of the lecture topics

Textbooks

Agrios G.N. 1997. Plant Pathology (4th ed.). Academic Press, London.
Brown JF & Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications. Chapters 16 & 17
Forey P.L., Humphries, C.J., Kitching, I.L., Scotland, R.W., Siebert, D.J. and Williams, D.M. 1992. Cladistics: A Practical Course in Systematics. Clarendon Press, Oxford.
Hoelzel, AR & Dover, GA. 1991. Molecular Genetic Ecology. IRL Press, Oxford.
Lewin, B. 1997. Genes VI. Oxford University Press, Oxford. (Or later editions)
McDonald, BA. 1997. The Population Genetics of Fungi: tools and techniques. Phytopathology 87:448-453
Taylor, J.W. Jacobson, D.J. Kroken, S. Kasuga, T. Geiser, D.M. Hibbett, D.S. Fisher, M.C. 2000. Phylogenetic species recognition and species concepts in fungi. Fungal Genetics & Biology: 31:21-32

AFNR5303
Adv Mycology and Diagnostic Plant Path

Credit points: 6 **Teacher/Coordinator:** Coordinator: Prof Lester Burgess. Other teaching staff: Dr Edward Liew, Dr Brett Summerell, Prof David Guest, Dr Peter McGee, Mr Len Tesoriero. **Session:** Semester 1 **Classes:** (2 lecture/tutorial, 3 labs, 1 seminar)/wk **Assumed knowledge:** PPAT3002 or equivalent **Assessment:** One 2hr theory exam, lab and fieldwork reports, two essay assignments

Mycology Module - includes lectures, tutorials and seminars in taxonomic mycology, fungal biology and sexual compatibility studies. Students learn to use morphological keys for identification and their limitations. Diagnostic Plant Pathology Module - this module is concerned with the diagnosis of plant disease in crops and natural ecosystems. It will include at least one excursion as well as laboratory classes. Both modules run in parallel and involve integrated programs

Textbooks
Kendrick, B. (2001). The Fifth Kingdom. www.mycolog.com.MycologuePublication, Ontario 3rd Edition.
Carlile, M.J. et al. (2001). The Fungi (2nd Ed) Academic Press.

AFNR5304
Soil Biology and Biodiversity

Credit points: 6 **Teacher/Coordinator:** Coordinator: Prof Lester Burgess. Other teaching staff: Dr Edward Liew, Prof David Guest, Adj Prof Brett Summerell, Dr Peter McGee, Dr Nerida Donovan, Mr Len Tesoriero, Dr Jillian Smith-White **Session:** Semester 1 **Classes:** 26 lectures/tutorials, 30 hr of labs, 9 hr of fieldwork **Assumed knowledge:** PPAT3002 or equivalent. soil physics and chemistry; agronomy; microbial diversity in plants and soil; basic understanding of the nature and cause of plant disease **Assessment:** One 2 hr theory exam, lab and field reports, essay assignment and oral presentation

An introduction to the diversity of organisms found in the soil, and the ecological principles governing their activities and interactions. Practical applications are illustrated with particular reference to soilborne plant diseases. Topics covered include the nature of the soil biota; isolation, identification and quantification of soil organisms; pathogenic and mutualistic interactions between fungi and roots; mycorrhizae; food webs and soil health; the nature and control of soilborne plant diseases; effects of water potential and temperature on the activity and survival of soil fungi; temporal and spatial distribution of soil fungi and soilborne diseases; and the soil biology of conservation farming. Practical classes demonstrate important concepts as well as techniques for working with soil organisms and soilborne diseases, and for controlling the soil environment, especially soil water, to manipulate biological activity

Textbooks
Burgess, L. et al. (2000). Biology of Diseases Caused by Soilborne Fungal Plant Pathogens. Crawford Fund Master Class Lecture Series. University of Sydney/Royal Botanic Gardens and Domain Trust.
Schjonning, P. et al. (2004). Managing Soil Quality CAB International
Summerell, B.A. et al. (2001). Fusarium: Paul E. Nelson Memorial Symposium, APS Press, St Paul. Minnesota
Erwin, D.C. and Ribeiro, O.K.(1996). Phytophthora Diseases Worldwide. APS Press, St Paul, Minnesota.

AFNR5305
Applied Entomology (Crops)

Credit points: 6 **Teacher/Coordinator:** Dr Sarah Mansfield **Session:** Semester 1 **Classes:** (1x2hour lec/tut, 1x3hour prac, 1x1hour insect collection)/wk **Assumed knowledge:** ENTO2001 or equivalent. **Assessment:** 1 x 2hour exam (40%), 1 x oral presentation (20%), 1 x insect collection (20%), 1 x field diary (20%)

Applied entomology deals with the control of insect pests and the use of beneficial insects. The primary focus of this unit is the development and adoption of integrated pest management within Australian agriculture. The biology of major pest (herbivores and disease vectors) and beneficial (predators, parasitoids, pollinators) insect groups is covered in depth. The advantages and disadvantages of biological, cultural and chemical pest control methods are described using examples from Australian cropping systems. The role of host plant resistance and genetically modified crop varieties is also examined. Students will consider the relative importance of insect ecology, pest control methods and socio-economic factors to successful adoption of integrated pest management. The practical component of the course includes an individual insect collection, some laboratory sessions and day field trips. Students will work in small groups to prepare an oral presentation. Knowledge of ENTO 2001 or an equivalent introductory entomology course is assumed

Textbooks
Required: New, T.R. 2002. Insects and Pest Management in Australia Agriculture. Oxford University Press, Melbourne. 346 pp.
Recommended: Gullan, P.J. & Cranston, P.S. 2005. The Insects: an outline of entomology. 3rd edition, Blackwell Publishing, Malden, MA. 505 pp.

AFNR5306
Insect Taxonomy and Systematics

Credit points: 6 **Teacher/Coordinator:** Dr Sarah Mansfield **Session:** Semester 1 **Classes:** (1x2hr lec/tut, 1x2hr museum project, 1x2hr insect collection)/wk **Assumed knowledge:** ENTO2001 or equivalent. **Assessment:** 1 x 2hour exam (40%), 1 x museum project (30%), 1 x insect collection (30%)

Correct taxonomic identification of insect species is essential for all areas of entomological research. Knowledge of the evolutionary relationships between insect groups contributes to our understanding of insect biology and ecology. Key concepts that underpin the study of insect systematics, biogeography and phylogeny are described using examples from the evolutionary development of insects. The role of morphological, genetic and molecular studies in the classification of insects is examined including the use of specialist software for data analysis. This unit extends the student's knowledge of insect taxonomy through field collections and museum studies of a particular insect group (chosen by the student). Knowledge of ENTO 2001 or an equivalent introductory entomology course is assumed

Textbooks
Required: Gullan, P.J. & Cranston, P.S. 2005. The Insects: an outline of entomology. 3rd edition, Blackwell Publishing, Malden, MA. 505 pp.
Recommended: CSIRO Entomology. 1991. The Insects of Australia. 2nd edition, Melbourne University Press, Carlton, VIC. Two volumes, 1137 pp.

AFNR5501
The Soil Resource

Credit points: 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Prof Alex McBratney, Dr Stephen Cattle **Session:** Semester 2 **Classes:** (2 lec, 2 hr prac)/wk **Assessment:** Fieldtrip participation (5%), soil mapping report (25%), laboratory report (15%), essay (10%), examination (45%)

The unit of study is designed to provide a detailed knowledge of the important features and problems of Australian soils. By the end of this unit of study, students will develop skills in describing and interpreting soil profile features in the field. They will become familiar with quantitative soil data handling procedures and be able do quantitative soil mapping; and measure common soil properties in the laboratory. They will also learn to work in a team environment and write a report on soil mapping and laboratory analysis. The lecture topics include- Features, geography and management of Australian soils; Digital soil mapping - concepts and spatial prediction of soil classes; Soil quality, soil health and soil function - physical, biological and chemical indicators of soil sustainability; Soil structure: The elements of soil structure and methods of their assessment; The degradation and amelioration of soil structure and its effect on agriculture; Soil water erosion - detachment, entrainment, runoff and deposition; Soil acidification: effects of soil acidity in soils, forms of soil acidity, sources of soil acidity, buffering mechanisms in soils, soil pH and Al availability, extent of soil acidity in Australia and remediation of soil acidity; Soil salinity: causes, sources of salts, nature of soil salinity, salinity parameters in soil and water, effects of salinity on plant growth, management of soil salinity; Soil contamination: concepts/definitions, sources of contaminants, effects of contaminants, major contaminants in soil, remediation of contaminated soils.; soil carbon accounting

AFNR5502
Remote Sensing, GIS and Land Management

Credit points: 6 **Teacher/Coordinator:** Dr Inakwu Odeh **Session:** Semester 1 **Classes:** 2 lec, 1tut & 4hr prac/wk (wks 1-6); Project: (wks 7-12) **Prerequisites:** Recommended courses include SOIL3008 (Rural Spatial Information Systems), SOIL3004 (The Soil Resource), GEOS3007 (Remote Sensing: Imaging the Earth), GEOS3014 (GIS in Coastal Management), GEOG5001 (Geographic Information Science A) and GEOG 5002 (Geographic Information Science B) **Assumed knowledge:** Some knowledge of GIS and spatial information systems and/or some knowledge of soil science,

geomorphology and environmental science **Assessment:** Lab prac reports, group work, presentation and project report

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

van Dijk, A. and Bos, M.G. 2001. GIS and remote sensing techniques in land- and water-management. Kluwer Academic Publisher, Dordrecht.
Skidmore, A. 2002. Environmental modelling with GIS and remote sensing. Taylor & Francis, London.
Mowrer, H. T. and Congalton, R. G. (Editors). 2000. Quantifying spatial uncertainty in natural resources: theory and applications for GIS and remote sensing. Ann Arbor Press
Wilson J. P. and Gallant J. C. (Editors). 2000. Terrain Analysis: Principles and Applications. John Wiley and Sons New York

AFNR5503
Field and Laboratory Soil Physics

Credit points: 6 **Teacher/Coordinator:** Prof Alex McBratney (Coordinator), Dr Budiman Minasny **Session:** S1 Intensive **Classes:** (2 lec, 2hr prac)/wk, 5 days in the field (prior to beginning of February semester) **Assessment:** 2hr exam, field report in form of webpage, lab report, presentation, essay

The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area. The emphasis is to examine the quantitative aspects of soil physics particularly in relation to the transfer of energy, gas, water, solids and solutes in soil. Lecture and lab topics include heat flow, gas movement, soil water energetics, saturated and unsaturated flow of soil water, infiltration, solute movement, water and wind erosion as well as the electrical properties of soil and fundamentals of numerical computer modelling of soil physical processes. Five days' field-work, in the week prior to the beginning of February Semester, involves field measurement of soil physical properties such as shear and compressive strength, electrical conductivity, temperature, evaporation, hydraulic conductivity and infiltration rates and moisture content

Textbooks

Reference books:
Hillel D. Environmental Soil Physics: Fundamentals, Applications, and Environmental Considerations. Academic Press, 1998
Jury WA & Horton R. Soil Physics. John Wiley, 2004
Warrick AW. Soil Water Dynamics. Oxford, 2003

AFNR5504
Field and Laboratory Pedology

Credit points: 6 **Teacher/Coordinator:** Dr Stephen Cattle (Coordinator), Dr Damien Field **Session:** S1 Intensive **Classes:** (2 lec, 2 hr prac)/ wk, 5 days in the field (prior to beginning of February semester) **Assessment:** 3hr exam, field report, lab report, presentation, essay

The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area. The main part of this unit of study is the pedological characterization of a number of contrasting soil profiles sampled during the pre-semester field trip. This 5 day field-trip begins 10 days before the beginning of the February semester and involves the study and sampling of soil through central and northern NSW. Students become acquainted with soil types in a variety of landscape, geologic, climatic and landuse settings and develop an understanding of the importance of different soil parent materials. Linkages are made between soil formation processes and resultant soil properties, and the role of soil in various environmental and agricultural ecosystems. Field skills acquired during this trip include a proficiency in soil profile description and an ability to classify soil type according to the Australian Soil Classification scheme. Laboratory analyses of soil samples collected during the field trip include particle-size analysis and extraction of fine-sand fraction for optical identification and quantification of the mineral species present. X-Ray diffraction is used to identify the clay minerals and elucidate mineralogical transformations in these samples. Scanning electron microscopy is also used to examine surface features and mineral composition. Thin sections of some typical NSW soil types are examined and the main features are identified and quantified. The data from these micromorphological investigations are used to provide an understanding of the pedogenesis of soil profiles in specific locations. The lecture series for this unit of study focuses on the main soil-forming (pedogenetic) processes operating both in Australia and abroad. Rock and soil mineral transformations and mechanisms for soil horizon development are addressed. Case studies and recent pedological research publications are used to highlight these topics. A detailed study, including exercises, is also made of two main international soil classification schemes, Soil Taxonomy and the World Reference Base for Soil Resources (WRB), and the Australian Soil Classification system

Textbooks

Reference books:
Buol S, Walker M, Southard R. Soil Genesis and Classification. Iowa State University. 2003
Isbell R. The Australian Soil Classification. CSIRO, 1996
Jenny H. Factors of Soil Formation: A System of Quantitative Pedology. Dover. 1994
McKenzie N, Jacquier D, Isbell R & Brown K. Australian Soils and Landscapes. CSIRO, 2004
Van Breeman, N & Buurman, P. Soil Formation. 2nd Edition. Kluwer Academic, 2002
Young A & Young R. Soils in the Australian Landscape. Oxford University Press, 2001

AFNR5505
Environmental Soil Chemistry

Credit points: 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Dr Markus Grafe **Session:** Semester 2 **Classes:** (2 lec, 3 hr prac)/wk **Assessment:** 3hr exam, 4 labs. Reports and one oral presentation on a given topic, essay

The main objective of the unit is to develop an understanding of the common chemical properties and processes in soil environment. By the end of this unit of study, students will become familiar with soil chemical composition and develop skills in describing chemical processes in soil environment. They will be able to measure various chemical properties of soil and soil solution in the laboratory; and perform chemical speciation of ions in soil solution. Students will also learn to work in a team environment and develop communication and writing skills. Syllabus summary:The lecture topics include- the structure and chemistry of inorganic components in soil, surface charge

of soil minerals, chemistry and general properties of soil organic matter, important functional groups of soil organic matter, role of organic matter in soil, cation exchange in soil, selectivity of cations on soil colloids, cation exchange reactions and selectivity coefficients, adsorption reactions of environmentally important ions, surface functional groups, adsorption isotherms, equilibrium based adsorption models, point of zero charge, diffuse double layer-theory and models, surface complexation models, soil solution-importance, methods of obtaining soil solutions, models to determine activity coefficients, speciation, dissolution and solubility processes in soil environment, soil chemical equilibria, geochemical speciation models and redox chemistry of soil

Textbooks

Reference books
Evangelou VP, Environmental Soil and Water Chemistry: John Wiley & Sons, New York, 1998
Lindsay WL, Chemical Equilibria in Soils. John Wiley & Sons, New York, 1979
McBride MB, Environmental Chemistry of Soils. Oxford University Press, New York, 1994.
Sparks DL, Environmental Soil Chemistry. Second Edition, Academic Press, San Diego, 2003
Sposito G, The Chemistry of Soils. Oxford University Press, New York, 1989

AFNR5506
Limnology and Water Quality

Credit points: 6 **Teacher/Coordinator:** Dr Dhia Al Bakri (Coordinator), Prof Ivan Kennedy, Dr Robert Caldwell **Session:** Semester 1 **Classes:** 6-day field trip in orientation week, 26 hr lec/tut, 20 hr prac **Prohibitions:** AGCH3030 **Assumed knowledge:** GEOG2303, LWSC2002, AGCH2003 or equivalent **Assessment:** 2 hr exam (50%), laboratory reports (25%), field trip professional report (25%)

This unit of study will provide students with an understanding of the main Australian water quality problems, related limnological issues and the underlying causes and processes. The unit commences with a field trip module to the productive Namoi and the Macquarie Valleys, where agriculture based on irrigation, environmental impacts on vegetation, soil and water of agricultural enterprises such as cotton farming and human settlements will be assessed. Field observations on pH, nutrient and salt content, pesticide contamination, and microbial content will be made on water, sediment, soils and in constructed wetlands, with samples returned for more detailed laboratory analysis at the University. The unit will also investigate sources and pathways of pollutants reaching streams, lakes and reservoirs, determine the interactions between runoff and water quality, and identify pollution control measures within the context of integrated catchment management (ICM). The unit will cover aspects of freshwater ecology with particular emphasis on wetlands ecosystem, riparian vegetation, macrophytes, phytoplanktonic communities and cyanobacteria. At the completion of this unit, the students will be able to determine different water quality and pollution problems in Australian water bodies; explain underlying causes and processes, relate the interaction between flow and water quality and evaluate their implications on catchment management. The students will also be able to employ limnological modeling to predict heat budget distribution; catchment loading and mass balance of given pollutants, and select appropriate pollution control and management strategies

Textbooks

Wetzel R G 2001. Limnology: Lake and reservoir ecosystems, 3rd edn, Academic Press London.
Dodson S. I. 2005. Introduction to Limnology. McGraw-Hill Book Company, New York.

AFNR5507
Catchment Hydrology and Management

Credit points: 6 **Teacher/Coordinator:** Dr Willem Vervoort (Coordinator), Dr Dhia Al Bakri **Session:** Semester 1 **Classes:** (2 hrs lec, 4 hrs prac/fieldwork)/wk **Assumed knowledge:** GEOG2321, LWSC3004, AFNR5506 or equivalent **Assessment:** Practical report (2000 words) 25%, discussion and justification (2000 words) 25%, 2hr exam 50%

This unit of study is designed to give students insight into the problems related to catchment-scale hydrological modeling, freshwater management and river restoration and policy making at the catchment level. The unit builds on the theoretical knowledge gained in LWSC 3004 and GEOG 2321. In the first part, the unit explores several ways to simulate catchment hydrological processes and how risk assessment in natural resource management takes places. In particular the unit tries to stimulate discussion on the possibilities and impossibilities of assessing the impact of management and policies in a catchment. The second part of the unit will focus on discussing and applying a range of techniques, models and management options used in improving quality of water resources, combating pollution and restoring degraded aquatic ecosystems. By the end of this unit the students should be able to apply salinity and groundwater risk assessment tools, apply catchment-scale simulation models to predict management and policy impact, and identify and employ appropriate technological solutions and management practices to control water quality problems and remediate stressed streams, lakes and reservoirs

Textbooks

Beven, K.J. Rainfall-Runoff modeling, The Primer, John Wiley and Sons, Chichester, 2001
Kumagai. M. and Warwick, W. F. 2003. Freshwater management: Global versus local perspectives, Springer-Verlag, Tokyo.

AFNR5601
Turf Management

Credit points: 6 **Teacher/Coordinator:** Dr Peter Martin **Session:** Semester 1 **Classes:** External studies and residential block **Assumed knowledge:** Practical knowledge of turf cultural practices; basic chemistry and basic biology **Assessment:** One 3 hr examination, two 2,000 word assignments, tutorial papers and practical reports

This unit examines the scientific basis of turf management for both warm climate and cool climate grasses. Topics include the history and economic importance of managed grass surfaces; the macro- and micro-environment of turf both above and below ground; the physiology of growth under turf conditions including the effects of water, traffic, mowing, cultivation and nutrition; establishment of turf by seed and vegetative methods; and the objective assessment of turf quality

Textbooks

Beard, J.B. Turfgrass: Science and Culture (Prentice Hall)
Atwell, B., Kriedemann, P. and Turnbull, C. Plants in Action: adaptation in nature; performance in cultivation (Macmillan Australia)
Glendinning, J (ed.) Australian Soil Fertility Handbook (CSIRO Publications Collingwood)

AFNR5602
Advanced Turf Management

Credit points: 6 **Teacher/Coordinator:** Dr Peter Martin **Session:** Semester 2 **Classes:** External studies and residential block **Prerequisites:** AFNR5601 Turf Management and AFNR5603 Turf Species and Varieties **Assumed knowledge:** Practical knowledge of turf cultural and construction practices; basic chemistry; basic biology **Assessment:** One 3hr examination, one oral presentation, one 2,000 word assignment, tutorial papers and practical reports

Readings, discussions and practical experiments to gain advanced expertise in laboratory and field aspects of selected areas of plant and soil sciences underlying turf management. Topics include germination and establishment, stress physiology, minimization of water use while maintaining acceptable turf quality, use of saline and downgrade waters for turf irrigation, root growth, growth analysis, fertilizer and pesticide management, environmental legislation relevant to turf facilities, turf construction materials and techniques, design of turf facilities, quality assurance in turf construction and maintenance of turf constructions

Textbooks

Adams, W.A. and Gibbs, R.J. Natural Turf for Sport and Amenity (CAB International, Wallingford).
Atwell, B., Kriedemann, P. and Turnbull, C. Plants in Action: adaptation in nature; performance in cultivation (Macmillan Australia)

AFNR5603
Turf Species and Varieties

Credit points: 6 **Teacher/Coordinator:** Dr Peter Martin **Session:** Semester 1 **Classes:** External studies and residential block **Corequisites:** AFNR5601 Turf Management **Assumed knowledge:** Practical knowledge of main turf species, basic biology **Assessment:** One 3hr examination, one 2,000 word assignment, tutorial papers, practical report and plant collection

This unit has three main aims: (a) to provide an overview of plant variation, ecotypic differentiation and the principles of plant taxonomy, with special reference to grasses, (b) to teach skills in identification of members of the grass family and related families including detailed morphological terminology and the use of conventional and vegetative taxonomic keys, and (c) to provide an introduction to the methods of development of new turf cultivars by breeding and/or selection. Information is also provided on biochemical methods of identifying grass varieties, comparative testing of turf grasses, plant breeders' rights and cultivar registration

Textbooks

Hubbard, C.E. Grasses, 3rd Edition, (Penguin Books, London)
Wheeler, D.J.B., Jacobs, S.W.L. and Whalley, R.D.B., Grasses of New South Wales, 3rd. Edition, (University of New England Printery, Armidale)
Reference book: Briggs, D. and Walters, S.M. Plant Variation and Evolution, 3rd Edition (Cambridge University Press, Cambridge)

AFNR5604
Diagnostic Methods in Turf Management

Credit points: 6 **Teacher/Coordinator:** Dr Peter Martin **Session:** Semester 1 **Classes:** External studies and residential block **Assessment:** One 3hr examination, one 2,000 word assignment, tutorial papers and a laboratory book

Following an overview of the main chemical, physical and biological diagnostic tests used in the formulation of advice by turf consultants and in decision making by turf managers, the course will cover the theory and practice of sampling and of the conduct of tests (including interpretation guidelines) using selected methods in the three areas. Chemical testing will include the more important diagnostic methods for soils, irrigation and effluent waters and tissues; physical testing will cover particle size analysis, bulk density, pore space, moisture characteristic and infiltration rates for gravels, sands and soils used in turf construction; biological testing will cover the techniques used for the identification of the major pests and diseases of turf grasses. The unit includes an extensive laboratory component. Reference will also be made to quality assurance procedures in sampling and laboratory practice and the importance of statistical procedures in the interpretation of results

Textbooks

Rayment, G.E. and Higginson, F.R. Australian Laboratory Handbook of Soil and Water Chemical Methods (Inkata Press, Adelaide).
Peverill, K.I. et al., Soil Analysis: an Interpretation Manual (CSIRO publishing, Collingwood)
Smiley, R.W., Dernoeden, P.H. and Clarke, B.B. Compendium of Turfgrass Diseases, 2nd Edition, (APS Press, St Paul)

AFNR5605
Applied Plant Ecology

Credit points: 6 **Teacher/Coordinator:** Dr Peter Martin **Session:** Semester 2 **Classes:** External studies and residential block **Prerequisites:** AFNR5601 or equivalent AFNR foundation unit of study **Assumed knowledge:** Practical awareness of pesticide use in the amenity horticulture industries. Basic chemistry, basic biology. **Assessment:** One 3hr exam, one 2,000 word assignment, one oral presentation, tutorial papers and practical reports

Intended primarily for students in the amenity horticulture field, this unit explores the effects of the management practices used in the industry on the micro- and macro- environments, both biological and physical. Input factors such as water, nutrients, organic amendments and pesticides will be considered in relation to their modes of action and their effects on soil sustainability (including acidification and salinification), macro-and micro-biodiversity, contamination of runoff water and ground water, and safety for staff and members of the community. Issues such as the use of selective versus broad-spectrum pesticides, the development of resistance to pesticides and enhanced bio-degradation of pesticides will be considered from the ecological perspective. Physical management methods such as scarification and coring in turf management and canopy reduction in tree management will be evaluated in terms of the net ecological benefits of the practices. During the semester each student will be required to choose a topic in consultation with the lecturer and subsequently present a seminar to the class in the form of a case study or situation analysis

Textbooks

Atwell, B., Kriedemann, P and Turnbull, C. Plants in Action: adaptation in nature, performance in cultivation. (Macmillan, Melbourne) (selected chapters)
Gibson, D.J. Methods in Comparative Plant Population Ecology. (Oxford University Press, Oxford).
Coleman, D.C. and Crossley, D.A. Fundamentals of Soil Ecology (Academic Press, London)
Smith, L.W. Notes on the Ecology of Weed Management (Plant Breeding Institute, Camden)

AFNR5901
Research Review

Credit points: 6 **Session:** Semester 1, Semester 2 **Classes:** No scheduled classes **Prohibitions:** AFNR5902, AFNR5903 **Assessment:** 10,000 word review (100%)

Students complete a review of the research literature on a mutually agreed topic relevant to their program and write a report of approximately 10,000 words. Each student will be assigned an adviser. This unit aims to train students in the following generic attributes: information skills, critical thinking, technical writing

AFNR5902
Research Study

Credit points: 12 **Session:** Semester 1, Semester 2 **Classes:** No scheduled classes **Prohibitions:** AFNR5901, AFNR5903 **Assessment:** 15,000 word review (75%), oral presentation (25%)

Students complete a review of the research literature and analyze predetermined data to test a hypothesis on a mutually agreed topic relevant to their program. The literature review and results of the analysis are presented in an oral presentation and a written report of approximately 15,000 words. Each student will be assigned supervisor. This unit aims to train students in the following generic attributes: information skills, critical thinking, hypothesis testing, oral presentation, data analysis and presentation, technical writing

AFNR5903
Research Project

Credit points: 24 **Session:** Semester 1, Semester 2 **Classes:** No scheduled classes **Prohibitions:** AFNR5901, AFNR5902. **Assessment:** 25,000 word thesis comprising a literature review (25%) and a research paper (45%), oral research proposal (10%), oral research presentation (20%)

Students complete a review of the research literature and conduct empirical research on a mutually agreed topic relevant to their program. Students present an oral research proposal, and the literature review and results of the research are presented in an oral presentation and a thesis of approximately 25,000 words. Each student will work closely with an assigned supervisor. This unit aims to train students in the following generic attributes: information skills, critical thinking, developing research proposals, hypothesis testing, data analysis and presentation, oral presentation, technical writing

Note: AFNR5901, AFNR5902 and AFNR5903 are mutually exclusive

AGEC5300
Business Topics in Amenity Horticulture

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** Intensive course 26 lectures plus supporting workshops **Assessment:** 2 hr examination; 2 assignments

This unit is focussed on managerial economics of profit and non-profit organisations involved in providing turf-related, and more generally horticulture-based, products and services, such as active and passive recreation and amenity services. Market priced and non-priced goods and services are considered. Topics may include accounting concepts, budgeting, financial planning and control, capital management, resource management, demand assessment, marketing and pricing strategies, environmental externalities and other market failures, regulation and other forms of government intervention, and non-market valuation

AGEC5301
Agribusiness Management

Credit points: 6 **Session:** Semester 2 **Classes:** (3 lec & 2 workshop)/wk **Assessment:** One mid semester exam (1 hour) one final exam (2hr), assignments

This unit of study deals with the application of economic principles and techniques of business management to agribusiness firms, with a particular focus on farms. The topics covered will include: management goals and objectives; budgeting; gross margins analysis; parametric budgeting; sources of management information and its analysis; simple systems simulation; applications of linear programming to farm and agribusiness planning; financial management; risk in planning and management; cash, credit, debt and taxation management; evaluation of investment and firm growth alternatives; acquisition and transfer of assets; the role of financial institutions in the agricultural credit market. Students develop skills in computer-based farm planning. While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program

Textbooks
J.B. Hardaker et al. Coping with Risk in Agriculture, 2nd edn (CABI, 2004)

AGEC5302
Agricultural and Resource Policy

Credit points: 6 **Session:** Semester 1 **Classes:** (2-3 lec, 1x1 hour tutorial)/week **Assessment:** One mid semester exam (1 hour); one final exam (2 hours); assignments; tutorial papers

This unit is designed to cover basic theoretical and modelling frameworks for economic evaluation of policy formation (including Pareto welfare economics and public choice theory); market and government failure; the institutional structure of agricultural and resource policy formulation in Australia; micro and macroeconomic issues in agricultural and resource policy; and issues arising from linkages between agriculture and the resource industries and with the rest of the economy. Students will be expected to read widely. While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program

AGEC5303
Applied Optimisation

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** (2 lec and 2 tut)/wk **Assessment:** One end-of-semester exam (2 hours), assignments, class work

This unit of study deals with constrained optimization problems in which when one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The focus of the unit is on linear programming (LP) problems, i.e. ones in which both the objective and the constraints are linear functions. Linear programming has wide application to farm planning, financial planning, and other planning contexts. Graphical and mathematical representations of linear programming problems are covered. Topics include solution methods, solution information, primal and dual formulations, stability of optimal solutions, and parametric programming. After covering the basics of LP, the focus shifts to modelling of real world scenarios in LP models. Special formulations (eg. transportation model), and extension to integer programming are examined. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (eg. LINDO). The unit includes material dealt with at the advanced undergraduate level. Additional workshops, seminars, tutorials, assignments and/or assessment are provided as appropriate to the postgraduate program

AGEC5304
Research Methods

Credit points: 6 **Session:** Semester 2 **Classes:** (2 lec, 1-2 hour tut)/week **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), assignments, research proposal

This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; inductive thought and deductive logic; creativity; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data; statistical design of sample surveys; questionnaire construction; interviewing techniques; and methods of analysis of survey data. Topics are illustrated with examples of research in theoretical economics, empirical discipline-advancing research, empirical exploratory research, and research using policy-evaluation modelling. Students are expected to read widely. While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program

AGEC5401
Agricultural Marketing Analysis

Credit points: 6 **Session:** Semester 2 **Classes:** (2-3 lec, 1x1 hour tut)/wk **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

Performance of the agricultural and resource marketing systems, marketing margins, transportation, storage, advertising, wholesaling, and retailing. The structure, conduct and performance of marketing firms, and government and public interest in the food system will also be addressed via a number of case studies. Extensive readings will be required. The unit is designed to focus on analysing applied strategic management problems facing marketing firms. Students will be required to read widely

Textbooks
Collections of readings

AGEC5402
Agricultural Development Economics

Credit points: 6 **Session:** Semester 2 **Classes:** (2-3 lec, 1x1 hour tut)/wk **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

This unit is designed to expose students to issues of economic growth and development, and their policy and welfare impacts in developing countries. More specifically the unit will focus on agricultural development policies and outcomes. Linkages with other industries, environment, sustainability, globalisation and national and international development agencies will also be discussed. Extensive reading will be required

Textbooks
Collections of readings

AGEC5403
Agricultural Trade

Credit points: 6 **Session:** Semester 1 **Classes:** (2-3 lec, 1x1 hour tut)/wk **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

In this unit of study the basic economic principles underlying international trade in agricultural and resource commodities and the policies involved will be presented. Issues related to trade and development will also be considered. The main topics covered will include: trends in agricultural and resources trade; economics and politics of protection, economic integration and impacts on international commodity trade; international trade policy making. An understanding of globalisation, including foreign direct investment, will also be required. Extensive reading will be required

Textbooks
Collections of readings.

AGEC5404
Agribusiness Analysis

Credit points: 6 **Session:** Semester 1 **Classes:** (2-3 lec, 1x1 hour tut)/wk **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies

This unit focuses on applications of economic theory and methods in agribusiness decision making. It provides advanced treatment of the industrial organisation of agribusiness firms. Case studies will be used to examine the economic complexities of global agribusiness systems. Extensive readings make up the central component of the unit

Textbooks

Collections of readings.

AGEC5405
Quantitative Planning Methods

Credit points: 6 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 1 **Classes:** (2 lec & 2 tut/lab session)/wk **Assessment:** One end-of-semester exam (2 hours), 2 assignments

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sectoral level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are briefly discussed. Topics include non-linear programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (eg. dynamic programming and optimal control). Sectoral level planning applications considered include transportation and plant location studies; spatial equilibrium; and resource utilization across time. Firm level applications include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization. The unit includes material dealt with at the advanced undergraduate level. Additional workshops, seminars, tutorials, assignments and/or assessment are provided as appropriate to the postgraduate program

AGEC5406
Agricultural Finance and Risk

Credit points: 6 **Teacher/Coordinator:** A/Prof Ross Drynan **Session:** Semester 2 **Classes:** (2 lec & 2 tut/lab session)/wk **Assessment:** One end-of-semester exam (2 hours), 2 assignments

This unit has two related components. One component concerns risk and risk management in agriculture; the other deals with issues of agricultural producer finance. Risk topics include: risk measurement, subjective probability, adjusting beliefs as a result of new information; risk attitudes; decision making under risk; expected utility theory; valuing information; generalizations of expected utility theory; E-V analysis; stochastic dominance; internal measures to cope with risk including diversification and flexibility; insurance, futures, options and other market instruments for managing risk. Finance topics include the implications of capital market imperfections and consequential differences between corporate and small business finance; financial relationships between debt/equity levels and risk, optimal debt levels; cost of capital; short term working capital management; and longer term capital (investment) budgeting. Techniques of valuation of projects in risk-free and risk situations are examined. Financial and risk management practices in Australian agriculture are reviewed. The unit includes material dealt with at the advanced undergraduate level. Additional workshops, seminars, tutorials, assignments and/or assessment are provided as appropriate to the postgraduate program

AGEC5407
Professional Skills

Credit points: 3 **Teacher/Coordinator:** A/Prof Fredoun Ahmadi-Esfahani **Session:** Semester 1 **Classes:** One 2 hour seminar/week **Assessment:** Discussion papers, 1x2 hour exam, essay

A series of lectures, seminars and workshops designed to provide students with enhanced professional skills. Sessions will focus on communication skills, including report writing, preparation of policy briefs, seminar and workshop presentations. Other sessions will be focused on aspects of professional ethics, attitudes and responsibilities and leadership. Participatory activities such as team debates and mock inquiry hearings addressing issues of current relevance to agricultural /resource economists are used to develop the student's communication skills and knowledge of issues

AGEC5408
Contemporary Issues

Credit points: 3 **Teacher/Coordinator:** Dr Michael Harris **Session:** Semester 2 **Classes:** One 2 hour seminar/week **Assessment:** 1x2hour final exam, 1xgroup presentation, 1x assignment

Through regular seminars by guest speakers and occasional workshops or other participatory activities, students examine a broad range of national and international issues of current relevance to Australian agricultural and resource economists

RSEC5431
Benefit Cost Analysis

Credit points: 6 **Session:** Semester 1 **Classes:** (2 lec, 1 tut)/wk **Assessment:** One 1 hr mid term exam, an essay paper, one 2 hr end of semester exam

This unit provides a detailed treatment of benefit-cost analysis and its use in public sector decision making and project evaluation. The underpinning concepts in welfare economics are analysed in detail, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures. Procedures of undertaking a benefit-cost analysis are presented, and tools of non-market valuation for environmental assets are covered in detail. These techniques include both stated and revealed preference techniques, including contingent valuation, choice modeling, hedonic pricing and travel cost methods

Textbooks

J. Sinden and D. Thampapillai, Introduction to Benefit Cost Analysis, Longman, 1995.
H. C. Campbell, and R. Brown, Benefit-Cost Analysis: Financial and Economic Appraisal Using Spreadsheets, Cambridge University Press, 2003.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC5432
Environmental Economics

Credit points: 6 **Session:** Semester 1 **Classes:** (2 lec, 1 tut)/wk **Assessment:** 1hr midterm exam, an essay paper, 2 hr end of semester exam

The unit provides theoretical and empirical background related to economic aspects of a range of environmental issues. The unit exemplifies the studied concepts with environmental problems related to agriculture (soil salinity, algal blooms, overgrazing etc.) as well as with environmental problems typical to Australia. The guiding economic themes are externalities, market failure, the importance of property rights, optimal allocation of pollution abatement, technical issues (e.g. measuring benefits without commodities [e.g. existence values]), and the processes for making choices relating to non-market goods. Some social issues related to environmental impacts are studied through exploration of the problems of population size and distribution, economic growth, and environmental regulation

Textbooks

D. Thampapillai., Environmental Economics: Concepts, Methods and Policies., Oxford University Press, 2002.
R. Perman, Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
C. D. Kolstad., Environmental Economics., Oxford University Press, 2000.
T. Tietenberg., Environmental and Natural Resource Economics., 6th Edition, Addison-Wesley, 2003.N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC5433
Economics of Mineral & Energy Industries

Credit points: 6 **Session:** Semester 2 **Classes:** (2 lec, 1 tut)/wk **Assessment:** 1hr midterm exam, an essay paper, 2 hr end of semester exam

The unit provides theoretical and empirical background in the economics of minerals exploration, extraction and marketing and in the economics of energy generation, distribution and use. The economics of the minerals and energy commodity markets will be discussed and analyzed. The interactions of mineral extraction and energy generation activities with other natural resources and the environment will be of particular interest (e.g. mine site remediation, land use conflicts). Sustainability and prospects for long term efficient use of these resources, as well as the development and use of alternative technologies will also be discussed. In addition, institutional and policy issues (e.g. regulatory reform), will be analyzed. The unit will discuss the main aspects of the markets for minerals and energy, market structure, business environment and price movements. The unit will also provide an introductory discussion on the markets for derivatives (options, futures, forward, swaps) on minerals and energy commodities

Textbooks

T. J. Brennan, L. K. Palmer, and A. S. Martinez, Alternating Currents: Electricity Markets and Public Policy, Resources for the Future Press, Washington D.C., 2002.
J. E. Tilton, On Borrowed Time? Assessing the Threat of Mineral Depletion, Resources for the Future Press, Washington D.C., 2003.
R. Perman, Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
T. Tietenberg., Environmental and Natural Resource Economics., 6th Edition, Addison-Wesley, 2003.
F. E. Banks., Energy Economics: A Modern Introduction., Kluwer Academic Publishers, 2000.
S. Kesler., Mineral Resources, Economics and the Environment, Maxwell Macmillan International, 1994. N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC5434
Economics of Water and Bio-resources

Credit points: 6 **Session:** Semester 2 **Classes:** (2 lec, 1 tut)/wk **Assessment:** 1hr midterm exam, an essay paper, 2 hr end of semester exam

The main objective of the economics of biological resources will be to introduce students to the bio-economic modeling of the resources that experience biological growth. The unit consists of two complementary parts: water economics and economics of biological resources (fisheries, forestry, other wildlife). The main objective of the water economic component is to investigate the economic aspects of water use and water quality. In particular approaches toward efficient use of the water resource over time, optimal allocation of water among competing uses and achievement of the socially optimal level of water quality will be discussed. The demand for water from various sectors will be analysed in both static and dynamic settings. Issues considered include the selection and construction of water storages, aquifer water extraction and alternative water sources. The issues of waste water disposal and water quality, changing water technologies, and water pollution will be also discussed. The unit will also discuss the economics of wildlife preservation and protection, as well as the economics of biodiversity. Particular attention will be devoted to the economic mechanisms for managing the water resources including property rights, water allocation and water markets. The key policy instruments (taxes, quotas, standards) in these areas are analyzed and discussed. The institutional and policy aspects will also be considered through analysis of water policy reform in Australia and elsewhere

Textbooks
Bergstrom, Boule and Poe (Eds.), The Economic Value of Water Quality, Edward Elgar Pub., 2001.
Easter, Rosegrant and Dinar (Eds.), Markets for Water: Potential and Performance, Kluwer Academic Pub., 1998.
D. Smith, Water in Australia, Oxford University Press, 1999.
R. Perman, Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
J. M. Hartwick and Nancy D. Olewiler., The Economics of Natural Resource Use., 2nd Ed. , Addison-Wesley, 1998.
J. M. Conrad, (1999), Resource Economics, Cambridge University Press, Cambridge.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

10. Postgraduate degree resolutions and policies

Resolutions of the Faculty

Graduate Certificate, Graduate Diploma and Master of Agriculture

1.1 Graduate Certificate, Graduate Diploma and Master of Agriculture candidates will proceed by coursework.
1.2 Students may undertake part-time candidature.
1.3 Students may commence candidature in either first or second semester.

2. **Admission requirements**

2.1 Admission requirements for the Graduate Certificate, Graduate Diploma and Master of Agriculture are normally a bachelor's degree or an equivalent qualification.
2.2 In some instances the admission requirements may be met by evidence of general or professional qualifications and appropriate work experience to indicate that the student has the academic preparation and capacity to complete the course in question.
2.3 With the approval of the Dean, students may be granted admission with advanced standing if they have completed relevant prior learning at an equivalent level elsewhere.

3. **Periods of candidature**

3.1 The period of candidature for a full-time candidate for the Graduate Certificate will be one semester.
3.2 The period of candidature for a full-time candidate for the Graduate Diploma will be one year.
3.3 The Master of Agriculture will normally take three semesters (18 months) of full time study to complete, but may be completed in two semesters with Faculty approval.

4. **Coursework to be completed**

4.1.1 Candidates for the Graduate Certificate complete a total of 24 credit points made up of 12 credit points from their selected specialisation as specified in TABLE A and the balance from elective units chosen from any other units listed in TABLE B (subject to meeting prior learning requirements and timetabling).
4.1.2 Students who have completed relevant prior learning at an equivalent level may be given up to 6 credit points advanced standing with the approval of the Dean.
4.2.1 Candidates for the Graduate Diploma complete a total of 36 credit points made up of 18 credit points from their selected specialisation as specified in TABLE A and the balance from elective units chosen from any other units listed in TABLE B (subject to meeting prior learning requirements and timetabling).
4.2.2 Students who have completed relevant prior learning at an equivalent level may be given up to 12 credit points advanced standing with the approval of the Dean.
4.3.1 Candidates for the Master of Agriculture complete a total of 48 credit points made up of 24 credit points from their selected specialisation as specified in TABLE A and the balance from elective units chosen from any other units listed in TABLE B (subject to meeting prior learning requirements and timetabling) or, with the Dean's approval, two appropriate 6 credit point units offered from outside the Faculty.
4.3.2 Students who have completed relevant prior learning at an equivalent level may be given up to 12 credit points advanced standing with the approval of the Dean.
4.4 Advanced standing is given only when:
4.4.1 no unit of study for which credit is granted has been a basis for the award of any other degree or diploma;
4.4.2 the unit or units were passed at a level of competence or with such additional assessment or other requirements as may be determined by the Board in each case;
4.4.3 the unit or units were completed within six years immediately preceding the commencement of candidature for the Master of Agriculture, the Graduate Diploma or the Graduate Certificate.
4.5 Students may transfer between programs and receive credit for any completed units, provided they have not taken out the award from which they are transferring.
4.6.1 To achieve the objectives of the courses, especially for students seeking training in a new discipline, some classes may be taught in conjunction with advanced undergraduate units.
4.6.2 However, postgraduate coursework students will engage in additional consultation and more advanced assignment work than their undergraduate counterparts.
4.6.3 They will also be assessed against a higher standard.

5. **Subject Areas**

5.1 The Graduate Certificate, Graduate Diploma and Master of Agriculture may be awarded in the following subject areas and the testamur for the award will specify the subject area:
5.1.1 Agribusiness
5.1.2 Agricultural Economics
5.1.3 Agricultural Technologies
5.1.4 Natural Resource Management
5.1.5 Resource Economics
5.1.6 Sustainable Agriculture
5.1.7 Turf Management

6. **Satisfactory progress**

6.1 The Board of Postgraduate Studies may require a candidate proceeding by coursework to show good cause why he or she should be allowed to reenrol in a unit of study which has been twice failed or discontinued to count as failure.

7. **Withdrawal from units of study**

7.1 A candidate for a Graduate Certificate, Graduate Diploma or Master of Agriculture who discontinues enrolment in a Semester 1 unit of study on or before 31 March in that year, will be recorded as withdrawn from that unit.
7.2 A candidate for a Graduate Certificate, Graduate Diploma or Master of Agriculture who discontinues enrolment in a Semester 2 unit of study on or before 31 August in that year, will be recorded as withdrawn from that unit.

8. **Discontinuation**

8.1 A candidate for a Graduate Certificate, Graduate Diploma or Master of Agriculture who discontinues enrolment in a unit of study after the withdrawal period but before the end of classes in that unit, will be recorded as 'Discontinued - Not to count as failure' in that unit.

9. **Completion of course**

9.1 Except by permission of the Dean, no student will be allowed to sit for any examination unless the requirements specified by the Faculty have been completed.
9.2 The Dean may call upon any student who has been absent from more than 10 per cent of classes in any semester to show cause for such absence.
9.3 Students who fail to show sufficient cause may be excluded from admission to examinations. No excuse for absence from lectures, demonstration or practical work will be received unless tendered in writing to the Faculty Office within one week after attendance is resumed.

10. **Delegation**

10.1 In these resolutions:
10.1.1 Faculty delegates its responsibility to the Board of Postgraduate Studies.
10.1.2 The Board of Postgraduate Studies awards the Graduate Certificate, Graduate Diploma and Master of Agriculture whenever the coursework results are satisfactory.
10.1.3 The Board of Postgraduate Studies delegates the following responsibilities to the Dean who in turn delegates them to the Associate Dean (Postgraduate): approval of:
10.1.3.1 admission to candidature
10.1.3.2 suspension of candidature
10.1.3.3 award of the Graduate Certificate, Graduate Diploma and Master of Agriculture.

Table A: core units

Semester 1 (all units are 6 credit points unless otherwise indicated)

Agribusiness	
AGEC5301	Agribusiness Management
AGEC5403	International Agricultural Trade
AGEC5404	Agribusiness Analysis

Agricultural Economics	
AGEC5403	International Agricultural Trade
AGEC5404	Agribusiness Analysis
AGEC5405	Quantitative Planning Methods
AGEC5407	Professional Skills (3 credit points)

Agricultural Technologies	
AFNR5102	Food Science A
AFNR5103	Food Science B
AFNR5104	Environmental Chemistry A
AFNR5107	Analytical Chemistry A
AFNR5109	Plant Breeding
AFNR5201	Crop Agronomy
AFNR5205	Production Horticulture
AFNR5206	Postharvest Biology and Technology
AFNR5207	Issues in Horticultural Science
AFNR5302	Molecular & Physiological Plant Path
AFNR5303	Adv Mycology & Diag Plant Path
AFNR5304	Soil Biology and Biodiversity
AFNR5305	Applied Entomology (Crops)
AFNR5306	Insect Taxonomy
AFNR5502	Remote Sensing, GIS & Land Mngt
AFNR5503	Field and Laboratory Soil Physics
AFNR5504	Field and Laboratory Pedology
AFNR5506	Limnology and Water Quality
AFNR5507	Catchment Hydrology and Mngt

Natural Resource Management	
AFNR5502	Remote Sensing, GIS & Land Mngt
AFNR5503	Field and Laboratory Soil Physics
AFNR5504	Field and Laboratory Pedology
AFNR5506	Limnology and Water Quality
AFNR5507	Catchment Hydrology and Mngt
RSEC5431	Benefit-Cost Analysis
RSEC5432	Environmental Economics

Resource Economics	
RSEC5431	Benefit-Cost Analysis
RSEC5432	Environmental Economics

Sustainable Agriculture	
AFNR5201	Crop Agronomy
AFNR5202	Professional Practice in Agronomy
AFNR5205	Production Horticulture
AFNR5206	Postharvest Biology and Technology
AFNR5207	Issues in Horticultural Science
RSEC5431	Benefit-Cost Analysis
RSEC5432	Environmental Economics

Turf Management	
AFNR5601	Turf Management
AFNR5603	Turf Species and Varieties
AFNR5604	Diagnostic Methods in Turf Mngt

Semester 2 (all units are 6 credit points unless otherwise indicated)

Agribusiness	
AGEC5401	Agricultural Marketing Analysis

Agricultural Economics	
AGEC5401	Agricultural Marketing Analysis
AGEC5402	Agricultural Development Economics
AGEC5406	Agricultural Finance and Risk
AGEC5408	Contemporary Issues (3 credit points)

Agricultural Technologies	
AFNR5101	Plant Agricultural Biotechnology
AFNR5105	Environmental Chemistry B
AFNR5106	Food Science C
AFNR5108	Plant Cytogenetics
AFNR5204	Crop Water Management
AFNR5208	Research & Practice in Hort Science
AFNR5301	Plant Disease
AFNR5501	The Soil Resource
AFNR5505	Environmental Soil Chemistry

Natural Resource Management	
AFNR5501	The Soil Resource
AFNR5505	Environmental Soil Chemistry

Resource Economics	
RSEC5433	Econs of Mineral & Energy Industries
RSEC5434	Econs of Water and Bio-resources

Sustainable Agriculture	
AFNR5204	Crop Water Management
AFNR5208	Research & Practice in Hort Science

Turf Management	
AFNR5602	Advanced Turf Management
AFNR5605	Applied Plant Ecology

Table B: all units

Code	Unit	Sem
AFNR5003	Biometry	1
AFNR5101	Plant Agricultural Biotechnology	2
AFNR5102	Food Science A	1
AFNR5103	Food Science B	1
AFNR5104	Environmental Chemistry A	1
AFNR5105	Environmental Chemistry B	2
AFNR5106	Food Science C	2
AFNR5107	Analytical Chemistry A	1
AFNR5108	Plant Cytogenetics	2
AFNR5109	Plant Breeding	1
AFNR5201	Crop Agronomy	1
AFNR5202	Professional Practice in Agronomy	1
AFNR5204	Crop Water Management	2
AFNR5205	Production Horticulture	1
AFNR5206	Postharvest Biology & Technology	1
AFNR5207	Issues in Horticultural Science	1
AFNR5208	Research and Practice in Horticultural Science	2
AFNR5209	Sustainable Cropping Systems	1
AFNR5301	Plant Disease	2

Code	Unit	Sem
AFNR5302	Molecular & Physiological Plant Path	1
AFNR5303	Adv Mycology & Diagnostic Plant Path	1
AFNR5304	Soil Biology and Biodiversity	1
AFNR5305	Applied Entomology (Crops)	1
AFNR5306	Insect Taxonomy	1
AFNR5501	The Soil Resource	2
AFNR5502	Remote Sensing, GIS & Land Mngt	1
AFNR5503	Field and Laboratory Soil Physics	1
AFNR5504	Field and Laboratory Pedology	1
AFNR5505	Environmental Soil Chemistry	2
AFNR5506	Limnology and Water Quality	1
AFNR5507	Catchment Hydrology and Management	1
AFNR5601	Turf Management	1
AFNR5602	Advanced Turf Management	2
AFNR5603	Turf Species and Varieties	1
AFNR5604	Diagnostic Methods in Turf Management	1
AFNR5605	Applied Plant Ecology	2
AFNR5901*	Research Review	1 or 2
AFNR5902*	Research Study (12 credit points)	1 or 2
AFNR5903*	Research Project (24 credit points)	1 or 2
AGEC5300	Business Topics in Amenity Horticulture	1
AGEC5301	Agribusiness Management	1
AGEC5302	Agricultural and Resource Policy	1
AGEC5303	Applied Optimisation	2
AGEC5304	Research Methods	1
AGEC5401	Agricultural Marketing Analysis	2
AGEC5402	Agricultural Development Economics	2
AGEC5403	International Agricultural Trade	1
AGEC5404	Agribusiness Analysis	1
AGEC5405	Quantitative Planning Methods	1
AGEC5406	Agricultural Finance and Risk	2
AGEC5407	Professional Skills (3 credit points)	1
AGEC5408	Contemporary Issues (3 credit points)	2
RSEC5431	Benefit-Cost Analysis	1
RSEC5432	Environmental Economics	1
RSEC5433	Economics of Mineral & Energy Industries	2
RSEC5434	Economics of Water and Bio-resources	2
*AFNR5901, AFNR5902 and AFNR5903 are mutually exclusive		

Master of Science in Agriculture, Master of Agricultural Economics and Doctor of Philosophy

1.1 A candidate for the degree of Master of Science in Agriculture, Master of Agricultural Economics or Doctor of Philosophy, will proceed by research and submission of a thesis.

1.2 A candidate for the degree of Master of Science in Agriculture will proceed to the degree in the Sciences Discipline.

1.3 A candidate for the degree of Master of Agricultural Economics will proceed in the Agricultural and Resource Economics Discipline.

2. **Admission requirements**

2.1 An applicant for admission to candidature for a research degree will:

2.1.1 hold a degree of Bachelor of the Faculty with First or Second Class Honours or equivalent of the University of Sydney; or

2.1.2 for the Master of Agricultural Economics or Master of Science in Agriculture, hold a degree of Bachelor of the Faculty with a credit grade or above in the fourth year in the field in which the candidate is proceeding; or

2.1.3 have completed courses in another faculty or institution, these courses being deemed by the Faculty to be equivalent.

2.2 Demonstrated research ability will be considered when determining eligibility; applicants proposing to proceed primarily by research and thesis should provide evidence such as publications in scientific journals.

2.3 A research topic, which is satisfactory in terms of research interests, resources and availability of supervision within the discipline, must be agreed upon between the applicant and the supervisor.

2.4.1 The Faculty will require a person admitted as a candidate for the degree of Master of Science in Agriculture, Master of Agricultural Economics or Doctor of Philosophy to serve a period of probation for not more than one year and to complete such work during the period as it may prescribe, and at the completion of the period, the Faculty will review the candidature and the work completed, and may confirm or terminate the candidature.

2.4.2 If the Faculty confirms the candidature, it will be deemed to have commenced at the beginning of the period of probation.

2.5.1 Applicants may be required to provide evidence of adequate financial resources for personal support and compulsory fees during candidature.

2.5.2 They may be required to demonstrate to the satisfaction of the Faculty a proficiency in the English language adequate to undertake the proposed candidature.

3. **Availability**

3.1 The number of students admitted may be limited and will be determined by:

3.1.1 availability of resources, including space, library, equipment and computing facilities, and

3.1.2 availability of adequate and appropriate supervision.

3.2 In considering an application for admission to candidature the Faculty will take account of resource limitations and will select in preference applicants who are most meritorious in terms of section 2 above.

4. **Periods of candidature**

4.1 The minimum period of candidature for a full-time candidate for the degree of Master of Science in Agriculture or the degree of Master of Agricultural Economics will be two years, except in the case of a candidate who holds the degree of Bachelor of the Faculty with first- or second-class Honours or another qualification accepted by the Faculty as equivalent, for whom the minimum period will be one year.

4.2 The maximum period of full-time candidature for the Master of Science in Agriculture or the Master of Agricultural Economics will be three years, but the Faculty may, in special circumstances, extend a candidature.

4.3 The minimum period of candidature for a full-time candidate for the degree of Doctor of Philosophy will usually be three years.

4.4 The maximum period of full-time candidature for the Doctor of Philosophy will be four years, but the Faculty may, in special circumstances, extend a candidature.

4.5 The Faculty will determine the minimum and maximum periods of candidature for part-time candidates on a pro-rata basis.

4.6 The Faculty may deem time spent or work done for another research degree of The University of Sydney to be time spent or work done for the degree of Master of Science in Agriculture or the degree of Master of Agricultural Economics if the candidate has ceased to be a candidate for the other degree, and the Faculty may reduce the minimum and maximum periods of candidature accordingly.

5. **Part-time candidature**

5.1 The Faculty may permit candidates to enrol in part-time candidature provided they supply a satisfactorily detailed plan of their proposed program and attend at the University for such consultation with the supervisor and participate in such faculty activities as are required by the Associate Dean (Postgraduate).

5.2 The Faculty may permit part-time candidates for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy admitted under the provisions of chapter 10 of the by-laws to complete the investigation elsewhere, after two years have been spent in this or equivalent candidature within the University.

5.3 Candidates admitted to part-time candidature are expected to devote a minimum of 20 hours per week (or equivalent) to their candidature.

5.4 Research assistants or associate lecturers in the University will enrol part-time unless they can demonstrate to the satisfaction of the Faculty that they have sufficient time to pursue full-time candidature.

6. **Control of candidature**

6.1 Each candidate for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy will pursue his or her course of advanced study and research wholly under the control of the Faculty.

6.2 Where a candidate is employed by an institution other than the University, the Faculty may require a statement by that employer acknowledging that the candidature will be under the control of the Faculty.

7. **Appointment of supervisor**

7.1 The Faculty will appoint a member of the full-time academic or research staff of the Discipline in which a candidate for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy is proceeding to be the candidate's supervisor.

7.2 The Faculty will also appoint one or more associate supervisor/s of the candidate who may be a member of the academic or research staff of the University, an Honorary Research Associate, or a person with appropriate qualifications in another institution or organisation.

8. **Progress**

8.1 Each candidate will report regularly to the Faculty on his or her progress towards completing the requirements for the degree.

8.2 The Faculty will consider the report of each candidate and may, if it considers that a candidate has not made satisfactory progress towards completing the requirements for the degree, terminate the candidature.

9. **Discontinuation of enrolment and readmission after discontinuation**

9.1 A Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy candidate will be presumed to have discontinued enrolment in a unit of study or the degree from the date of application to the Faculty unless evidence is produced

9.1.1 that the discontinuation occurred at an earlier date, and

9.1.2 that there was good reason why the application could not be made at the earlier time.

9.2 A candidate who discontinues enrolment in a unit of study or degree before 31 March or 31 August will be recorded as having withdrawn from that unit or degree.

9.3 A candidate who discontinues enrolment in a unit of study or degree after 31 March or 31 August will be recorded as 'Discontinued - Not to count as failure'.

9.4 A candidate who at any time discontinues enrolment from a degree will not be entitled to re-enrol in that degree unless the candidate is readmitted to candidature for that degree.

9.5 Subject to section 9.1, candidates may not discontinue enrolment in a unit of study after the end of classes in that unit, unless the degree regulations permit otherwise.

9.6 The Dean, Pro Dean or an Associate Dean of a Faculty may act on behalf of that Faculty in the administration of these resolutions.

10. **Lodgement of thesis**

10.1.1 Not earlier than the end of the minimum period of candidature, each candidate proceeding by research and thesis will lodge with the Faculty copies of a thesis embodying the results of an original investigation carried out by the candidate.

10.1.2 Three copies of a thesis are required from Masters candidates and four copies from PhD candidates.

10.2 The candidate will state in the thesis, generally in a preface and specifically in notes, the sources from which the information was derived, the extent to which the candidate has made use of the work of others, and the portion of the thesis the candidate claims to be original.

10.3 The thesis will be accompanied by a certificate from the candidate's supervisor stating whether, in the supervisor's opinion, the form of presentation of the thesis is satisfactory.

10.4 A candidate must be enrolled at the time of submission of the thesis.

11. **Form of a thesis**

11.1 A thesis may be bound for submission in either a temporary or a permanent form.

11.2 Temporary binding must be strong enough to withstand ordinary handling and postage. The preferred form of binding is the 'Perfect Binding' system; ring-back or spiral binding is not permitted.

11.3 The cover of a temporarily bound thesis must have a label with the candidate's name, name of the degree, the title of the thesis and the year of submission.

11.4 The requirements for permanent binding are set out in the Statutes and Regulations in the Academic Board's resolutions for binding of PhD theses.

11.5 Following examination, and emendation if necessary, at least one copy of a thesis (the Rare Book Library copy) must be bound in permanent form on archive paper.

11.6 If emendations are required, all copies of a thesis which are to remain available within the University must be emended.

12. **Examination**

12.1 The Faculty will appoint three examiners for a PhD thesis, of whom at least two will be external to the University. An internal examiner need not be expected and the supervisor can not be an examiner.

12.2 The Faculty will generally appoint two examiners for a Masters thesis of whom at least one will be external to the University. The supervisor can not be an examiner.

13. **Result of candidature**

13.1 The Board of Postgraduate Studies awards, or for the PhD degree the PhD Awards Sub Committee of the University's Committee of Graduate Studies recommends the award of, the degree whenever:

13.1.1 the examiners have recommended without reservation that the degree be awarded and the Pro Dean concurs; or

13.1.2 all of the examiners have recommended that the degree be awarded or awarded subject to emendations to all copies of the thesis which are to remain available within the University and the Pro Dean concurs; or

13.1.3 the Board of Postgraduate Studies unanimously accepts a recommendation from the Discipline Leader to award or award subject to emendations despite reservations expressed by one or more of the examiners; or

13.2 The Board of Postgraduate Studies may permit an unsuccessful candidate to prepare for re-examination if, in its opinion, the candidate's work is of sufficient merit to warrant this concession and the Pro Dean has so recommended.

14. **Delegation**

14.1 In these resolutions Faculty delegates its responsibility to the Board of Postgraduate Studies.

14.2 The Board of Postgraduate Studies delegates the following responsibilities to the Dean who in turn delegates them to the Associate Dean (Postgraduate): approval of:

14.2.1 award of the degree of Doctor of Philosophy under conditions approved by the University's Committee for Graduate Studies

14.2.2 award of the Master of Science in Agriculture and Master of Agricultural Economics degrees when there is no apparent reason for debate by the Board

14.2.3 appointment of examiners

14.2.4 admission to candidature

14.2.5 supervisory arrangements

14.2.6 variation of candidature

14.2.7 extension of candidature

14.2.8 completion of candidature away from the University

14.2.9 suspension of candidature

14.2.10 approval of continuance following receipt of annual progress reports.

15. **Board of Postgraduate Studies**

15.1 Pursuant to the resolutions of Senate the Faculty appoints the following to the Board of Postgraduate Studies:

15.1.1 Dean

15.1.2 Pro Dean

15.1.3 Associate Dean (Postgraduate)

15.1.4 Professors of the Faculty

15.1.5 Discipline Leaders (or nominees)

15.1.6 Postgraduate Coordinators

15.1.7 Two elected representatives of the Faculty of Agriculture, Food and Natural Resources.

11. Postgraduate scholarships and prizes

The University of Sydney on the recommendation of the Faculty awards postgraduate scholarships to candidates proceeding by research and thesis to the degrees of Doctor of Philosophy, Master of Science in Agriculture and Master of Agricultural Economics. The terms and conditions for the Thomas Lawrance Pawlett Postgraduate Scholarship, the Christian Rowe Thornett Scholarship, the Alexander Hugh Thurburn Scholarship, the WC Turland Postgraduate Scholarship and the FH Loxton Studentship are listed below. They are normally offered annually, when available, as soon as possible after the award of the Australian Postgraduate Awards upon which value the stipend is based.

Summary of scholarships and prizes
The following table is a summary only; for full details concerning the conditions governing the awards of these prizes and scholarships contact the Research Office.

Scholarship	Value $	Closing date	Other information
Tenable at the University of Sydney			
Australian Postgraduate Awards	19,231 in 2006	31 October	Graduates with Hons I. For research in any field
University of Sydney Postgraduate Awards	as for APA	31 October	Graduates with Hons I. For research in any field
Henry Bertie and Florence Mabel Gritton Postgraduate Research Scholarships	as for APA	January and July	For research in chemistry in relation to industry and agriculture
Richard Claude Mankin Scholarship – Postgraduate	as for APA	January	For research into water conservation.
James Vincent Scholarship in Microbiology	up to 1000	31 March	APA or similar scholarship holders working in applied microbiology
Awards restricted to candidates in Agriculture			
McCaughey Memorial Institute Scholarship	as for APA	as advertised	Graduates to conduct research in agricultural sciences with particular relevance to rice
Norman Scott Noble Scholarship	up to 1000	mid-May	Travel grant or grant-in-aid to candidates in the discipline of agricultural entomology
Irvine Armstrong Watson Scholarship	up to 500	mid-May	Travel grant or grant-in-aid to candidates in the disciplines of agricultural genetics, biometry, plant breeding or plant pathology
Faculty scholarships			
The following five are identical (except that the FH Loxton is restricted to males) and are awarded annually depending on the availability of funds.			
Thomas Lawrence Pawlett Postgraduate Scholarship	as for APA	31 October	Graduates for full-time research within Faculty (preference to Hons I or II Div. 1 or equivalent)
Christian Rowe Thornett Scholarship	as above	31 October	as above
Alexander Hugh Thurburn Scholarship	as above	31 October	as above
WC Turland Postgraduate Scholarship	as above	31 October	as above
FH Loxton Postgraduate Scholarship	as above	31 October	as above. Restricted to males

General terms and conditions

The scholarships are awarded under the following general terms and conditions:

1. The object of the scholarships shall be the encouragement and promotion of the scientific study of agriculture within the Faculty.
2. The scholarships shall be awarded by the Faculty of Agriculture, Food and Natural Resources, to University graduates, graduands or persons holding equivalent qualifications who are eligible for admission to candidature for a higher degree by research and thesis and who enrol as full-time candidates.
3. In awarding the scholarships, consideration shall be given to the work of the applicants during their undergraduate courses, their postgraduate careers, if any, and their special aptitude and ability to carry out the object of the scholarship.
4. The annual value of the scholarship shall be equal to the value of the Australian Postgraduate Awards and shall provide the same allowances as those awards
5. The maximum tenure of the scholarships shall be, in the case of a candidate:

5.1 for the degree of Master, for up to two years, or
5.2 for the degree of Doctor of Philosophy, for three years and in exceptional circumstances may be extended by up to six months.

6. The tenure of the scholarships may be, in the case of a candidate:

6.1 who has been enrolled previously for a higher degree in the Faculty, reduced by the time credited towards the degree for which the candidate enrols, or
6.2 who is or has been enrolled for the same degree for which the scholarship is awarded, reduced by the time the candidate has been enrolled for that degree.

7. The scholar shall furnish progress reports to the Faculty annually at the end of the academic year and at other times if directed.
8. The scholar shall acknowledge the tenure of the scholarship in any thesis or other publication which shall result from such tenure.
9. No scholar shall, except with the approval of the Faculty, occupy any salaried position or hold any other award during the term of appointment. The scholar may undertake teaching assistance consistent with the University Postgraduate Research Award conditions.

Specific terms of award

The following specific terms and conditions of award apply:

Thomas Lawrance Pawlett Scholarships

Dr Thomas Lawrance Pawlett of Cremorne bequeathed the income from his residuary estate to the University for the purpose of encouraging and promoting the scientific study of agriculture in connection with the said University for the founding of a research or travelling scholarship or scholarships in agriculture, to be called the Thomas Lawrance Pawlett Scholarship.

There are three types of scholarship established under the foundation: the Thomas Lawrance Pawlett Postgraduate Scholarship, the Thomas Lawrance Pawlett Postdoctoral Scholarship and the Thomas Lawrance Pawlett Visiting Scholarship.

Thomas Lawrance Pawlett Postgraduate Scholarship

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Thomas Lawrance Pawlett Postgraduate Scholarship.

Christian Rowe Thornett Scholarship

The scholarship was established in 1975 by a bequest from Mrs Christian Rowe Thornett for the teaching and development of agricultural science.

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Christian Rowe Thornett Scholarship.

Alexander Hugh Thurburn Scholarship

In 1972 the Faculty of Agriculture received a bequest from Mary Esme Thurburn, who established a scholarship in memory of her husband.

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Alexander Hugh Thurburn Scholarship.

WC Turland Postgraduate Scholarship

The scholarship was established in 1976 by a bequest from WC Turland.

It is awarded under the following condition:

1. The name of the scholarship shall be the WC Turland Postgraduate Scholarship.

FH Loxton Postgraduate Scholarship

Established in 1960 under the will of FH Loxton, who bequeathed a portion of the income of his residuary estate to the University for the purpose of establishing and maintaining studentships and or scholarships tenable in the Faculties of Veterinary Science, Agricultural Science and Engineering in particular in the Department of Chemical Engineering. These studentships and scholarships shall be awarded to male persons only by the Faculty of Veterinary Science, the Faculty of Agriculture, Food and Natural Resources or the Department of Chemical Engineering.

The scholarships shall be awarded in any of the following categories, at Faculty discretion:

- Postgraduate Research Scholarships
- Postgraduate Supplementary Scholarships
- Postgraduate Short term Research/Thesis Completion Scholarships
- Undergraduate Scholarships
- Postdoctoral Fellowships

1. The name of the scholarships shall be the FH Loxton Postgraduate Studentships.
2. The scholarships are for postgraduate research and shall be awarded on the basis of academic merit.
3. The scholarships are of the annual value of an Australian postgraduate award (APA). A relocation allowance and a thesis allowance are payable in line with APA entitlements.
4. The scholarships are tenable for up to two years for a master's degree and up to three years for a PhD degree subject to satisfactory annual progress judged by the Faculty concerned, or the Department in the case of Chemical Engineering. In exceptional circumstances, a further extension of six months may be granted to PhD candidates. Periods of study already undertaken towards the degree prior to the commencement of the award will be deducted from the maximum period of tenure.

Norman Scott Noble Scholarship

Established in 1987 by a donation of $14,000 by Mrs Mabel Noble in memory of her husband, Dr Norman Scott Noble, a distinguished graduate of the Faculty of Agriculture.

The scholarship is awarded under the following conditions:

1. The name of the scholarship shall be the Norman Scott Noble Scholarship.
2. The objects of the scholarship shall be to further studies in agricultural entomology and to encourage and promote the discipline at the University of Sydney.
3. The scholarship shall be awarded by the Faculty of Agriculture, Food and Natural Resources on the recommendation of the Dean, who shall act on the advice of the appropriate professors, associate professors, readers and the candidate's supervisor in recommending the award and in determining the value of the scholarship.
4. The scholarship may only be awarded to a candidate enrolled in the Faculty of Agriculture, Food and Natural Resources for a higher degree or a diploma in the discipline of agricultural entomology.
5. The scholarship may be held in conjunction with any other postgraduate award and may be in the form of a travel grant or a grant-in-aid for the holder for expenses incurred in connection with the holder's research.
6. More than one scholarship may be awarded in any one year if sufficient funds are available. The maximum amount available for the award of the scholarships in any year shall be $1000.
7. A candidate may be awarded the scholarship more than once, provided that the total value of the awards to any one candidate does not exceed $3000.

Applications for the scholarship shall be lodged at the Research Office by mid-May each year.

Irvine Armstrong Watson Scholarship

The scholarship was established in 1987 by a donation of $5000 by Mrs Loloma Watson and family in memory of their husband and father, Emeritus Professor Irvine Armstrong Watson.

The scholarship is awarded under the following conditions:

1. The name of the scholarship shall be the Irvine Armstrong Watson Scholarship.
2. The object of the scholarship shall be to further studies in the disciplines of agricultural genetics, biometry, plant breeding or plant pathology.
3. The scholarship shall be awarded by the Faculty of Agriculture, Food and Natural Resources on the recommendation of the Dean, who shall act on the advice of the appropriate professors, associate professors, readers and the candidate's supervisor in recommending the award and in determining the value of the scholarship.
4. The scholarship may only be awarded to a candidate enrolled in the Faculty of Agriculture, Food and Natural Resources for a higher degree or a diploma in one of the disciplines of agricultural genetics, biometry, plant breeding or plant pathology.
5. The scholarship may be held in conjunction with any other postgraduate award and may be in the form of a travel grant or a grant-in-aid for the holder for expenses incurred in connection with the holder's research.
6. More than one scholarship may be awarded in any one year if sufficient funds are available. The maximum amount available for the award of the scholarships in any year shall be $500.
7. A candidate may be awarded the scholarship more than once, provided that the total value of the awards to any one candidate does not exceed $1000.

Applications for the scholarship shall be lodged at the Research Office by mid-May each year.

Awards not restricted to graduates in Agriculture

- Travelling scholarships
- Baillieu Research Scholarship*
- HS Carslaw Memorial Scholarship
- William and Catherine McIlrath Scholarship
- The Rhodes Scholarship
- The Gowrie Postgraduate Research Scholarships
- The JB Watt Travelling Scholarship
- The James King of Irrawang Travelling Scholarship*
- The Charles Gilbert Heydon Travelling Fellowship in Biological Sciences
- The Eleanor Sophia Wood Travelling Fellowships
- The Herbert Johnson Travel Grants*
- The Commonwealth Scholarship and Fellowship Plan Awards

**Grants in aid*

Grants in aid

Grants-in-aid are designed to provide supplementary living allowances, travel grants or grants-in-aid. Applicants must be:

1. enrolled full-time in a higher degree at the University of Sydney (some grants-in-aid are also open to part-time students and graduates); and
2. citizens or permanent residents of Australia.

Applicants are required to complete a single application form for the awards and they will be considered for the award(s) for which they are eligible.

If seeking one of the awards designed to support overseas travel, it is essential that applicants justify in their applications why support for overseas travel is being sought. Applicants should state whether their research can be undertaken in Australia and, if not, why it is necessary for them to travel overseas for purposes of study. Applicants should provide an outline of their proposed travel plans, indicating the extent to which the period of overseas study is necessary and is regarded to be integral to their total research program, in addition to details of current financial support and the amount of funding sought from the scholarships. If necessary, a separate sheet should be attached to the application form.

Applications must be lodged no later than the closing date of mid May in each year.

These awards, details of which follow, are currently offered as grants-in-aid only in the Faculty of Agriculture, Food and Natural Resources:

Award	Maximum value $
Norman Scott Noble Scholarship	1000
Irvine Armstrong Watson Scholarship	500

Note: The selection committees reserve the right to share any of the above awards.

Further information

Other scholarships are available.

Enquiries about scholarships should be made at the Research Office. International students should make their enquiries at the International Office. Enquiries about scholarships offered by other universities should be addressed to the registrar of the university concerned. Scholarship conditions may change without notice.

12. Other Faculty information

This chapter contains information specific to the Faculty and some general information. For further details about discontinuation and examinations, as well as general information about the organisation of the University, assistance for students with disabilities, child care facilities, accommodation, health, counselling, financial assistance, careers advice and a range of other matters go to www.usyd.edu.au

Enrolment

Students who do not satisfy the pre-enrolment conditions should contact the Faculty Office in the McMillan Building.

Confirmation of enrolment

All the information provided when you enrol is added to the University's computerised student record system. This includes your degree, academic year and the units you are taking. It is important that this information be recorded correctly at the beginning of the year, and amended should a change occur in any of the details during the year. Any subject enrolment has a financial implication under the Higher Education Contribution Scheme (HECS).

To enable you to see what enrolment data has been recorded, you will be sent a "confirmation of enrolment" notice shortly after completion of enrolment. You should check this carefully. If the information is correct you should keep the notice as a record of your current enrolment. Should the notice be incorrect in any detail, you should apply at the Faculty Office immediately to have your record amended. A new confirmation will then be prepared and sent to you. You will also receive, about two months after the beginning of each semester, a statement showing your HECS/fee assessment for that semester. If there appears to be an error in this assessment, you should follow the directions for correction of the assessment which are included on the statement.

Changing or discontinuing your enrolment

If you wish to:

- change a unit of study in which you are enrolled;
- discontinue a unit of study

you may do so on the University website at MyUni within a limited range of dates, prior to and early in each semester. Outside those dates, you should apply at the Faculty Office. Your record at the University will not be correct unless you do this. It is not sufficient, for instance, to tell a professor or the lecturer, or even the Faculty Office that you discontinued a unit. Unless an enrolment change is approved on MyUni or at the Faculty Office (both of which should generate a new confirmation of enrolment form) it will not be accepted by the University and in some cases you will still incur a financial liability under HECS.

If you wish to discontinue enrolment totally you must provide written advice to the Faculty Office.

Classes

The Faculty takes all possible care to avoid timetable clashes between the core units in each year of the degrees, but it is the responsibility of each student to ensure they do not have any timetable clashes when taking repeat or elective units of study.

Examinations

There are two formal examination periods each year:

Period	Held	Approximate duration
Semester 1	June	2 weeks
Semester 2	November	2 weeks

In addition, individual faculties and departments may examine at other times and by various methods of assessment, such as essays, assignments, viva voce, practical work. Some departments do not examine during the February semester.

The following information applies to the Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor of Science in Agriculture degrees.

Notification of examination results

The results of semester examinations are available on MyUni and posted to you at the end of each semester.

Disclosure of examination marks

Final marks will appear on your semester result notice. Marks may also be obtained from the Faculty for the major components of assessment which make up the final marks. You are entitled to information about any details of the assessment procedures used to determine the final result.

Your examination scripts may be retrieved for up to six months after the completion of assessment in each unit. This does not apply to examination papers which involve the repeated use of the same material in successive examinations.

Examination grades

Each unit taken will be allotted one of the following grades at examinations:

Grade	Per cent
High Distinction	85–100
Distinction	75–84
Credit	65–74
Pass	50–64
Fail	0–49

Plagiarism

Plagiarism can be broadly defined as knowingly presenting another person's ideas, findings or written work as one's own by copying or reproducing them without due acknowledgment of the source. Plagiarism may involve copying the work of another student, or it may involve paraphrasing or copying a published author's text or argument without giving a reference. At its worst, plagiarism is theft.

Please read the University policy on plagiarism which may be viewed on the University website at
www.usyd.edu.au/senate/policies/Plagiarism.pdf.

Students are required to submit a signed statement of compliance for all work submitted to the University for assessment, presentation or publication certifying that no part of the work constitutes a breach of this Policy.

The need to seek early advice

Many students in need of advice fail to make full use of the assistance available to them. If you believe that your performance during a course, or your preparation for your examinations, has been adversely affected by medical, psychological or family circumstances, you should seek advice as early as possible. Members of the teaching staff, especially your degree coordinator, the University Counselling Service and the University Health Service are all available for consultation and can give advice on appropriate action to take. Students can seek initial guidance from the Faculty Office about available help.

Special consideration procedure

If you believe that your performance has been adversely affected by illness or other misadventure, you should submit a special consideration form to the Faculty Office. Only well-attested serious illness or misadventure during a semester or occurring at the time of an examination will warrant special consideration for academic performance. Occasional brief or trivial illness would not normally be regarded as sufficient to explain an absence or a poor performance and students are discouraged from submitting certificates for absences totaling less than one week, although frequent recurrent short absences would need documentation.

To apply for special consideration:

1. Obtain a special consideration application pack from the Faculty Office, University or Faculty website or the Student Centre
2. Complete the special consideration forms: (for consideration due to serious illness have a registered medical practitioner or counsellor complete the Professional Practitioner's Certificate; for consideration due to misadventure attach the appropriate documentation)
3. Lodge the form with the Faculty Office
4. Applications must be received within one week from the end of the period (i.e. assignment due date or date of examination) for which consideration is being sought
5. Retain the receipt that will be given on lodgement of the form.

Any application must be accompanied by appropriate medical certificates or other relevant documents. The Professional Practitioner Certificate must include:

1. dates of consultation
2. an evaluation by the practitioner, psychologist etc, as to the severity, duration and effect on the student's ability to attend classes, learn or complete assessment requirements
3. a description of the nature and seriousness of the student's problems, within the limits of confidentiality, so that an academic assessment can be made of the possible effects of the illness or accident on the student's performance
4. any other relevant information relating to the student's illness, trauma etc
5. any other documentation that may be relevant; and
6. the Practitioner authorises the University to contact them to confirm the authenticity of the certificate.

Statement of generic graduate attributes

The University states that our graduates' attitude towards scholarship, global citizenship and lifelong learning will set them apart from other graduates. Further, these broad attributes can be understood as a combination of five overlapping clusters of skills and abilities. These skills and abilities (contextualised for FAFNR) are shown below.

1. Research and Inquiry. Graduates of the University will be able to create new knowledge and understanding through the process of research and inquiry.

- Recognise and master appropriate theories, concepts and principles from a range of disciplines
- Collect and integrate several lines of evidence and apply them in a balanced way in an argument
- Design an experiment, investigation, survey or other means to test an hypothesis or proposition
- Critically analyse information, synthesising and summarising the outcomes
- Be able to clearly identify problems
- Apply knowledge and understanding to address familiar and novel problems
- Demonstrate awareness of the provisional nature of the facts and principles associated with a field of study
- Appreciate the issues of sample selection, accuracy, precision and uncertainty during collection, recording and analysis of data
- Demonstrate ability to assess data quality
- Understand and manage the nature of risk and uncertainty in decision making
- Prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques and packages
- Solve numerical problems using computer-based and non-computer based techniques

2. Information Literacy. Graduates of the University will be able to use information effectively in a range of contexts.

- Collect and record electronic or non-electronic information or data in the library, laboratory or field and summarise it using appropriate qualitative and/or quantitative techniques
- Appreciate and analyse financial and other management information, both current and historical, and use it in decision making
- Appreciate the difficulties of having incomplete information on which to base decisions
- Identify, evaluate and respond to a variety of information sources (e.g. electronic, textual, numerical, verbal, graphical)
- Identify, evaluate and respond to a variety of data types (e.g. scientific, non-scientific, primary and secondary)
- Demonstrate competence in the use of computer-based information handling and data processing tools
- Appreciate the economic, legal, social, ethical and cultural issues in the gathering and use of information

3. Personal and Intellectual Autonomy. Graduates of the University will be able to work independently and sustainably, in a way that is informed by openness, curiosity and a desire to meet new challenges.

- To be intellectually curious
- To be open to new ideas, methods and ways of thinking
- Identify individual and collective goals and responsibilities
- Devise strategies to achieve goals
- Assume responsibility for one's actions
- Reflect on and evaluate own performance as an individual and as a team member, and identify areas for future improvement

- Identify and work towards targets for personal, academic and career development
- Develop an adaptable and flexible approach to study and work
- Develop the skills necessary for self-managed and lifelong learning (e.g. working independently, time management and organisational skills)
- Develop independent thinking

4. Ethical, Social and Professional Understanding. Graduates of the University will hold personal values and beliefs consistent with their role as responsible members of local, national, international and professional communities.

- Recognise the complementary roles of leadership and management in an organisation
- Recognise and respect the views, opinions and contributions of other team members
- Recognise moral and ethical issues related to the subject
- Appreciate the need for professional codes of conduct where applicable
- Display the potential for competence, behaviour and attitudes required in a professional working life including initiative, leadership, team skills, and professional responsibility
- Devise, plan and undertake investigations in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, legal requirements and sensitivity to the impact of investigation on the environment and stakeholders
- Understand the role of agriculture, food and natural resources within the Australian society and economy, as well as being aware of the opportunities for international contributions and collaboration
- Display the capacity to be informed, responsible and critically discriminating participants in academic, social, cultural and moral issues, in the community of scholars, in the workforce and as citizens of both Australia and the world

5. Communication. Graduates of the University will recognise and value communication as a tool for negotiating and creating new understanding, interacting with others, and furthering their own learning.

- Communicate accurately, clearly, concisely, confidently and appropriately to a variety of audiences in written, verbal and graphical forms
- Contribute constructively to group discussions
  Listen to, appreciate and evaluate the views of others
- Use the internet critically and exhaustively as a means of communication and a source of information
- Use computer packages to create effective ways to communicate information

Faculty computer laboratories

The Faculty currently has four computer Laboratories. They are used by undergraduate and postgraduate students undertaking units given by the Faculty of Agriculture, Food and Natural Resources. They can be used by arrangement with the Faculty's Network Manager, Mr Kyle Kiefer (+61 2 9351 3947). Please consult the timetable on the entrance doors before proceeding into the laboratory. During some small classes casual access may be permitted, but please check with supervising staff first.

Watt Computer Laboratory, located in room 307 of the Watt Building A04. This laboratory has 27 PCs and is opened automatically at 7am and closed automatically at 7pm Monday to Friday (except for public holidays). There are a limited number of swipe cards available from the University Security Office for weekend access – please consult the undergraduate intranet for a list of eligible students.

Ross Street Computer Laboratory, located on the ground floor of the Ross St Building A03, and consisting of 30 PCs. This laboratory is not opened automatically, but is generally available Monday to Friday.

Woolley Computer Laboratory, located on the ground floor of the Woolley Building A20, and consisting of 10 PCs. This laboratory is not opened automatically, but fourth year and postgraduate students can be given a code for out of hours use.

GIS Computer Laboratory, located in Room 303 of the Macmillan Building A05. This laboratory is not opened automatically and is generally restricted to students in certain disciplines.

Summer school

Most faculties at the University offer units of study from degree programs during January/February. As the University uses all of its HECS quota in first and second semester, these units are full fee-paying and entirely voluntary. However, Summer School units enable students to accelerate their degree progress, make up for a failed unit or fit in a unit which otherwise would not suit their timetables. New students may also gain a head start by completing requisite subjects before they commence their degrees. Units start in January and run for up to six weeks (followed by an examination week). Notice of the units available is contained in the various Faculty Handbooks and is usually circulated to students with their results notices. Fee waiver scholarships are available. See www.summer.usyd.edu.au for further details.

Ancillary fees and charges

The following fees and charges from 2006 can be a guide for similar charges in 2007.

Printing Charges

All students have free access to the Ross Street, Watt, McMillan and Woolley computer laboratories of the Faculty and a printing allocation to cover what may be expected by way of assignments and computer output from practical classes. Currently the limits are 125 pages per year for first to third year undergraduate students and 500 for fourth year students. Students may top up their limit ($10 per 125 pages). For postgraduate students no limit to printing is set.

Manuals and Notes

Students are usually provided with unit of study material in class, via the Faculty intranet or through WebCT. Some manuals and lecture notes are sold and students are advised of charges at the beginning of the respective unit.

Excursions

Students are required to pay a fee towards the cost of excursions in some elective Year 3 and 4 units. Fees are determined by taking into account the cost of basic accommodation and adequate meals. Fees for these units of study can be ascertained from the unit of study coordinator.

Libraries

University of Sydney Library

Web: www.library.usyd.edu.au
The University of Sydney Library is a network of 19 libraries across 9 campuses.

The specialist libraries for research in Agriculture are:

Badham Librarywww.library.usyd.edu.au/libraries/badham/
Camden Library www.library.usyd.edu.au/libraries/camden/

Your student card will allow you to borrow from any of the Libraries in the system. Location maps for these Libraries, opening hours and contacts are listed at the URLs above. Many of the other Libraries will have information of interest to you too. Please check the Library website for a complete list of Libraries (www.library.usyd.edu.au/libraries).

The Library provides access to services including the Library catalogue (see opac.library.usyd.edu.au) and a range of databases, used to find references to journal articles (see www.library.usyd.edu.au/databases/). It is possible to access many of these databases from off campus, please check www.library.usyd.edu.au/databases/wam.html for more information, or contact your Faculty Liaison Librarian.

For more information and pointers to great information sources check out the:

Agriculture, Food and Natural Resources Subject Guide
Web: www.library.usyd.edu.au/subjects/agriculture/

Veterinary Education and Information Network (VEIN)
Web: vein.library.usyd.edu.au
for animal science information.

Your Faculty Liaison Librarian

Information specialists are available to assist you with your information needs.

Camden and Narrabri campuses

Karen Black
Email: k.black@library.usyd.edu.au
Phone: +61 2 9351 1627
Fax: +61 2 4655 6719

Camperdown Campus

Jennifer Hayes
Email: j.hayes@library.usyd.edu.au
Phone: +61 2 9351 3775
Fax: +61 2 9351 3852

Mathematics Learning Centre

Head Jacqueline M Nicholas

The Mathematics Learning Centre offers help to undergraduate students who enter the University with insufficient preparation in mathematics to enable them to cope with the mathematical requirements of their chosen course. In the Faculty of Agriculture, Food and Natural Resources, units in Agricultural Economics, Biometry, Economics and Econometrics all assume a certain level of knowledge of mathematics. Generally, students entering the Faculty are assumed to have taken HSC 2-unit mathematics or its equivalent. If you know that you lack this assumed knowledge, or if you are doubtful whether you are well enough prepared, you should contact the Mathematics Learning Centre.

Staff at the Centre can help you decide which topics you need to do extra work on. Resources are provided for individual study, with guidance from the Centre's staff, and small tutorials can be arranged for students who are having difficulties. Introductory and bridging courses are organised during the summer.

The Centre is on the fourth floor of the Carslaw Building, Room 455. Any student seeking assistance should call at the Centre, phone +61 2 9351 4061 or see the website www.usyd.edu.au/mlc

Faculty societies

The Sydney University Agricultural Society (AgSoc)

AgSoc is an association for the undergraduates of the Faculty of Agriculture, Food and Natural Resources, as well as students from rural backgrounds and anyone with an interest in agriculture. It is run by a student-elected committee from within the Faculty, which organises social and sporting events. Details of how to join are explained during Orientation Week.

Why should you join?

There is a small annual membership fee to become part of AgSoc, which entitles you to vote, hold office, participate in Faculty sports and obtain great discounts to all social functions as well as on the large range of "Agger" merchandise. Functions include formal events such as the annual ball, as well as numerous harbour cruises, barbecues and other informal occasions.

Membership of many Faculty societies is compulsory. This is not the case in Agriculture, yet large numbers of students join for every year of their degree, an indication of the close social interaction and love of a good time that makes Agriculture the envy of the larger faculties. The AgSoc 2007 Committee encourages all members of the Faculty to become involved.

Sydney University Agricultural Graduates' Association (SUAGA)

SUAGA is a graduate society. All graduates of the Faculty of Agriculture, Food and Natural Resources, and all current and former members of the academic staff of the Faculty, are eligible for membership. Some of the more important aims of the Association are to maintain and foster the relationship between agriculture graduates and the University, to promote social and cultural relationships among the graduates and to take an interest in any matters that may be of benefit to the Faculty.

Institutes and Advisory Councils

Advisory Council of the Plant Breeding Institute within the Faculty of Agriculture, Food and Natural Resources

1.1 There shall be an institute to be known as the Plant Breeding Institute within the Faculty of Agriculture, Food and Natural Resources.
1.2 The Institute shall undertake, promote and develop the science of plant breeding and allied areas.
2.1 The Institute shall have an Advisory Council comprising:
2.1.1 the Vice-Chancellor and Principal, the Dean of the Faculty of Agriculture, Food and Natural Resources and the Director of the Plant Breeding Institute or their nominees;
2.1.2 not more than three trustees of the New South Wales Wheat Research Foundation appointed by the Dean on the recommendation of the Foundation and three additional members of the broader industry sectors serviced by the Institute appointed by the Dean on the recommendation of the Director;
2.1.3 not more than three members of the full-time staff of the University appointed by the Dean on the recommendation of the Faculty of Agriculture, Food and Natural Resources, two of whom shall be staff of the Plant Breeding Institute.
2.2 Each member shall hold office for a period of three years and shall be eligible for reappointment.
2.3 The Council shall provide advice to the Plant Breeding Institute on:
2.3.1 industry trends
2.3.2 areas for research expansion/development
2.3.3 services required for industry (including educational services for the users of the Plant Breeding Institute's products)

2.3.4 strengths and weaknesses in the Plant Breeding Institute's programs.
2.4 The Council shall have such other functions as may be assigned by the Dean.
3.1 The Council shall elect annually from amongst its members an honorary Chairperson.
3.2 All questions which come before the Council shall be decided at any meeting duly convened, at which a quorum is present, by a majority of the votes of the members present.
3.3 The chairperson at any such meeting shall have one vote.
3.4 At any such meeting seven members shall form a quorum.
4.1 There shall be a Director of the Plant Breeding Institute appointed under normal University procedures for appointing a Head of Department/School.
4.2 The Director shall have functions and duties set out in the relevant position statement, and any other functions or duties delegated from time to time.
5. The Director shall report to the Dean. In addition, the Director shall present to the Council an Annual Report that includes an overview of the financial situation.

The Institute of Advanced Studies within the Faculty of Agriculture, Food and Natural Resources

1. The name of the Institute shall be the Institute of Advanced Studies within the Faculty.
2.1 The Institute shall advise the Senate regarding the funds of the Joane Josephine Harris Bequest, the Thomas Lawrance Pawlett Bequest, the Mrs Christian Rowe Thornett Bequest, the Alexander Hugh Thurburn Fund, the Turland Endowment and the portion of the funds of the FH Loxton Bequest which has been allocated to the Faculty.
2.2 The Institute shall promote the attraction of additional income.
3.1 The Institute shall further the development of postgraduate studies and research in the Faculty.
3.2 The Institute shall be responsible for the administration of the scholarship program in the Faculty.
4. The names of the donors shall be perpetuated by their association with the various projects that the Institute initiates.
5. The Directors of the Institute will be:
5.1 Ex officio
5.2 Dean (Chair)
5.3 Pro-Dean
5.4 Associate Dean (Postgraduate)
5.5 Discipline Leaders, Director of the Plant Breeding Institute
5.6 Two academic staff representatives, elected biennially at the final Faculty meeting of a year in which a term ends; a casual vacancy shall be filled on nomination by the Dean.
6. The directors shall submit recommendations for postgraduate activities to the Faculty for consideration and recommendation to Senate for approval.

EJ Holtsbaum University of Sydney Agricultural Research Institute

The EJ Holtsbaum University of Sydney Agricultural Research Institute (HARI) has been established in conjunction with the gift by Mr EJ Holtsbaum to the University of his property "Nowley". Mr Holtsbaum, whose family owned Nowley since 1964, made the gift with the view that the farm would continue to prosper under the University's stewardship, and serve as a centre on the Liverpool Plains for the creation and dissemination of innovative technology for agricultural production and natural resource management.

"Nowley" is located in the Spring Ridge district on the central/north west slopes of NSW, in a versatile and reliable dryland cropping region. The property of 2083 ha supports a successful mixed farming enterprise centred on crops of wheat, barley and canola in winter, sorghum and sunflower in summer, and a Shorthorn cattle herd of breeders, replacement heifers and bulls.

"Nowley" has mostly fertile basaltic soils, an average annual rainfall of about 600 mm with a relatively even summer and winter distribution. The extreme variation in soil types and parent materials, and the proximity of a large, natural water body (Lake Goran), means that the property offers unique opportunities to study the impacts of parent material and topography on soil type, and consequently on agricultural opportunities. Stands of remnant native forest on sections of the property provide invaluable undisturbed reference sites for comparative studies of agricultural and native ecosytems, and the influence of human impacts.

"Nowley" will considerably enhance the Faculty's academic programs by giving students a strong sense of the interaction of landscape and agriculture. While continuing to operate as a fully commercial enterprise, "Nowley" will provide an excellent field site for undergraduate and postgraduate students to learn and research about crop and livestock management in mixed farming systems, plant improvement, and natural resource management.

Objectives of the Holtsbaum Agricultural Research Institute (HARI)

The objectives of the HARI are aligned with a Statement of Intention made by Mr Holtsbaum in conjunction with his gift.

"Nowley is to be used for the purposes of the Faculty of Agriculture, Food and Natural Resources (hereafter referred to as 'the Faculty') including in particular but not limited to:

- *research for the benefit of primary producers, researchers, students and other parties interested in agriculture*
- *provision of funds for scholarships to the Faculty.*

A wide range of enterprises should be trialled and evaluated as the need or otherwise arises in conjunction with the 'bread and butter' activities of the day.
The results of these activities to be carried out at 'Nowley' to be available to farmers, faculty students, research workers and other parties with an interest in agriculture. The future mix of enterprises on the property will be determined to produce a viable income. After retention of profits or part thereof to provide working capital, any surplus is to be directed into a scholarship fund for the Faculty or for the benefit of teaching and research in agriculture as determined by the Dean in consultation with the Management Advisory Board. The property's well-being is of paramount importance and number one priority."

Management of the Holtsbaum Agricultural Research Institute

The purchase of plant and equipment, working capital and additional land by the University was financed by the creation of an internal Property Trust known as the "Nowley Property Pool". In recognition of the gift by Mr Holtsbaum, and additional funds invested in the Nowley Property Pool by the Faculty, the latter will be allocated approximately 74 per cent of the units in the Pool, with Livingston Farm to purchase the remaining 26 per cent of the units in the Pool.

Net operating surpluses will be distributed proportionately to unit holders in the Nowley Property Pool. The Properties and Investments Office will be responsible to the Management Advisory Committee for the day to day operation of the property, which will be managed as part of the rural property portfolio. Research and innovative trials by the Faculty will be oversighted by the Management Advisory Board.

In the event a situation arises where the Advisory Board recommends that the property be disposed of, it will be done so in a manner that will realise the Faculty the highest sum of money attainable on the day. The proceeds may be invested in a similar venture or one suitable to the Faculty and Management of the day. Whatever the new venture, the name "EJ Holtsbaum" is to be preserved.

Holtsbaum Agricultural Research Institute Management Advisory Board: Terms of Reference

To oversight the management of the Holtsbaum Agricultural Research Institute in order to ensure that it:

- operates as a financially viable enterprise
  facilitates research for the benefit of primary producers, researchers, students and other parties interested in Agriculture
  provides funds for the provision of scholarships and other activities for the benefit of teaching and research in the Faculty.

The Management Advisory Board will:

- receive financial statements relating to the property
- receive reports from the Dean of the Faculty relating to the use of the property for teaching, research and outreach activities.
- receive reports from the Properties and Investments Office relating to operational and financial aspects of the enterprise.
- advise the Dean of the Faculty on the distribution of the EJ Holtsbaum Trust's share of the profits from the Nowley Property Pool for scholarships and other activities for the benefit of teaching and research programs.

The Management Advisory Board will meet at least twice per year.

The HARI Management Advisory Board will consist of:

- The Dean of the Faculty
- A representative of the Faculty
- The working Manager
- Two practising agriculturists within reasonable proximity of "Nowley"
- The Director, University Properties and Investments

According to Mr Holtsbaum's Statement of Intention, "practising agriculturists" are to provide local knowledge. Their term of appointment should be at least three years, and they should be "quiet achievers" in their own right, demonstrating an ability to run a sound and profitable enterprise or having exceptional expertise in a field or fields relevant to the prevailing pursuit/s on Nowley. The initial appointments have been made by Mr Holtsbaum, and will be made subsequently by the Advisory Board. They shall not be nominated by farmer bodies, Boards or vested interests or politicians. The positions are honorary, apart from reimbursement for out-of-pocket expenses.

Scholarships

Should the Management Advisory Board determine there is sufficient money available for scholarship allocation Mr Holtsbaum made the following suggestions, in addition to conditions that normally apply in the University for the award of scholarships. The recipient shall be of high academic merit and show the intention to establish a career in agriculture (in whatever form). The Scholarship would be known as "The EJ Holtsbaum University of Sydney Faculty of Agriculture, Food and Natural Resources Scholarship".

The intention of the scholarships is to help students fund their studies, and to encourage in recipients a sense of giving something back to the land through their degree, should they have the opportunity to do so. Allocation of money for scholarships will be determined by the Faculty, in consultation with the Management Advisory Board.

The Sydney Summer and Winter Schools

2007	Dates
Summer School	December 2006–February 2007
Winter School	July 2007

The Summer School

The Summer School is a full fee-paying, intensive program offering high quality undergraduate and postgraduate units of study from most faculties. These units of study are the same as those offered in Semesters One and Two, but are taught as an intensive program over summer. Some classes commence in December, others commence in January and continue into February (including the exam week). Some units of study run for seven weeks others are shorter. Students can take a maximum of two units of study.

The Winter School

The Winter School is held every July during the academic year. The Winter School is a smaller, more intensive three week program.

Advantages

Attending classes at Sydney University during summer offers many advantages. You can

- use this time to accelerate your academic career and to finish your degree sooner
- devote your full attention to a single area of study
- take courses that might be outside your normal degree
- reduce your workload throughout the rest of the year
- repeat units of study in which you may have been unsuccessful
- combine study with a field trip in Australia or a tour overseas.

For high school graduates, you can

- sample a university program
- get a head start on your degree.

How to apply

Applications will only be accepted online. Our website is www.summer.usyd.edu.au

Some units have limited places and fill very quickly. All places are filled strictly on a first in first served basis so it is recommended that you apply early.

Applications open on 27 September 2006.

Applications close on 15 December 2006.

Census dates – Summer School 2007

Students can withdraw from their unit of study without academic penalty and receive a full refund until the census date. However, a late withdrawal fee may apply. As classes start throughout December to February there are three census dates for the Summer School. These are based on when the class commences.

ID	Session name	Classes begin	Census date
42*	Summer Dec	11 December	2 January
43	Summer Main	4 January	12 January
44**	Summer Late	12 January	6 February

**42 Summer Dec: Allows for a unit to run for 3–9 weeks, provided that the 20 per cent criterion is met.*
***44 Summer Late: Last exam must be held by 1 March.*

Withdrawal and Refund policy

- For classes commencing in **December 2006**, students withdrawing from a Summer School unit of study from 28 November 2006 to 2 January 2007, will receive a refund of tuition fees but will be liable for a $500 late withdrawal fee.
- For classes commencing after **4 January 2007**, students withdrawing from a Summer School unit of study from 16 December 2006 to 12 January 2007, will receive a refund of tutition fees but will be liable for a $500 late withdrawal fee.
- For classes commencing after **12 January 2007**, students withdrawing from a Summer School unit of study from 16 December 2006 to 6 February 2007, will receive a refund of tutition fees but will be liable for a $500 late withdrawal fee.
- Students may withdraw from their Summer School unit(s) of study up until 4pm on the last day of the Teaching Period for that particular unit of study. However, there may be an academic penalty (please refer to our website).The Teaching Period for purposes of this policy is defined in hours of published classes from the first day through to the last day of classes, excluding any final examination or assessment.
- Students withdrawing from a Summer School unit of study after 4pm on the relevant census date will receive no refund of their tuition fee.

Transferring between Summer School units

There will be no penalty if a student changes between units of study in the Summer School before the commencment of class. However NO transfers will be allowed after the commencement of the class.

Summer School scholarships

Merit scholarships

Only four merit scholarships are available and are automatically awarded to the top four students who achieve the highest results in their Summer School unit of study.

Educational/Financial Disadvantage scholarships

Partial or full Summer School scholarships are available to local undergraduate students for the Summer School with a good academic record. To be eligible for consideration you will need to provide evidence of long-term and serious educational disadvantage based on two or more criteria, one of which must be financial hardship. Please check our website for further details. Applications close on 27 October 2006.

For more information

Web: www.summer.usyd.edu.au
Email: info@summer.usyd.edu.au
Phone: +61 2 9351 5542
Fax: +61 2 9351 5888

University of Sydney (Coursework) Rule 2000 (as amended)

Approved by: Senate on 4 December 2000
Date of effect: 1 January 2001

Latest amendment approved by: Senate on 3 December 2001
Date of effect: 1 January 2002

[Section 1]

University Coursework Rule

Preliminary

1. **Commencement and purpose of Rule**

1.1 This Rule is made by the Senate pursuant to section 37(1) of the *University of Sydney Act 1989* for the purposes of the *University of Sydney By-Law 1999*.

1.2 This Rule comes into force on 1 January 2001.

1.3 This Rule governs all coursework award courses in the University. It is to be read in conjunction with the *University of Sydney (Amendment Act) Rule 1999* and the Resolutions of the Senate and the faculty resolutions relating to each award course in that faculty.

Rules relating to coursework award courses

1. **Definitions In this Rule:**

1.1 **award course** means a formally approved program of study which can lead to an academic award granted by the University.

1.2 **coursework** means an award course not designated as a research award course. While the program of study in a coursework award course may include a component of original, supervised research, other forms of instruction and learning normally will be dominant. All undergraduate award courses are coursework award courses.

1.3 **credit** means advanced standing based on previous attainment in another award course at the University or at another institution. The advanced standing is expressed as credit points granted towards the award course. Credit may be granted as specific credit or non-specific credit.

1.3.1 **specific credit** means the recognition of previously completed studies as directly equivalent to units of study;

1.3.2 **non-specific credit** means a 'block credit' for a specified number of credit points at a particular level. These credit points may be in a particular subject area but are not linked to a specific unit of study; and

1.3.3 **credit points** means a measure of value indicating the contribution each unit of study provides towards meeting award course completion requirements stated as a total credit point value.

1.4 **dean** means the dean of a faculty or the director or principal of an academic college or the chairperson of a board of studies.

1.5 **degree** means a degree at the level of bachelor or master for the purpose of this Rule.

1.6 **embedded courses/programs** means award courses in the graduate certificate/graduate diploma/master's degree by coursework sequence which allow unit of study credit points to count in more than one of the awards.

1.7 **faculty** means a faculty, college board, a board of studies or the Australian Graduate School of Management Limited as established in each case by its constitution and in these Rules refers to the faculty or faculties responsible for the award course concerned.

1.8 **major** means a defined program of study, generally comprising specified units of study from later stages of the award course.

1.9 **minor** means a defined program of study, generally comprising units of study from later stages of the award course and requiring a smaller number of credit points than a major.

1.10 **postgraduate award course** means an award course leading to the award of a graduate certificate, graduate diploma, degree of master or a doctorate. Normally, a postgraduate award course requires the prior completion of a relevant undergraduate degree or diploma.

1.11 **research award course** means an award course in which students undertake and report systematic, creative work in order to increase the stock of knowledge. The research award courses offered by the University are: higher doctorate, Doctor of Philosophy, doctorates by research and advanced coursework, and certain degrees of master designated as research degrees. The systematic, creative component of a research award course must comprise at least 66 per cent of the overall award course requirements.

1.12 **stream** means a defined program of study within an award course, which requires the completion of a program of study specified by the award course rules for the particular stream, in addition to the core program specified by award course rules for the award course.

1.13 **student** means a person enrolled as a candidate for a course.

1.14 **testamur** means a certificate of award provided to a graduate, usually at a graduation ceremony.

1.15 **transcript** or **academic transcript** means a printed statement setting out a student's academic record at the University.

1.16 **unit of study** means the smallest stand-alone component of a student's award course that is recordable on a student's transcript. Units of study have an integer credit point value, normally in the range 3–24.

1.17 **undergraduate award course** means an award course leading to the award of an associate diploma, diploma, advanced diploma or degree of bachelor.

2. **Authorities and responsibilities**

2.1 Authorities and responsibilities for the functions set out in this Rule are also defined in the document *Academic Delegations of Authority.* The latter document sets out the mechanisms by which a person who has delegated authority may appoint an agent to perform a particular function.

2.1 The procedures for consideration of, and deadlines for submission of, proposals for new and amended award courses will be determined by the Academic Board.

Division 1: Award course requirements, credit points and assessment

3. **Award course requirements**

3.1 To qualify for the award of a degree, diploma or certificate, a student must:

3.1.1 complete the award course requirements specified by the Senate for the award of the degree, diploma or certificate concerned;

3.1.2 complete any other award course requirements specified by the Academic Board on the recommendation of the faculty and published in the faculty resolutions relating to the award course;
3.1.3 complete any other award course requirements specified by the faculty in accordance with its delegated authority and published in the faculty resolutions relating to the award course; and
3.1.4 satisfy the requirements of all other relevant by-laws, rules and resolutions of the University.

4. **Units of study and credit points**

4.1.1 A unit of study comprises the forms of teaching and learning approved by a faculty. Where the unit of study is being provided specifically for an award course which is the responsibility of another faculty, that faculty must also provide approval.
4.1.2 Any faculty considering the inclusion of a unit of study in the tables of units available for an award course for which it is responsible may review the forms of teaching and learning of that unit, may consult with the approving faculty about aspects of that unit and may specify additional conditions with respect to inclusion of that unit of study.
4.2 A student completes a unit of study if the student:
4.2.1 participates in the learning experiences provided for the unit of study;
4.2.2 meets the standards required by the University for academic honesty;
4.2.3 meets all examination, assessment and attendance requirements for the unit of study; and
4.2.4 passes the required assessments for the unit of study.
4.3 Each unit of study is assigned a specified number of credit points by the faculty responsible for the unit of study.
4.4 The total number of credit points required for completion of an award course will be as specified in the Senate resolutions relating to the award course.
4.5 The total number of credit points required for completion of award courses in an approved combined award course will be specified in the Senate or faculty resolutions relating to the award course.
4.6 A student may, under special circumstances, and in accordance with faculty resolutions, be permitted by the relevant dean to undertake a unit or units of study other than those specified in the faculty resolutions relating to the award course and have that unit or those units of study counted towards fulfilling the requirements of the award course in which the student is enrolled.

5. **Unit of study assessment**

5.1 A student who completes a unit of study will normally be awarded grades of high distinction, distinction, credit or pass, in accordance with policies established by the Academic Board. The grades high distinction, distinction and credit indicate work of a standard higher than that required for a pass.
5.2 A student who completes a unit of study for which only a pass/fail result is available will be recorded as having satisfied requirements.
5.3 In determining the results of a student in any unit of study, the whole of the student's work in the unit of study may be taken into account.
5.4 Examination and assessment in the University are conducted in accordance with the policies and directions of the Academic Board.

6. **Attendance**

6.1 A faculty has authority to specify the attendance requirements for courses or units of study in that faculty. A faculty must take into account any University policies concerning modes of attendance, equity and disabled access.
6.2 A faculty has authority to specify the circumstances under which a student who does not satisfy attendance requirements may be deemed not to have completed a unit of study or an award course.

Division 2: Enrolment

7. **Enrolment restrictions**

7.1 A student who has completed a unit of study towards the requirements of an award course may not re-enrol in that unit of study, except as permitted by faculty resolution or with the written permission of the dean. A student permitted to re-enrol may receive a higher or lower grade, but not additional credit points.
7.2 Except as provided in section 7.1, a student may not enrol in any unit of study which overlaps substantially in content with a unit that has already been completed or for which credit or exemption has been granted towards the award course requirements.
7.3 A student may not enrol in units of study additional to award course requirements without first obtaining permission from the relevant dean.
7.4 Except as prescribed in faculty resolutions or with the permission of the relevant dean:
7.4.1 a student enrolled in an undergraduate course may not enrol in units of study with a total value of more than 32 credit points in any one semester, or 16 credit points in the summer session; and
7.4.2 a student enrolled in a postgraduate award course may not enrol in units of study with a total value of more than 24 credit points in any one semester, or 12 credit points in the summer session.

Division 3: Credit, cross-institutional study and their upper limits

8. **Credit for previous studies**

8.1 Students may be granted credit on the basis of previous studies.
8.2 Notwithstanding any credit granted on the basis of work completed or prior learning in another award course at the University of Sydney or in another institution, in order to qualify for an award a student must:
8.2.1 for undergraduate award courses, complete a minimum of the equivalent of two full-time semesters of the award course at the University; and
8.2.2 for postgraduate award courses, complete at least 50 per cent of the requirements prescribed for the award course at the University.

These requirements may be varied where the work was completed as part of an embedded program at the University or as part of an award course approved by the University in an approved conjoint venture with another institution.

8.3 The credit granted on the basis of work completed at an institution other than a university normally should not exceed one third of the overall award course requirements.
8.4 A faculty has authority to establish embedded academic sequences in closely related graduate certificate, graduate diploma and master's degree award courses. In such embedded sequences, a student may be granted credit for all or some of the units of study completed in one award of the sequence towards any other award in the sequence, irrespective of whether or not the award has been conferred.
8.5 In an award course offered as part of an approved conjoint venture the provisions for the granting of credit are prescribed in the Resolutions of the Senate and the faculty resolutions relating to that award course.

9. **Cross-institutional study**

9.1 The relevant dean may permit a student to complete a unit or units of study at another university or institution and have that unit or those units of study credited to the student's award course.
9.2 The relevant dean has authority to determine any conditions applying to cross-institutional study.

Division 4: Progression

10. **Repeating a unit of study**

10.1 A student who repeats a unit of study shall, unless granted exemption by the relevant dean:
10.1.1 participate in the learning experiences provided for the unit of study; and
10.1.2 meet all examination, assessment and attendance requirements for the unit of study.
10.2 A student who presents for re-assessment in any unit of study is not eligible for any prize or scholarship awarded in connection with that unit of study without the permission of the relevant dean.

11. **Time limits**

11.1 A student must complete all the requirements for an award course within ten calendar years or any lesser period if specified by resolution of the Senate or the faculty.

Division 5: Discontinuation of enrolment and suspension of candidature

12. **Discontinuation of enrolment**

12.1 A student who wishes to discontinue enrolment in an award course or a unit of study must apply to the relevant dean and will be presumed to have discontinued enrolment from the date of that application, unless evidence is produced showing:

12.1.1 that the discontinuation occurred at an earlier date; and

12.1.2 that there was good reason why the application could not be made at the earlier time.

12.2 A student who discontinues enrolment during the first year of enrolment in an award course may not re-enrol in that award course unless:

12.2.1 the relevant dean has granted prior permission to re-enrol; or

12.2.2 the student is reselected for admission to candidature for that course.

12.3 No student may discontinue enrolment in an award course or unit of study after the end of classes in that award course or unit of study, unless he or she produces evidence that:

12.3.1 the discontinuation occurred at an earlier date; and

12.3.2 there was good reason why the application could not be made at the earlier time.

12.4 A discontinuation of enrolment may be recorded as 'Withdrawn (W)' or 'Discontinued – not to count as failure (DNF)' where that discontinuation occurs within the time-frames specified by the University and published by the faculty, or where the student meets other conditions as specified by the relevant faculty.

13. **Suspension of candidature**

13.1 A student must be enrolled in each semester in which he or she is actively completing the requirements for the award course. A student who wishes to suspend candidature must first obtain approval from the relevant dean.

13.2 The candidature of a student who has not re-enrolled and who has not obtained approval from the dean for suspension will be deemed to have lapsed.

13.3 A student whose candidature has lapsed must apply for re-admission in accordance with procedures determined by the relevant faculty.

13.4 A student who enrols after suspending candidature shall complete the requirements for the award course under such conditions as determined by the dean.

Division 6: Unsatisfactory progress and exclusion

14. **Satisfactory progress**

14.1 A faculty has authority to determine what constitutes satisfactory progress for all students enrolled in award courses in that faculty, in accordance with the policies and directions of the Academic Board.

15. **Requirement to show good cause**

15.1 For the purposes of this Rule, 'good cause' means circumstances beyond the reasonable control of a student, which may include serious ill health or misadventure, but does not include demands of employers, pressure of employment or time devoted to non-University activities, unless these are relevant to serious ill health or misadventure. In all cases the onus is on the student to provide the University with satisfactory evidence to establish good cause. The University may take into account relevant aspects of a student's record in other courses or units of study within the University and relevant aspects of academic studies at other institutions provided that the student presents this information to the University.

15.2 The relevant dean may require a student who has not made satisfactory progress to show good cause why he or she should be allowed to re-enrol.

15.3 The dean will permit a student who has shown good cause to re-enrol.

16. **Exclusion for failure to show good cause**

The dean may, where good cause has not been established:

16.1 exclude the student from the relevant course; or

16.2 permit the student to re-enrol in the relevant award course subject to restrictions on units of study, which may include, but are not restricted to:

16.2.1 completion of a unit or units of study within a specified time;

16.2.2 exclusion from a unit or units of study, provided that the dean must first consult the head of the department responsible for the unit or units of study; and

16.2.3 specification of the earliest date upon which a student may re-enrol in a unit or units of study.

17. **Applying for re-admission after exclusion**

17.1 A student who has been excluded from an award course or from a unit or units of study may apply to the relevant dean for re-admission to the award course or re-enrolment in the unit or units of study concerned after at least four semesters, and that dean may readmit the student to the award course or permit the student to re-enrol in the unit or units of study concerned.

17.2 With the written approval of the relevant dean, a student who has been excluded may be given credit for any work completed elsewhere in the University or in another university during a period of exclusion.

18. **Appeals against exclusion**

18.1 In this Rule a reference to the Appeals Committee is a reference to the Senate Student Appeals Committee (Exclusions and Re-admissions).

18.2.1.1 A student who has been excluded in accordance with this Rule may appeal to the Appeals Committee.

18.2.1.2 A student who has applied for re-admission to an award course or re-enrolment in a unit of study after a period of exclusion, and who is refused re-admission or re-enrolment may also apply to the Appeals Committee.

18.2.2 The Appeals Committee shall comprise:

18.2.2.1 three *ex officio* members (the Chancellor, the Deputy Chancellor and the Vice-Chancellor and Principal);

18.2.2.2 the Chair and Deputy Chairs of the Academic Board;

18.2.2.3 two student Fellows; and

18.2.2.4 up to four other Fellows.

18.2.3 The Appeals Committee may meet as one or more subcommittees providing that each subcommittee shall include at least one member of each of the categories of:

18.2.3.1 *ex officio* member;

18.2.3.2 Chair or Deputy Chair of the Academic Board;

18.2.3.3 student Fellow; and

18.2.3.4 other Fellows.

18.2.4 Three members shall constitute a quorum for a meeting of the Appeals Committee or a subcommittee.

18.2.5 The Appeals Committee and its subcommittees have authority to hear and determine all such appeals and must report its decision to the Senate annually.

18.2.6 The Appeals Committee or a subcommittee may uphold or disallow any appeal and, at its discretion, may determine the earliest date within a maximum of four semesters at which a student who has been excluded shall be permitted to apply to re-enrol.

18.2.7 No appeal shall be determined without granting the student the opportunity to appear in person before the Appeals Committee or subcommittee considering the appeal. A student so appearing may be accompanied by a friend or adviser.

18.2.8 The Appeals Committee or subcommittee may hear the relevant dean but that dean may only be present at those stages at which the student is permitted to be present. Similarly, the dean is entitled to be present when the Committee or subcommittee hears the student.

18.2.9 If, due notice having been given, a student fails to attend a meeting of the Appeals Committee or subcommittee scheduled to consider that student's appeal, the Appeals Committee or subcommittee, at its discretion, may defer consideration of the appeal or may proceed to determine the appeal.

18.2.10 A student who has been excluded in accordance with these resolutions and has lodged a timely appeal against that exclusion may re-enrol pending determination of that appeal if it has not been determined by the commencement of classes in the next appropriate semester.

Division 7: Exceptional circumstances

19. **Variation of award course requirements in exceptional circumstances**

19.1 The relevant dean may vary any requirement for a particular student enrolled in an award course in that faculty where, in the opinion of the dean, exceptional circumstances exist.

Division 8: Award of degrees, diplomas and certificates

20. **Classes of award**

20.1 Undergraduate diplomas may be awarded in five grades – pass, pass with merit, pass with distinction, pass with high distinction or honours.

20.2 Degrees of bachelor may be awarded in two grades – pass or honours.

20.3 Graduate diplomas and graduate certificates may be awarded in one grade only – pass.

20.4 Degrees of master by coursework may be awarded three grades – pass, pass with merit or honours.

21. **Award of the degree of bachelor with honours**

21.1 The award of honours is reserved to indicate special proficiency. The basis on which a student may qualify for the award of honours in a particular award course is specified in the faculty resolutions relating to the course.

21.2 Each faculty shall publish the grading systems and criteria for the award of honours in that faculty.

21.3 Classes which may be used for the award of honours are:

21.3.1 First Class

21.3.2 Second Class/Division 1

21.3.3 Second Class/Division 2

21.3.4 Third Class

21.4 With respect to award courses which include an additional honours year:

21.4.1 a student may not graduate with the pass degree while enrolled in the honours year;

21.4.2 on the recommendation of the head of the department concerned, a dean may permit a student who has been awarded the pass degree at a recognised tertiary institution to enrol in the honours year in that faculty;

21.4.3 faculties may prescribe the conditions under which a student may enrol part-time in the honours year;

21.4.4 a student who fails or discontinues the honours year may not re-enrol in it, except with the approval of the dean.

22. **University Medal**

22.1 An honours bachelor's degree student with an outstanding academic record throughout the award course may be eligible for the award of a University Medal, in accordance with Academic Board policy and the requirements of the faculty resolutions relating to the award course concerned.

23. **Award of the degree of master with honours or merit**

23.1 The award of honours or pass with merit is reserved to indicate special proficiency or particular pathways to completion. The basis on which a student may qualify for the award of honours or the award with merit in a particular degree is specified in the Faculty Resolutions relating to that degree.

24. **Transcripts and testamurs**

24.1 A student who has completed an award course or a unit of study at the University will receive an academic transcript upon application and payment of any charges required.

24.2 Testamurs may indicate streams or majors or both as specified in the relevant faculty resolutions.

Division 9: Transitional provisions

25. **Application of this Rule during transition**

25.1 This Rule applies to all candidates for degrees, diplomas and certificates who commence candidature after 1 January 2001.

25.2 Candidates who commenced candidature prior to this date may choose to proceed in accordance with the resolutions of the Senate in force at the time they enrolled, except that the faculty may determine specific conditions for any student who has re-enrolled in an award course after a period of suspension.

University of Sydney (Doctor of Philosophy (PhD)) Rule 2004

University of Sydney (Doctor of Philosophy (PhD)) Rule 2004

Please also see the University of Sydney (Authority Within Academic Units) Rule 2003 (as amended)

Part 1 – Preliminary

1. **Citation and commencement**

1.1 *Citation*

1.1.1 This Rule is made by the Senate of the University of Sydney pursuant to section 37(1) of the University of Sydney Act 1989 for the purposes of the University of Sydney By-law 1999.

1.2 *Commencement*

1.2.1 This Rule commences on the day after it is made in accordance with Chapter 2 of the University of Sydney By-law 1999.

2. **Purpose**

2.1 This Rule:

2.1.1 repeals and replaces Part 10, Division 4 of the University of Sydney (Amendment Act) Rule 1999 in its entirety; and

2.1.2 deals with matters relating to the degree of Doctor of Philosophy.

Part 2 – Admission to candidature

3. **Heads of department**

3.1 A head of department may delegate to a specified member of the academic staff his or her responsibilities under these Rules by countersigning a specific recommendation in respect of a particular candidature or by making, and forwarding to the Registrar, a written statement of delegation of those powers.

4. **Admission to candidature**

4.1 An applicant for admission as a candidate for the degree shall, except as provided in 4.2 and 4.3 below, hold or have fulfilled all the requirements for:

4.1.1 the degree of master, or

4.1.2 the degree of bachelor with first or second class honours.

4.2 A faculty may admit as a candidate for the degree an applicant holding the degree of bachelor without first or second class honours after the applicant has passed a qualifying examination at a standard equivalent to the bachelor's degree with first or second class honours, provided that a faculty may exempt an applicant from the qualifying examination if the applicant has obtained a high distinction or distinction in the highest course available in the subject or subjects relevant to the proposed course of advanced study and research.

4.3 The Academic Board has endorsed an interpretation of the qualifying examination as including completion of a period of relevant full-time or part-time advanced study and research towards a master's degree in the University of Sydney, at such a standard as would demonstrate to the satisfaction of the faculty that the candidate is suitably prepared in the particular field of study to undertake candidature for the degree of Doctor of Philosophy.

4.4 The Academic Board may, in accordance with this Rule, admit as a candidate for the degree an applicant holding qualifications which, in the opinion of the faculty concerned and of the Academic Board, are equivalent to those prescribed in 4.1 or 4.2 above and such candidate shall proceed to the degree under such conditions as the Academic Board may prescribe.

4.5 An applicant for admission to candidature shall submit to the faculty concerned:

4.5.1 a proposed course of advanced study and research, approved by the head of the department in which the work is to be carried out, to be undertaken by the applicant in a department of the University, and

4.5.2 satisfactory evidence of adequate training and ability to pursue the proposed course.

4.6 The faculty may require a candidate, as part of the evidence of the candidate's training and ability to pursue the proposed course, to pass a special examination.

4.7 A reference in this section to a department includes a reference to one or more departments, one or more schools, an interdepartmental committee and an interschool committee.

5. **Probationary acceptance**

5.1 A candidate may be accepted by a faculty on a probationary basis for a period not exceeding one year and upon completion of this probationary period, the faculty shall review the candidate's work and shall either confirm the candidate's status or terminate the candidature.

5.2 In the case of a candidate accepted on a probationary period under 5.1 above, the candidature shall be deemed to have commenced from the date of such acceptance.

6. **Control of candidature**

6.1 Each candidate shall pursue his or her course of advanced study and research wholly under the control of the University.

6.2 Where a candidate is employed by an institution other than the University, the faculty or college board may require a statement by that employer acknowledging that the candidature will be under the control of the University.

7. **Other studies during the candidature**

7.1 A candidate may be required by the head of department or the supervisor to attend lectures, seminar courses or practical work courses or to undertake courses and, if required, the assessment for such courses, subject to the approval of any other head of department concerned.

8. **Credit for previous studies**

8.1 A candidate who, at the date of admission to candidature, has completed not less than six months as a candidate for the degree of master in any faculty or board of studies of the University of Sydney, may be permitted by the faculty concerned to be credited for the whole or any part of the period of candidature completed for the degree of master as a period of candidature completed for the degree of Doctor of Philosophy, provided that the period of candidature for the degree of master for which credit is sought shall have been a course of full-time or part-time advanced study and research under a supervisor appointed by the faculty or board of studies concerned and directly related to the candidate's proposed course of advanced study and research for the degree of Doctor of Philosophy.

8.2 A candidate who, at the date of admission has completed not less than six months as a candidate for a higher degree in another university or institution may be permitted by the Academic Board, on the recommendation of the faculty concerned, to be credited for the whole or any part of the period of candidature completed as a period completed for the degree of Doctor of Philosophy of the University of Sydney, provided that:

8.2.1 at the date of admission to candidature for the higher degree of the other university or institution concerned the candidate shall have fulfilled the requirements of admission to candidature set out in section 3 above;

8.2.2 the period of candidature for the higher degree of the other university or institution concerned for which credit is sought shall have been a course of full-time or part-time advanced study and research under a supervisor appointed by the

other university or institution concerned and directly related to the candidate's proposed course of advanced study and research in the University of Sydney;

8.2.3 the candidate shall have abandoned candidature for the higher degree of the other university or institution concerned for which credit is sought;

8.2.4 the amount of credit which may be so granted shall not exceed one year; and

8.2.5 no candidate who has been granted credit shall present a thesis for examination for the degree earlier than the end of the second year after acceptance.

8.3 The Faculty of Medicine may grant credit not exceeding one year to a candidate for the degree of Doctor of Philosophy in that Faculty who has submitted documented evidence of having previously completed supervised study towards the degree of Doctor of Medicine of the University of Sydney.

Part 3 – Supervision

9. **Appointment and qualifications of supervisors and associate supervisors**

9.1 The faculty or college board, on the recommendation of the head of department concerned, shall appoint a suitably qualified supervisor and associate supervisors for each candidate to take primary responsibility for the conduct of the candidature and to be responsible for the progress of the candidature to the head of department and the faculty or college board concerned in accordance with policy established by the Academic Board.

Part 4 – Candidature

10. **Location**

10.1.1 Subject to the annual approval of the supervisor, head of department and faculty or college board, the candidate shall pursue the course of advanced study and research either:

10.1.1.1 within the University including its research stations and teaching hospitals;

10.1.1.2 on fieldwork either in the field or in libraries, museums or other repositories;

10.1.1.3 within industrial laboratories or research institutions or other institutions considered by the faculty or college board concerned to provide adequate facilities for that candidature; or

10.1.1.4 within a professional working environment;

10.1.2 and shall attend at the University for such consultation with the supervisor and shall participate in such departmental and faculty or college seminars as shall annually be specified.

10.2.1 A candidate pursuing candidature outside Australia must also complete a minimum of two semesters of candidature within the University [but not necessarily immediately before submission, not necessarily as a continuous two-semester period] before submission of the thesis.

10.2.2 The corresponding period for candidates for whom the minimum length of candidature is four semesters is a minimum of one semester.

10.3 When recommending the detailed annual conditions for each candidate's particular course of advanced study and research the supervisor and head of department must indicate whether they are satisfied that the proposed supervision arrangements will be satisfactory.

11. **Progress**

11.1 At the end of each year each candidate shall provide evidence of progress and attend a progress review interview to the satisfaction of the supervisor and head of department concerned and any Departmental or Faculty Postgraduate Review Committee.

11.2 On the basis of evidence provided and the interview, the head of department shall recommend the conditions of candidature to apply for the following year and may require the candidate to provide further evidence of progress at the end of one semester or such other period as the head of department considers appropriate.

11.3 If a candidate fails to submit evidence of progress or if the head of department concerned considers that the evidence submitted does not indicate satisfactory progress, the faculty or college board may, on the head's recommendation, call upon that candidate to show cause why that candidature should not be terminated by reason of unsatisfactory progress towards completion of the degree and where, in the opinion of the faculty or college board, the candidate does not show good cause the faculty or college board may terminate that candidature or may impose conditions on the continuation of that candidature.

Part 5 – Submission of thesis

12. **The thesis**

12.1.1 On completing the course of advanced study and research, a candidate shall present a thesis embodying the results of the work undertaken, which shall be a substantially original contribution to the subject concerned.

12.1.2 The candidate shall state, generally in the preface and specifically in notes, the sources from which the information is derived, the animal and human ethical approvals obtained, the extent to which the work of others has been made use of, and the portion of the work the candidate claims as original.

12.2 A candidate may also submit in support of the candidature any publication of which the candidate is the sole or joint author. In such a case the candidate must produce evidence to identify satisfactorily the sections of the work for which the candidate is responsible.

12.3 Except where the candidature has been governed by an approved cotutelle agreement, a candidate may not present as the thesis any work which has been presented for a degree or diploma at this or another university, but the candidate will not be precluded from incorporating such in the thesis, provided that, in presenting the thesis, the candidate indicates the part of the work which has been so incorporated.

12.4 Theses shall be written in English, except that:

12.4.1 in the case of a candidature governed by an approved cotutelle agreement, the thesis may be written in English or in another language; and

12.4.2.1 in the Faculty of Arts, in the case of language departments, theses may be written either in English or in their target language as determined by the department, unless a department has specified by means of a Faculty resolution that it will consider applications to submit the thesis in a language other than:

12.4.2.1.1 English; or

12.4.2.1.2 a target language of the department.

12.4.2.2 Such applications should be made in writing; and approved by the head of department concerned and the Dean of the Faculty, before the commencement of candidature.

12.4.2.3 In considering applications a head of department shall take into account arrangements for supervision and examination.

12.5 A candidate shall submit to the Registrar four copies of the thesis in a form prescribed by resolution of the Academic Board and four copies of a summary of about 300 words in length.

12.6 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.

13. **Earliest date for submission**

13.1 Except as provided below, a candidate may not submit a thesis for examination earlier than the end of the sixth semester of candidature.

13.2 A faculty or college board may permit a candidate holding any of the following qualifications of the University of Sydney or from such other institution as the faculty or college board may approve, to submit a thesis for examination not earlier than the end of the fourth semester of candidature:

13.2.1 a degree of master completed primarily by research;

13.2.2 both the degrees of Bachelor of Dental Surgery with honours and Bachelor of Science (Dental) with honours;

13.2.3 both the degrees of Bachelor of Medicine with honours and Bachelor of Science (Medical) with honours; or

13.2.4 both the degrees of Bachelor of Veterinary Science with honours and Bachelor of Science (Veterinary) with honours.

13.3 Notwithstanding 13.1 and 13.2 above, a faculty may, on the recommendation of the head of department and supervisor concerned, permit a candidate to submit a thesis for examination up to one semester earlier than prescribed if, in the opinion of the faculty, evidence has been produced that the candidate has made exceptional progress in his or her candidature.

13.4.1 Notwithstanding 13.1, 13.2 and 13.3 above, the Chair of the Academic Board may, on the recommendation of the dean

of the faculty in which the candidate is enrolled, permit a candidate to submit a thesis for examination earlier than prescribed if, in the opinion of the Chair of the Academic Board, evidence has been produced that the candidate has made exceptional progress in his or her candidature.

13.4.2 The Chair of the Academic Board may take advice from the Chair of the Graduate Studies Committee and shall report any applications under this provision and the action taken to the next meeting of the Academic Board.

14. **Latest date for submission**

14.1 Except as provided in 14.1 to 14.3 below, a candidate shall submit the thesis for examination not later than the end of the eighth semester of candidature.

14.2 A candidate whose candidature has been part-time throughout shall submit the thesis for examination not later than the end of the 16th semester of candidature.

14.3 The time limits set out in 14.1 to 14.2 above, apply to candidates who commence candidature after 31 December 2000. Candidates who commenced candidature prior to this date may choose to proceed in accordance with the Rules in force at the time when they commenced candidature.

14.4 The relevant dean may permit a candidate to submit the thesis for examination after a period of time greater than the maximum periods specified.

15. **Examination**

15.1 The procedures for examination shall be prescribed by the Academic Board.

General University information

For further information or advice, please feel free to call our Helpline on **1300 362 006**.

Accommodation Service
Admissions Office
Applying for a course
Assessment
Careers Centre
Casual Employment Service
Centre for Continuing Education
Centre for English Teaching
Child Care
Client Services, Information and Communications Technology (ICT)
The Co-op Bookshop
Counselling Service
Disability Services
Email
Enrolment
Environmental Policy
Examinations
Fees
Financial Assistance Office
Freedom of Information
Graduations Office
(Grievances) Appeals
HECS and Fees Office
HELP
Information and Communications Technology
International Office
International Student Support Unit
Koori Centre and Yooroang Garang
Learning Centre
Library
Mathematics Learning Centre
Multimedia and Educational Technologies in Arts (META) Resource Centre
MyUni Student Portal
Part-time, full-time
Policy online
Privacy
Scholarships for undergraduates
Services for Students
Student Centre
Student Identity Cards
Student Services
The Sydney Summer School
The University of Sydney Foundation Program
Timetabling Unit
University Health Service

Accommodation Service

The Accommodation Service helps students find off-campus accommodation. The service maintains extensive databases of share accommodation, rental properties, and full board accomodation. Currently enrolled students can access the database online through the MyUni student portal, or the accommodation website via your MyUni student portal or the Services for Students website.

Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 29351 3312
Fax: +61 2 9351 8262
Email: accomm@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/accom

Admissions Office

The Admissions Office, located in the Student Centre, is responsible for overseeing the distribution of offers to undergraduate applicants through the Universities Admission Centre (UAC). They can advise prospective local undergraduate students on admission requirements. Postgraduate students should contact the appropriate faculty. If you are an Australian citizen or a permanent resident but have qualifications from a non-Australian institution phone +61 2 9351 4118 for more information. For enquiries regarding special admissions (including mature-age entry) phone +61 2 9351 3615. Applicants without Australian citizenship or permanent residency should contact the International Office.

Student Centre
Ground Floor, Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4117 or +61 2 9351 4118
Fax: +61 2 9351 4869
Email: admissions@records.usyd.edu.au
Web: http://www.usyd.edu.au/studentcentre

Applying for a course

Domestic applicants for undergraduate courses and programs of study

For the purpose of admission and enrolment 'domestic applicant' refers to citizens and permanent residents of Australia and citizens of New Zealand. If you are in this group and wish to apply for admission into an undergraduate course, you would generally apply through the Universities Admissions Centre (UAC). The deadline for application is the last working day of September in the year before enrolment. Go to the UAC website for more information.

Note that some faculties, such as Pharmacy, the Sydney Conservatorium of Music and Sydney College of the Arts, have additional application procedures.

Domestic applicants for postgraduate courses and programs of study

For the purpose of admission and enrolment 'domestic applicant' refers to citizens and permanent residents of Australia and citizens of New Zealand. Application is direct to the faculty which offers the course that you are interested in. Application forms for postgraduate coursework, postgraduate research and the master's qualifying or preliminary program and for non-award postgraduate study can be found at http://www.usyd.edu.au/studentcentre.

Please note that some faculties use their own specially tailored application forms for admission into their courses. Please contact the relevant faculty.

International applicants for all course types (undergraduate and postgraduate)

'International applicants' refers to all applicants other than Australian citizens, Australian permanent residents and citizens of New Zealand. In the majority of cases international applicants apply for admission

through the University's International Office (IO). All the information international applicants need, including application forms, is available from the IO website.

Assessment

For assessment matters refer to the relevant department or school.

Careers Centre

The Careers Centre will help you with careers preparation and gradutate recruitment.

Careers Centre
Ground Floor, Mackie Building K01
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3481
Fax: +61 2 9351 5134
Email: info@careers.usyd.edu.au
Web: http://www.careers.usyd.edu.au

Casual Employment Service

The Casual Employment Service helps students find casual and part-time work during their studies and during University vacations. The service maintains a database of casual employment vacancies. Currently enrolled students can access the database online through the MyUni student portal, or the casual employment website via your MyUni student portal, or the Services for Students website.

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NSW 2006 Australia

Phone: +61 2 9351 8714
Fax: +61 2 9351 8717
Email: ces@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/cas_emp

Centre for Continuing Education

The Centre for Continuing Education offers a wide range of short courses for special interest, university preparation and professional development.

Centre for Continuing Education
160 Missenden Rd
Newtown NSW 2042

Postal address:
Locked Bag 2020
Glebe NSW 2037

Ph: +61 2 9036 4789
Fax: +61 2 9036 4799
Email: info@cce.usyd.edu.au
Web: http://www.cce.usyd.edu.au

Subject areas include: history and culture, creative arts, social sciences, languages, IT, business and overseas study tours. Courses are open to everyone.

Centre for English Teaching (CET)

The Centre for English Teaching (CET) offers English language and academic study skills programs to students from overseas and Australian residents from non-English speaking backgrounds who need to develop their English language skills to meet academic entry requirements.

Camperdown Campus G01
University Of Sydney
NSW 2006 Australia

Phone: +61 2 9351 0760
Fax: +61 2 9351 0710
Email: info@cet.usyd.edu.au
Web: http://www.usyd.edu.au/cet

Child care

Contact the Child Care Information Officer for information about child care for students and staff of the University who are parents. For details of centres, vacation and occasional care see the child care website via your MyUni student portal or the Services for Students Website

Child Care Information Officer
Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 5667
Fax: +61 2 9351 7055
Email: childc@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/childcare

Client Services, Information and Communications Technology (ICT)

Client Services are responsible for the delivery of many of the computing services provided to students. Students can contact Client Services by phoning the ICT Helpdesk on 9351 6000, through the IT Assist website (http://www.itassist.usyd.edu.au) or by visiting the staff at one of the University Access Labs.
The access labs on the Camperdown and Darlington campuses are located in:

- Fisher Library (Level 2);
- Carslaw Building (Room 201);
- Education Building (Room 232);
- Christopher Brennan Building (Room 232);
- Engineering Link Building (Room 222); and
- Pharmacy and Bank Building (Room 510).

Other labs are available at the Law, Westmead Hospital and Cumberland campuses.

The labs provide students free access to computers including office productivity and desktop publishing software.

Services are available on a fee for service basis which include Internet access, printing facilities and the opportunity to host their own non-commercial website.

Each student is supplied with an account, called a 'Unikey' account, which allows access to a number of services including:

- free email (http://www-mail.usyd.edu.au);
- access to the Internet from home or residential colleges (http://www.itassist.usyd.edu.au/services.html);
- student facilities via the MyUni student portal (http://myuni.usyd.edu.au), including exam results, enrolment variations and timetabling; and
- free courses in basic computing (such as MS Office; basic html and excel) that are run by Access Lab staff in the week following orientation week. To register contact the Access Lab Supervisor on +61 2 9351 6870.

Client Services, Helpdesk
University Computer Centre, H08
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 6000
Fax: +61 2 9351 6004
Email: support@usyd.edu.au
Web: http://www.itassist.usyd.edu.au

The Co-op Bookshop

The Co-op Bookshop is a one-stop bookshop for:

- textbooks
- general books
- reference books
- DVDs
- flash drives; and
- software at academic prices.

Lifetime membership costs $20.00 and gives great discounts on purchases (conditions apply).

Sports and Aquatic Centre Building G09

Phone: +61 2 9351 3705
Fax: +61 2 9660 5256
Email: sydu@coop-bookshop.com.au
Web: http://www.coop-bookshop.com.au

Counselling Service

The Counselling Service aims to help students fulfil their academic, individual and social goals through professional counselling. The Service provides short-term, problem-focused counselling to promote psychological wellbeing and to help students develop effective and realistic coping strategies. International students can access counselling assistance through the International Students Support Unit (ISSU). Each semester the Counselling Service runs a program of workshops designed to assist students master essential study and life management skills. Workshops are available to all local and international students. For details of workshops, activities and online resources provided by the service see the Counselling Service website via your MyUni student portal or the Services for Students website. Phone to make an appointment. Daily walk-in appointments are also available between 11am and 3pm.

Camperdown and Darlington campuses

Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2228
Fax: +61 2 9351 7055
Email: counsell@mail.usyd.edu.au
Web: http://www.usyd.edu.au/counsel

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +61 2 9351 9638
Fax: +61 2 9351 9635
Email: CS_Cumberland@fhs.usyd.edu.au
Web: http://www.usyd.edu.au/counsel

Disability Services

Disability Services is the principal point of contact for advice on assistance available for students with disabilities. Students with a disability need to register with Disability Services to recieve support and assistance. Disability Services works closely with academic and administrative staff to ensure that students receive reasonable accommodations in their areas of study. Assistance available includes the provision of note taking, interpreters and negotiation with academic staff regarding assessment and course requirement modifications where appropriate. For details on registering with the Service including documentation required and online resoures see the Disability Services website via your MyUni student portal or
http://www.usyd.edu.au/disability.

Camperdown and Darlington campuses

Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 7040
Fax: +61 2 9351 3320
TTY: +61 2 9351 3412
Email: disserv@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/disability

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +61 2 9351 9638
Fax: +61 2 9351 9635
Email: DS_Cumberland@fhs.usyd.edu.au
Web: http://www.usyd.edu.au/disability

Equity Support Services

Equity Support Services, located within Student Services, brings together a number of student support services that produce practical assistance and information to support students in meeting their academic and personal goals while at University. Services include Accommodation Service, Casual Employment Service, Childcare Information Officer, Disability Services and the Financial Assistance Officer. For details of these services and online resources provided see their individual entry in this Handbook or go to the MyUni student portal or the Services for Students website.

Email

See Client Services, Information and Communications Technology

Enrolment

Students entering first year

Details of enrolment procedures will be sent to you with your UAC offer of enrolment. Enrolment takes place at a specific time and date, usually during the last week of January.

All other students

A pre-enrolment package is sent to all enrolled students in late September and contains instructions on the procedure for web-based pre-enrolment.

Environmental Policy

The University of Sydney's Environmental Policy promotes sustainable resource and product use; and encourages the practice of environmental stewardship by staff and students. The policy is supported by the University wide Sustainable Campus Program.

Enquiries can be directed to the Manager, Environmental Strategies
Phone: +61 2 93512063
Email: sustainable@usyd.edu.au
or go to http://www.usyd.edu.au/sustainable where you can find out what the University is doing and how you can get involved, make suggestions or receive the Sustainable Campus Newsletter.

Examinations

The Examinations and Exclusions Office looks after the majority of examination arrangements and student progression. Some faculties, such as the Sydney Conservatorium of Music, make all examination arrangements for the units of study that they offer.

Examinations and Exclusions Office
Student Centre
Level 1, Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4005 or +61 2 9351 4006
Fax: +61 2 9351 7330
Email: exams.office@exams.usyd.edu.au

Fees

The Fees Office provides information on how to pay fees, where to pay fees and if payments have been received. The office also has information on obtaining a refund for fee payments.

Fees Office
Margaret Telfer Building K07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 5222
Fax: +61 2 9351 4202
Email: feespay@usyd.edu.au

Financial Assistance Office

The University of Sydney has a number of loan and bursary funds to assist students experiencing financial difficulties. Loan assistance is available for undergraduate and postgraduate students enrolled in degree and diploma courses at the University. The assistance is not intended to provide the principle means of support but to help enrolled students in financial need with expenses such as housing bonds and rent; phone and electricity bills; medical expenses; buying textbooks and course equipment. Loans are interest free and are repayable usually within one year. Bursaries may be awarded depending on financial need and academic merit and are usually only available to local full-time undergraduate students. Advertised bursaries, including First Year Bursaries, are advertised through the MyUni student portal in January each year. For details of types of assistance and online resources provided by the service see the Financial Assistance website via your MyUni student protal or the Services for Students website

Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2416
Fax: +61 2 9351 7055
Email: fao@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/fin_assist

Freedom of Information

The University of Sydney falls within the jurisdiction of the *NSW Freedom of Information Act, 1989*. The act:

- requires information concerning documents held by the University to be made available to the public;
- enables a member of the public to obtain access to documents held by the University; and
- enables a member of the public to ensure that records held by the University concerning his or her personal affairs are not incomplete, incorrect, out of date or misleading.

(Note that a 'member of the public' includes staff and students of the University.)

It is a requirement of the act that applications be processed and a determination made within a specified time period, generally 21 days. Determinations are made by the University's Registrar.

While application may be made to access University documents, some may not be released in accordance with particular exemptions provided by the act. There are review and appeal mechanisms which apply when access has been refused.

The University is required to report to the public on its freedom of information (FOI) activities on a regular basis and to produce two documents: a *Statement of Affairs* (annually) and a *Summary of Affairs* (every six months). The *Statement of Affairs* contains information about the University, its structure, function and the kinds of documents held. The *Summary of Affairs* identifies the University's policy documents and provides information on how to make an application for access to University documents.

Further information and copies of the current Statement and Summary may be found at http://www.usyd.edu.au/arms/foi

While application may be made to access University documents, some may not be released in accordance with particular exemptions provided by the act. There are review and appeal mechanisms which apply when access has been refused.

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Further information and copies of the current Statement and Summary may be found at http://www.usyd.edu.au/arms/foi

Graduations Office

The Graduations Office is responsible for organising graduation ceremonies and informing students of their graduation arrangements.

Student Centre
Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3199, +61 2 9351 4009
Protocol: +61 2 9351 4612
Fax: +61 2 9351 5072

(Grievances) Appeals

You may consider that a decision affecting your candidature for a degree or other activities at the University has not taken into account all relevant matters.

In some cases the by-laws or resolutions of the Senate (see the University Calendar) provide for a right of appeal against particular decisions; for example, there is provision for appeal against academic decisions, disciplinary decisions and exclusion after failure.

A document outlining the current procedures for appeals against academic decisions is available at the Student Centre, at the SRC, and on the University's policy online website (click on 'Study at the University', then click on 'Appeals' – see the Academic Board and Senate resolutions).

For assistance or advice regarding an appeal contact:
Students' Representative Council
Level 1, Wentworth Building G01
University of Sydney
NSW 2006 Australia

Phone: +61 2 9660 5222

HECS and Fees Office

Student Centre
Ground Floor, Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 5659, +61 2 9351 5062, +61 2 9351 2086
Fax: +61 2 9036 6111

HELP

See HECS and Fees Office

Information and Communications Technology

See Client Services, Information and Communications Technology

International Office

The International Office provides assistance with application, admission and enrolment procedures for international students. The International Office also includes units responsible for international marketing, government relations, international scholarships, including AusAID scholarships, and compliance with government regulations related to international students. The Study Abroad and Exchange unit assists both domestic and international students who wish to enrol for study abroad or exchange programs.

International Office

Services Building G12
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4079
Fax: +61 2 9351 4013
Email: info@io.usyd.edu.au
Web: http://www.usyd.edu.au/internationaloffice

Study Abroad

Phone: +61 2 9351 3699
Fax: +61 2 9351 2795
Email: studyabroad@io.usyd.edu.au
Web: http://www.usyd.edu.au/studyabroad

Student Exchange

Phone: +61 2 9351 3699
Fax: +61 2 9351 2795
Email: exchange@io.usyd.edu.au
Web: http://www.usyd.edu.au/studentexchange

International Student Support Unit

The International Student Support Unit assists international students through the provision of orientation, counselling and welfare services to both students and their families. ISSU aims to help international students cope successfully with the challenges of living and studying in a unfamiliar culture, to achieve success in their studies and to make the experience of being an international student rewarding and enjoyable. For details of orientation activities, counselling and welfare services provided to both students and their families and online resources, see the MyUni student portal or the Services for Students website http://www.usyd.edu.au/stuserv. International students also have access to all University student support services.

Camperdown and Darlington campuses

Ground Floor, Services Building G12
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4749
Fax: +61 2 9351 6818
Email: info@issu.usyd.edu.au
Web: http://www.usyd.edu.au/issu

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
University of Sydney
East Street, Lidcombe
NSW 2141 Australia

Phone: +61 2 9351 9638
Fax: +61 2 9351 9635
Email: ISSU_Cumberland@fhs.usyd.edu.au
Web: http://www.usyd.edu.au/issu

Koori Centre and Yooroang Garang

Islander people in all aspects of tertiary education at the University of Sydney. The Cadigal Special Entry Program assists Indigenous Australians to enter undergraduate study across all areas of the University.

As well as delivering block-mode courses for Indigenous Australian students, the Koori Centre teaches Indigenous Australian Studies in various mainstream courses. In addition the Centre provides tutorial assistance, and student facilities such as: computer lab, Indigenous research library and study rooms for Indigenous Australian students across the University.
In particular the Koori Centre aims to increase the successful participation of Indigenous Australians in undergraduate and postgraduate degrees, develop the teaching of Aboriginal Studies, conduct research in the field of Aboriginal education, and establish working ties with schools and communities.

The Koori Centre works in close collaboration with Yooroang Garang: School of Indigenous Health Studies in the Faculty of Health Sciences at the University's Cumberland Campus. Yooroang Garang provides advice, assistance and academic support for Indigenous students in the faculty, as well as preparatory undergraduate and postgraduate courses.

Koori Centre

Ground Floor, Old Teachers College A22
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2046 (general enquiries)
Toll Free: 1800 622 742
Community Liaison Officer: +61 2 9351 7003
Fax: +61 2 9351 6923
Email: koori@koori.usyd.edu.au
Web: http://www.koori.usyd.edu.au

Yooroang Garang

T Block, Level 4, Cumberland Campus C42
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 9393
Toll Free: 1800 000 418
Fax: +61 2 9351 9400
Email: yginfo@fhs.usyd.edu.au
Web: http://www.yg.fhs.usyd.edu.au

Learning Centre

The Learning Centre helps students develop the generic learning and communication skills that are necessary for university study and beyond. The centre is committed to helping students achieve their academic potential throughout their undergraduate and postgraduate studies. The centre's program includes a wide range of workshops on study skills, academic reading and writing, oral communication skills and postgraduate writing and research skills. Other services include an individual learning program, faculty-based workshops, computer-based learning resources, publications of learning resources and library facilities. For details of programs, activities and online resources provided by the centre see the website via your MyUni student portal or the Services for Students website.

Camperdown and Darlington campuses

Level 7, Education Building A35
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3853
Fax: +61 2 9351 4865
Email: lc@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/lc

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +61 2 9351 9638
Fax: +61 2 9351 9635
Email: LC_Cumberland@fhs.usyd.edu.au
Web: http://www.usyd.edu.au/lc

Library

The University of Sydney Library, the largest academic library in the Southern Hemisphere, is a network of 17 libraries located on nine campuses. The Library website provides access to services and resources, anywhere at anytime. The locations, opening hours and subject specialities of the libraries are listed on the website.

Over five million items are available via the Library catalogue, including more than 68,000 electronic journals and 281,000 electronic books. Past exam papers are also available online. Enrolled students are entitled to borrow from any of the University Libraries. More information is available at http://www.library.usyd.edu.au/borrowing.

Reading list items are available via the reserve service. Increasingly, reading list material is becoming available in electronic form. For details see the reserve service website.

Library staff are always available to support students in their studies. 'Ask a Librarian' in person, by email, or by using an online chat service.

A specialist librarian is available for all discipline areas and will provide training in finding high quality information. Courses cover a range of skills including research methodology, database searching, effective use of the Internet and the use of reference management software. See the subject contact page.

Library facilities include individual and group study spaces, computers, printers, multimedia equipment, photocopiers and adaptive technologies. Check the 'Libraries' link on the home page to find out about services and facilities in specific libraries.

The *Client Service Charter* describes the Library's commitment to supporting students' learning, including those with special needs. See the *Client Service Charter* online.

Your comments and suggestions are always welcome.

University of Sydney Library F03
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2993 (general enquiries)
Fax: +61 2 9351 2890 (administration)
+61 2 9351 7278 (renewals)
Email: loanenq@library.usyd.edu.au (loan enquiries),
udd@library.usyd.edu.au (document delivery enquiries)
Web: http://www.library.usyd.edu.au

Mathematics Learning Centre

The Mathematics Learning Centre assists undergraduate students to develop the mathematical knowledge, skills and confidence that are needed for studying first level mathematics or statistics units at university. The Centre runs bridging courses in mathematics at the beginning of the academic year (fees apply). The centre also provides on-going support to eligible students during the year through individual assistance and small group tutorials. For details of activities and online resources provided by the centre see the website via your MyUni student portal or the Services for Students website.

Level 4, Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4061
Fax: +61 2 9351 5797
Email: mlc@stuserv.usyd.edu.au
Web: http://www.usyd.edu.au/mlc

Multimedia and Educational Technologies in Arts (META) Resource Centre (Languages and E-Learning)

The centre provides access to recorded lectures, classwork and interactive self-paced learning materials for students of languages other than English (LOTE) and English as a second language (ESL). The self study room provides interactive computer assisted learning and access to live multilingual satellite television broadcasts. Computer access labs provide Internet, email and word processing access. The centre also provides teaching rooms with state-of-the-art multimedia equipment, language laboratories and video conferencing facilities for Faculty of Arts courses.

Level 2, Brennan Building (opposite Manning House)
University of Sydney
NSW 2006 Australia

Phone: Library enquiries +61 2 9351 2683
For all other enquiries +61 2 9351 6781
Fax: +61 2 9351 3626
Email: For Library enquiries meta.library@arts.usyd.edu.au
For all other enquiries meta@arts.usyd.edu
Web: http://www.arts.usyd.edu.au/centres/meta

MyUni Student Portal

The MyUni student portal is the starting point and 'one-stop' environment for students to access all their web-based University information and services. MyUni automatically tailors what a student sees based on their login-in and offers students the option of further personalising content. Most importantly, MyUni allows students to complete tasks online that would previously have required attendance in person. The following are examples of MyUni services and information:

- support services for students in health, counselling, child care, accommodation, employment and wellbeing;
- student administration systems for obtaining exam results, enrolment and variations, timetabling, email services and links to courses and units of study information;
- links to the University's e-learning systems;
- library services;
- important messages and student alerts;
- information technology and support services;
- information for local, indigenous and international students; and
- campus maps, with descriptions of cultural, sporting and campus facilities.

Website: http://myuni.usyd.edu.au

Part-time, full-time

Undergraduate students

Undergraduate students are usually considered full-time if they have a student load of at least 0.375 each semester. Anything under this amount is considered a part-time study load.

Note that some faculties have minimum study load requirements for satisfactory progress.

Postgraduate students (Coursework)

For postgraduate coursework students part-time or full-time status is determined by credit-point load. Enrolment in units of study which total at least 18 credit points in a semester is classed as full-time. Anything under this amount is a part-time study load.

Please note that classes for some coursework programs are held in the evenings (usually 6–9pm).

Postgraduate students (Research)

Full-time candidates for research degrees do not keep to the normal semester schedule, instead they work continuously throughout the year with a period of four weeks recreation leave. There is no strict definition of what constitutes full-time candidature but if you have employment or other commitments that would prevent you from devoting at least the equivalent of a 35-hour working week to your candidature (including attendance at the University for lectures, seminars, practical work and consultation with your supervisor) you should enrol as a part-time candidate. If in doubt you should consult your faculty or supervisor.

International students

Student visa regulations require international students to undertake full-time study. International students on visas other than student visas may be permitted to study part-time.

Policy online

In addition to the resolutions covering specific courses there are a number of University policies that apply to students. These include:

- The code of conduct for students
- Academic honesty in coursework
- Student plagiarism: Coursework assessment and examination of coursework

All of these policies can be accessed from the University's Policy online website.

Privacy

The University is subject to the *NSW Privacy and Personal Information Protection Act 1998* and the *NSW Health Records and Information Privacy Act 2002*. Central to both acts are the sets of information protection principles (IPPs) and health privacy principles which regulate the collection, management, use and disclosure of personal and health information. In compliance with the *Privacy and Personal Information Protection Act* the University developed a *Privacy Management Plan* which includes the *University Privacy Policy*. The *Privacy Management Plan* sets out the IPPs and how they apply to functions and activities carried out by the University. Both the plan and the *University Privacy Policy* were endorsed by the Vice-Chancellor on 28 June 2000.

Further information and a copy of the plan may be found at http://www.usyd.edu.au/arms/privacy.

Any questions regarding the *Freedom of Information Act*, the *Privacy and Personal Information Protection Act*, the *Health Records and Information Privacy Act* or the *Privacy Management Plan* should be directed to:

Tim Robinson: +61 2 9351 4263, or
Anne Picot: +61 2 9351 7262
Email: foi@mail.usyd.edu.au

Scholarships for undergraduates

Scholarships Unit
Room 147, Ground Floor, Mackie Building KO1
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2717
Fax: +61 2 9351 5134
Email: scholarships@careers.usyd.edu.au
Web: http://www.usyd.edu.au/scholarships

Services for Students

See Student Services

Student Centre

Ground Floor, Carslaw Building F07
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3023 (general enquiries)
Academic records: +61 2 9351 4109
Discontinuation of enrolment: +61 2 9351 3023
Handbooks: +61 2 9351 5057
Prizes: +61 2 9351 5060
Fax: +61 2 9351 5081, +61 2 9351 5350 (academic records)
Web: http://www.usyd.edu.au/studentcentre

Student Identity Cards

The student identity card functions as a library borrowing card, a transport concession card (when suitably endorsed) and a general identity card. The card must be carried at all times on the grounds of the University and must be shown on demand.

Student Services

The University provides personal, welfare, administrative and academic support services to facilitate your success at University. Many factors can impact on your wellbeing while studying at university and student services can assist you in managing and handling these more effectively. For details of services and online resources provided see your MyUni student portal or the Services for Students website: http://www.usyd.edu.au/stuserv.

The Sydney Summer School

Most faculties at the University offer units of study from undergraduate degree programs during summer. There are also some units of study available for postgraduate coursework programs from some faculties. As the University uses its entire quota of Commonwealth supported places in first and second semester, these units are full fee-paying for both local and international students and enrolment is entirely voluntary. However, Summer School units enable students to accelerate their degree progress, make up for a failed unit or fit in a unit which otherwise would not suit their timetables. New students may also gain a head start by completing subjects before they commence their degrees. Units start at various times from late November and run for up to six weeks (followed by an examination week). Notice of the units available is on the Summer School website and is usually circulated to students with their results notices. A smaller Winter School is also run from the Summer School office. It commences on 3 July and runs for up to three weeks (followed by an examination week). It offers mainly postgraduate and a few undergraduate units of study.

Information can be found on the Summer School website: http://www.summer.usyd.edu.au.

The University of Sydney Foundation Program (USFP)

The University of Sydney offers its foundation program to international students as a preparation for undergraduate degrees at several Australian universities.
The Foundation Program is conducted by Taylors College on behalf of Study Group Australia and the University of Sydney. The Foundation Program allows both first and second semester entry to undergraduate courses at the University of Sydney and other universities within Australia.

Phone: +61 2 8263 1888
Fax: +61 2 9267 0531

Email: info@io.usyd.edu.au
Web: http://www.usyd.edu.au/foundationprogram

College Address
The University of Sydney Foundation Program
Taylors College
965 Bourke St
Waterloo NSW 2017

Phone: +61 2 8303 9700
Fax: +61 2 8303 9777

Timetabling Unit

The Timetabling Unit in the Student Centre is responsible for producing students' class and tutorial timetables. Semester One timetables are available from the Wednesday of O Week through the MyUni website.

University Health Service

The University Health Service provides a full experienced general practitioner service and emergency medical care to all members of the University community. You can consult a doctor either by appointment or on a walk-in basis (for more urgent matters only). The Health Service bills Medicare or your overseas student health care provider (Worldcare or Medibank Private) directly for the full cost of most consultations.

Email: director@unihealth.usyd.edu.au
Web: http://www.unihealth.usyd.edu.au
Fax: +61 2 9351 4110

University Health Service (Holme)

University Health Service (Holme)]]
Holme Building A09
Science Rd
University of Sydney
NSW 2006 Australia

Opening Hours: 8:30am–5pm, Mon–Fri
Phone: +61 2 9351 4095

University Health Service (Wentworth)

Level 3, Wentworth Building G01
University of Sydney
NSW 2006 Australia

Opening Hours: 8:30am–5:30pm, Mon–Fri
Phone: +61 2 9351 3484
Holme Building A09
Science Rd
University of Sydney
NSW 2006 Australia

Opening Hours: 8:30am–5pm, Mon–Fri
Phone: +61 2 9351 4095

See also the Glossary for administrative information relating to particular terms.

Student organisations and International students

Student organisations

Students' Representative Council

The Students' Representative Council (SRC) advances and defends the interests of Sydney University undergraduate students at Sydney University and in the comunity. SRC members receive free advocacy and advice and a discount at the SRC shop.

Level 1, Wentworth Building G01
University of Sydney
NSW 2006 Australia

Phone: + 61 2 9660 5222
Fax: +61 2 9660 4260
SRC Shop: +61 2 9660 4756
Email: info@src.usyd.edu.au
Web: www.src.usyd.edu.au

Sydney University Postgraduate Representative Association (SUPRA)

SUPRA is an independent representative association providing advice, advocacy and support services for the postgraduate student community. SUPRA is your postgraduate student association and is here to help you.

Raglan Street Building G10
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3715
Freecall: 1800 249 950
Fax: +61 2 9351 6400
Email: admin@supra.usyd.edu.au
Web: www.supra.usyd.edu.au

Sydney University Sport

Sydney University Sport provides opportunities for participation in a range of sporting and recreational activities along with first class facilities.

University Sports and Aquatic Centre G09
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4960
Fax: +61 2 9351 4962
Email: admin@susport.usyd.edu.au
Web: www.susport.com

University of Sydney Union

The University of Sydney Union (USU) is the main provider of catering facilities, retail services, welfare programs and social and cultural events for the University community on the Camperdown and Darlington campuses and at many of the University's affiliated campuses.

University of Sydney Union
Level 1, Manning House A23
University of Sydney
NSW 2006 Australia

Phone: 1800 013 201 (switchboard)
Fax: +61 2 9563 6109
Email: info@usu.usyd.edu.au
Web: www.usuonline.com

International students

The following information is for international students studying onshore on an Australian Student Visa.

Full-time study

International students must maintain full-time enrolment at all times (a minimum of 18 credit points). However, in the following limited circumstances, part-time study is permitted:

- students studying in Australia on a different type of visa that does not carry study restrictions;
- students in their final semester who are required to take additional units to complete their course;
- cross-institutional students enrolled full-time at their home institution;
- students enrolled in an approved joint delivery program that involves enrolment at two institutions.

Satisfactory academic progress

The University is required to report to the Department of Immigration and Multicultural Affairs (DIMA) any International Student who fails to maintain satisfactory academic progress. This may result in automatic visa cancellation. It is important that International Students contact the International Office if they are experiencing academic difficulties.

Distance/web-based study

International students studying onshore in Australia are not permitted to enrol in distance or web-based courses. However, a small number of web-based units within a course taught largely in face-to-face mode are allowed. Contact the faculty to discuss enrolment options.

Work permits

International students with a work permit are permitted to work for up to 20 hours during semester and full-time during the University's official vacation periods. Contact the International Office for more information.

Change of address

International Students must notify the University of their residential address within seven days of arrival and notify any change of address within seven days. This may be done via the University's MyUni Web portal.

Course transfers

Sponsored students will need permission from their sponsors before transferring courses. Australian Government sponsored students (AusAID, Endeavour) and Asia Development Bank (ADB) sponsored students should contact the International Office in the early stages of considering a course transfer.

Suspension/discontinuation

The University is required to report to DIMA international students who discontinue or suspend their studies. Students who suspend their studies for severe medical or compassionate reasons should contact the International Office urgently.

Overseas student health cover

Australian Student Visa holders must maintain overseas health cover for the duration of their stay. The International Office arranges health cover for the first year but it is the individual student's responsibility to maintain health cover for each subsequent year.

Additional information

For more information related to international students, please see the Glossary in this handbook.

Abbreviations

For a glossary of terms, describing the terminology in use at the University of Sydney, please see the glossary section.

Listed below are the more commonly used acronyms that appear in University documents and publications.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A	
AARNet	Australian Academic Research Network
AAUT	Australian Awards for University Teaching
AAM	Annual Average Mark
ABC	Activity Based Costing
ABSTUDY	Aboriginal Study Assistance Scheme
ACER	Australian Council for Educational Research
AGSM	Australian Graduate School of Management
ANZAAS	Australian and New Zealand Association for the Advancement of Science
APA	Australian Postgraduate Awards
APAC	Australian Partnership for Advanced Computing
APAI	Australian Postgraduate Awards (Industry)
APA-IT	Australian Postgraduate Awards in Information Technology
APDI	Australian Postdoctoral Fellowships Industry
APEC	Asia-Pacific Economic Cooperation
APF	Australian Postdoctoral Fellowship
AQF	Australian Qualifications Framework
ARC	Australian Research Council
ARTS	Automated Results Transfer System
ASDOT	Assessment Fee Subsidy for Disadvantaged Overseas Students
ATN	Australian Technology Network
ATP	Australian Technology Park
ATPL	Australian Technology Park Limited
AUQA	Australian Universities Quality Agency
AusAID	Australian Agency for International Development
AUTC	Australian Universities Teaching Committee
AVCC	Australian Vice-Chancellors Committee

B	
BAA	Backing Australia's Ability
BAC	Budget Advisory Committee
BITLab	Business Intelligence Lab
BLO	Business Liaison Office
BOTPLS	Bridging for Overseas Trained Professionals Loans Scheme

C	
CAF	Cost Adjustment Factor
CAUT	Committee for Advancement of University Teaching
CDP	Capital Development Program
CEP	Country Education Profile
CEQ	Course Experience Questionnaire
CES	Casual Employment Service
CFO	Chief Financial Officer
CHASS	College of Humanities and Social Sciences
CHESSN	Commonwealth Higher Education System Student Number
CHS	College of Health Sciences
CIO	Chief Information Officer
COE	Confirmation of Enrolment
CPSU	Community and Public Sector Union

C	
CRC	Cooperative Research Centre
CREO	Centre for Regional Education, Orange
CRICOS	Commonwealth Register of Institutions and Courses for Overseas Students
CRRI	Centre for Rural and Regional Innovation
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CST	College of Sciences and Technology
CULT	Combined Universities Language Test
CUTSD	Committee for University Teaching and Staff Development

D	
DAC	Data Audit Committee
DEST	Commonwealth Department of Education, Science and Training
DET	NSW Department of Education and Training
DIMA	Department of Immigration and Multicultural Affairs
D-IRD	Discovery-Indigenous Researchers Development Program
DVC	Deputy Vice-Chancellor

E	
EB	Enterprise Bargaining
EFTSU	Equivalent Full-Time Student Unit
EFTSL	Equivalent Full-Time Student Load
EIP	Evaluations and Investigations Program
ELICOS	English Language Intensive Course of Study
EMU	Electron Microscope Unit
ESOS Act	Education Services for Overseas Student Act

F	
FFT	Fractional Full-Time (Equivalent Staff)
FlexSIS	Flexible Student Information System
FHS	Faculty of Health Sciences
FMO	Facilities Management Office
FOS	Field of Study
FTE	Full-Time Equivalent (Staff)
FRM	Faculty of Rural Management

G	
GATS	General Agreement on Trade in Services
GCCA	Graduate Careers Council of Australia
GDS	Graduate Destination Survey
GPOF	General Purpose Operating Funds
GSA	Graduate Skills Assessment
GSG	Graduate School of Government
GWSLN	Greater Western Sydney Learning Network

H	
HDR	Higher Degree Research
HECS	Higher Education Contribution Scheme
HEEP	Higher Education Equity Program

H	
HEFA	Higher Education Funding Act 1988
HEIMS	Higher Education Information Management System
HEIP	Higher Education Innovation Program (DEST)
HELP	Higher Education Loan Program
HEO	Higher Education Officer
HEP	Higher Education Provider
HERDC	Higher Education Research Data Collection
HESA	Higher Education Support Act
HOD	Head of Department

I	
IAF	Institutional Assessment Framework (This is a new name for what was previously the DEST Profile process.)
IAS	Institute of Advanced Studies
ICT	Information and Communication Technology
ICTR	Information and Communication Technology Resources
IELTS	International English Language Testing Scheme
IGS	Institutional Grants Scheme (DEST)
IO	International Office
IP	Intellectual Property
IPRS	International Postgraduate Research Scholarships
IREX	International Researcher Exchange Scheme
ISFP	Indigenous Support Funding Program
ISIG	Innovation Summit Implementation Group
ISSU	International Student Services Unit
ITC	Information Technology Committee
ITL	Institute for Teaching and Learning
ITS	Information Technology Services

J	
JASON	Joint Academic Scholarships Online Network

L	
LBOTE	Language Background Other Than English

M	
MBA	Master of Business Administration
MISG	Management Information Steering Group
MNRF	Major National Research Facilities Scheme
MOU	Memorandum of Understanding
MPG	Major Projects Group
MRB	Medical Rural Bonded Scholarship Scheme

N	
NBCOTP	National Bridging Courses for Overseas Trained Program
NCG	National Competitive Grant
NESB	Non-English-Speaking Background
NHMRC	National Health and Medical Research Council
NOIE	National Office for the Information Economy
NOOSR	National Office for Overseas Skill Recognition
NRSL	Non-Recent School Leaver
NSW VCC	New South Wales Vice-Chancellors' Conference
NTEU	National Tertiary Education Industry Union

O	
OECD	Organisation for Economic Cooperation and Development
OLA	Open Learning Australia
OLDPS	Open Learning Deferred Payment Scheme

O	
OPRS	Overseas Postgraduate Research Scholarships

P	
PELS	Postgraduate Education Loans Scheme
PSO	Planning Support Office
PVC	Pro-Vice-Chancellor

Q	
QA	Quality Assurance
QACG	Quality Advisory and Coordination Group

R	
R&D	Research and Development
R&R	Restructuring and Rationalisation Program
RC	Responsibility Centre
REG	Research and Earmarked Grants
REP	Research Education Program
RFM	Relative Funding Model
RIBG	Research Infrastructure Block Grant (DEST)
RIEF	Research Infrastructure Equipment and Facilities Scheme
RISF	Restructuring Initiatives Support Fund
RMO	Risk Management Office
ROA	Record of Achievement
RQ	Research Quantum
RQU	Recognition Quality Unit (Higher Education Division – DEST)
RRTMR	Research and Research Training Management Reports
RSL	Recent School Leaver
RTS	Research Training Scheme (DEST)

S	
SCA	Sydney College of the Arts
SCEQ	Sydney Course Experience Questionnaire
SCM	Sydney Conservatorium of Music
SCR	Science Capability Review
SDF	Strategic Development Fund
SEG	Senior Executive Group
SES	Socioeconomic Status
SI	Scholarship Index
SLE	Student Learning Entitlement
SNA	Safety Net Adjustment
SPIRT	Strategic Partnerships with Industry – Research and Training Scheme
SPR	Student Progress Rate
SRC	Students' Representative Council
SSR	Student/Staff Ratio
STABEX	Study Abroad Exchange (database)
SUPRA	Sydney University Postgraduate Students' Representative Association
SUSport	Sydney University Sport

T	
TAFE	Technical and Further Education
TOEFL	Test of English as a foreign language
TPI	Teaching Performance Indicator

U	
UAC	Universities Admissions Centre
UMAP	University Mobility in Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organisation

U	
UPA	University Postgraduate Awards

V	
VCAC	Vice-Chancellor's Advisory Committee
VET	Vocational Education and Training

W	
WAM	Weighted Average Mark
WRP	Workplace Reform Program
WTO	World Trade Organization

Y	
YFE	Year of First Enrolment

Glossary

For a table of the more commonly used acronyms and abbreviations that appear in University documents and publications please see the abbreviations section.

This glossary describes terminology in use at the University of Sydney.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Academic Board
The senior academic body within the University. In conjunction with faculties, the Academic Board has responsibility for approving, or recommending to Senate for approval, new or amended courses and units of study and policy relating to the admission and candidature of students. (For further information, see the University Calendar.)

Academic cycle
The program of teaching sessions offered over a year. Currently the cycle runs from the enrolment period for Semester One through to the completion of the processing of results at the end of Semester Two. (See also Stage.)

Academic dishonesty
Academic dishonesty occurs when a student presents another person's ideas, findings or written work as his or her own by copying or reproducing them without due acknowledgement of the source and with intent to deceive the examiner. Academic dishonesty also covers recycling, fabrication of data, engaging another person to complete an assessment or cheating in exams. (See also Plagiarism.)

Academic record
The complete academic history of a student at the University. It includes, among other things: personal details; all units of study and courses taken; assessment results (marks and grades); awards and prizes obtained: infringements of progression rules; approvals for variation in course requirements and course leave; thesis and supervision details.
Access to a student's academic record is restricted to authorised University staff and is not released to a third party without the written authorisation of the student. (See also Academic transcript.)

Academic transcript
A printed statement setting out a student's academic record at the University. There are two forms of academic transcript: external and internal. (See also External transcript, Internal transcript.)

Academic year
The current calendar year in which a student is enrolled.
(See also Academic cycle, Stage.)

Admission
Governed by the University's admission policy, this is the process for identifying applicants eligible to receive an initial offer of enrolment in a course at the University. Admission to most courses is based on performance in the HSC, with applicants ranked on the basis of their UAI. Other criteria such as a portfolio, interview, audition, or results in standard tests may also be taken into account for certain courses.

Admission basis
The main criteria used by a faculty in assessing an application for admission to a course. The criteria used include, among other things, previous secondary, TAFE or tertiary studies; work experience; special admission; and the Universities Admission Index (UAI).

Admission (Deferment)
An applicant who receives an offer of admission to a course may apply to defer enrolment in that course for one semester or one academic cycle.

Admission mode
A classification based on how a student was admitted to a course, for example 'UAC' or 'direct'.

Admission period
The period during which applications for admission to courses are considered.

Admission year
The year the student expects to begin the course (see also Commencement date.)

Advanced diplomas
(See Award course.)

Advanced standing
(See Credit.)

Advisor
A member of academic staff appointed in an advisory role for some postgraduate coursework students. (See also Associate supervisor, Instrumental supervisor/teacher, Research supervisor, Supervision.)

Aegrotat
In exceptional circumstances involving serious illness or death of a student prior to completion of their course, the award of aegrotat and posthumous degrees and diplomas may be conferred.

Alumni sidneiensis
A searchable database of graduates of the University from 1857 to 30 years prior to the current year.

Annual average mark (AAM)
The average mark over all units of study attempted in a given academic year (equivalent to the calendar year).

The formula for this calculation is:

$$AAM = \frac{\sum (marks \times credit\ point\ value)}{\sum (credit\ point\ value)}$$

(sums over all units of study completed in the selected period)
Where the mark is the actual mark obtained by the student for the unit of study, or in the case of a failing grade with no mark – 0. Pass/fail assessed subjects and credit transfer subjects (from another institution) are excluded from these calculations; however, the marks from all attempts at a unit of study are included.

Annual progress report
A form which is used to monitor a research student's progress each year. The form provides for comments by the student, the supervisor, the head of the department and the dean (or their nominee). The completed form is attached to the student's official file.

Appeals
Students may lodge an appeal against academic or disciplinary decisions. An academic appeal (e.g. against exclusion) is managed by the Student Centre – Exclusions Office while it is under consideration and a record of the outcome of the appeal will be retained.

Assessment
The process of measuring the performance of students in units of study and courses. Performance may be assessed by examinations, essays, laboratory projects, assignments, theses, treatises or dissertations. (See also Result processing, Result processing schedule.)

Formative assessment
Formative assessment is used principally to provide students with feedback on their progress in learning. It reinforces successful learning, and is an opportunity for students to expose the limitations in their knowledge and understanding.

Summative assessment
Summative assessment is used to certify competence, or to arrange students in a rank order of merit. It certifies the attainment of a standard, and is used as the basis for progression to the next part of a program, or to graduation.

Associate supervisor
A person who is appointed in addition to the supervisor of a research student, who can provide the day-to-day contact with the candidate or provide particular expertise or additional experience in supervision. (See also Advisor, Instrumental supervisor/teacher, Research supervisor, Supervision.)

Assumed knowledge
For some units of study, a student is assumed to have passed a relevant subject at the HSC and this is called assumed knowledge. While students are generally advised against taking a unit of study for which they do not have the assumed knowledge, they are not prevented from enrolling in the unit of study. (See also Prerequisite.)

Attendance pattern
Attendance pattern is classified as full-time, part-time or external, this is dependant on the student's mode of attendance and the student load.

Attendance mode
A Department of Education, Science and Technology (DEST) classification defining the manner in which a student is undertaking a course, i.e. internal, external, mixed or offshore.

Australian Qualifications Framework (AQF)
The framework for recognition and endorsement of qualifications established by the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA).

AUSTUDY
Austudy provides financial help to students who are aged 25 years or more who meet the required criteria, and are undertaking an approved full-time course at an approved institution. (See also Youth Allowance.)

Automated Results Transfer System (ARTS)
This system was developed by the Australasian Conference of Tertiary Admissions Centres (ACTAC) to allow the electronic academic record of a student to be accessed, via an admission centre, by tertiary institutions.

Award course
(See Course.)

B

Bachelor's degree
The highest undergraduate award offered at the University. A bachelor's degree course normally requires three or four years of full-time study or the part-time equivalent. (See also Award course.)

Barrier
An instruction placed on a student's record that prevents the student from re-enrolling or graduating. (See also Deadlines (fees), Suppression of results.)

Board of Studies
An academic body which supervises a course or courses, and which is similar to a faculty except that it is headed by a chair rather than a dean and does not supervise PhD candidates.

Bursaries
Financial award made to a student, based primarily on need. (See also Scholarships.)

C

Calendar
The annual University publication which provides general and historical information about the University of Sydney, the statutes and regulations under which it operates and the Senate resolutions relating to constitutions and courses in each faculty.

Cadigal program
A program, named in recognition of the Aboriginal people of the land on which the University is located, designed to increase the successful participation of Aboriginal and Torres Strait Islander people in degree courses in all faculties at the University of Sydney.

Campus
The grounds on which the University is situated. There are 10 campuses of the University of Sydney:

- Burren Street (Institute of Transport Studies)
- Camperdown
- Darlington
- Camden (Agriculture and Veterinary Science)
- Conservatorium (Sydney Conservatorium of Music)
- Cumberland (Health Sciences)
- Mallett Street (Nursing)
- Rozelle (Sydney College of the Arts)
- St James (Law)
- Surry Hills (Dentistry)

Cancellation
Where enrolment is cancelled for non-payment of fees.

Candidature
Candidature commences when a student is admitted to a course of study leading to the award of a degree, diploma or certificate. There are maximum periods and in some cases minimum periods of candidature depending on the award course and whether the candidate is a full-time or part-time student.

Census date
The date at which a student's enrolment, load and HECS liability are finalised before this information is reported to DEST. (See also Commonwealth-supported Student, HECS-HELP.)

Ceremony
(See Graduation ceremony.)

Chancellor
The non-executive head of the University. An honorary position, the Chancellor presides over meetings of the University's governing body, the Senate, and important ceremonial occasions such as graduations.

Clinical experience
Students undertake clinical placements in a professional environment as part of their course requirements. Many require University approved supervision. In order to undertake clinical placements a student may be required to fulfil additional requirements.

College of Health Sciences
Consists of the Faculties of Dentistry; Health Sciences; Medicine; Nursing; and Pharmacy.

College of Humanities and Social Sciences (CHASS)
Consists of the Faculties of Arts; Economics and Business; Education; Law; the Sydney College of the Arts; and the Sydney Conservatorium of Music.

College of Sciences and Technology (CST)
Consists of the Faculties of Agriculture, Food and Natural Resources; Architecture; Engineering; Rural Management; Science, and Veterinary Science.

Combined course
A course which leads to two awards. For example the Arts/Law course leads to the separate awards of Bachelor of Arts and Bachelor of Laws.

Combined degree
A combined degree is a single program with a single set of course resolutions leading to the award of two degrees (unless otherwise specified in the resolutions). (See also Combined course.)

Commencement date
The date a student commences candidature.

Commonwealth-supported student
Most of the students who study at the University of Sydney are Commonwealth supported. These students have most of the cost of their education paid by the government but must also contribute towards this cost themselves (their student contribution).

Compulsory subscriptions
Each enrolled student is liable to pay annual (or semester) subscriptions, as determined by the Senate, to the student organisations at the University. There are different organisations for undergraduate and postgraduate students.

The student organisations are specific to different campuses. The organisations at campuses other than Camperdown and Darlington include: the Conservatorium Student Association, the Cumberland Student Guild, the Orange Agricultural College Student Association and the Student Association of Sydney College of the Arts. (See also Compulsory subscription exemption, Joining fee, Life membership.)

Compulsory subscription exemption
Students of a certain age or those with disabilities or medical conditions may be exempt from the subscription to the sports body. Conscientious objectors to the payment of subscriptions to unions of any kind may apply to the Registrar for exemption. The Registrar may permit such a student to make the payment to the Jean Foley Bursary Fund instead. (See also Compulsory subscriptions.)

Confirmation of Enrolment form (COE)
This form is issued to each student after enrolment, showing the course and the units of study in which the student is enrolled, together with the credit point value of the units of study and the HECS weights. Until all fees are paid, it is issued provisionally. A new confirmation of enrolment form is produced every time a student's enrolment is varied.

Conjoint ventures
Two or more institutions cooperate to provide a unit or course of study to postgraduate coursework students. Arrangements exist between individual departments at the University of Sydney and individual departments at the University of New South Wales (UNSW) and the University of Technology Sydney (UTS), whereby students enrolled for a degree at one institution complete one or more units of study at the other institution to count towards the award program at their 'home' institution.

Continuing professional education
A process which provides a number of programs of continuing education courses for professionals as they move through their career. These programs are presently administered by the Centre for Continuing Education and a number of departments and foundations across the University. This process supports the whole of life learning concept and involves the maintenance of a long term relationship between the student and the University.

Convocation
The body comprising all graduates of the University.

Core unit of study
A unit of study that is compulsory for a particular course or subject area. (See also Unit of study.)

Corequisite
A unit of study which must be taken in the same semester or year as a given unit of study (unless it has already been completed). These are determined by the faculty or board of studies concerned, published in the faculty handbook and shown in FlexSIS. (See also Prerequisite, Waiver.)

Cotutelle Scheme
Agreement between the University and any overseas university for joint supervision and examination of a PhD student as part of an ongoing cooperative research collaboration. If successful, the student receives a doctorate from both universities with each testamur acknowledging the circumstances under which the award was made.

Course
An undertaking of study at the University of Sydney.

Award course
A formal course of study that will see attainment of a recognised award. Award courses are approved by Senate, on the recommendation of the Academic Board. The University broadly classifies courses as undergraduate, postgraduate coursework or postgraduate research. (See also Bachelor's degree, Course rules, Diploma, Doctorate, Major, Master's degree, Minor, PhD, Stream.)

Non-award course
Studies undertaken by students who are not seeking an award from the University. (See also Cross-institutional enrolment.)

Coursework
An award course not designated as a research award course. While the program of study in a coursework award course may include a component of original, supervised, other forms of instruction and learning normally will be dominant.

Research
A course in which at least 66 per cent of the overall course requirements involve students in undertaking supervised research, leading to the production of a thesis or other piece of written or creative work, over a prescribed period of time.

Course alias
A unique five character alpha-numeric code which identifies a University course.

Course code
(See Course alias.)

Course enrolment status
A student's enrolment status in a course is either 'enrolled' or 'not enrolled'. 'Not enrolled' reasons include: cancelled; suspended; under examination; or terminated. (See also Cancellation, Candidature, Course leave, Enrolment, Enrolment variation, Terminated, Under examination.)

Course leave
Students are permitted to apply for a period away from their course without losing their place. Course leave is formally approved by the supervising faculty for a minimum of one semester. Students on leave are regarded as having an active candidature, but they are not entitled to a student card. At undergraduate level, leave is not counted towards the total length of the course. Students who are absent from study without approved leave may be discontinued and may be required to formally reapply for admission. (See also Progression.)

Course rules
Rules which govern the allowable enrolment of a student in a course. Course rules may be expressed in terms of types of units of study taken, length of study, and credit points accumulated, e.g. a candidate

may not enrol in units of study having a total value of more than 32 credit points per semester. Course rules also govern the requirements for the award of the course, e.g. a candidate must have completed a minimum of 144 credit points. (See also Award course, Corequisite, Prerequisite.)

Course suspension
(See Course leave.)

Course transfer
A transfer occurs when a student changes from one course in the University to another course in the University without the requirement for an application and selection process (e.g. from a PhD to a master's program in the same faculty).

Credit
The recognition of previous studies successfully completed at this University, or another university or tertiary institution recognised by the University of Sydney, as contributing to the requirements of the course to which the applicant requesting such recognition has been admitted. Credit may be granted as specified credit or non-specified credit.

Specified credit
The recognition of previously completed studies as directly equivalent to units of study.

Non-specified credit
A 'block credit' for a specified number of credit points at a particular level. These credit points may be in a particular subject area but are not linked to a specific unit of study. (See also AAM – Annual average mark, Waiver, Weighted average mark (WAM).)

Credit points
The value of the contribution each unit of study provides towards meeting course completion requirements. Each unit of study will have a credit point value assigned to it. The total number of credit points required for completion of award courses will be specified in the Senate Resolutions relevant to the award course.

Cross-institutional enrolment
An enrolment in units of study at one university to count towards an award course at another university. Cross-institutional enrolments incur a student-contribution liability (see Commonwealth-supported student) or tuition fee charge at the institution at which the unit of study is being undertaken. (See also Non-award course).

D

Data Audit Committee (DAC)
The Data Audit Committee's role is to oversee the integrity and accuracy of the course and unit of study data as strategic University data. It also advises the Academic Board on suggested policy changes related to course and unit of study data. A subcommittee of the VCAC Enrolment Working Party, it is chaired by the Registrar, with membership including the deans, the Student Centre, FlexSIS and the Planning Support Office.

Deadlines (Enrolment variations)
(See Enrolment variation.)

Deadlines (Fees)
The University has deadlines for the payment of fees (e.g. HECS, compulsory subscriptions, course fees). Students who do not pay fees by these deadlines may have their enrolment cancelled or they may have a barrier placed on the release of their record. (See also Barrier, Cancellation.)

Dean
The head of a faculty, or the principal or director of a college (such as the Sydney Conservatorium of Music or the Sydney College of Arts).

Dean's certificate
A statement from the Dean certifying that all requirements, including fieldwork and practical work, have been met and that the student is eligible to graduate. Not all faculties use Dean's Certificates. In faculties that do, qualified students have 'Dean's Certificate' noted on their academic record.

Deferment (Deferral)
(See Admission (deferment), Course leave.)

Degree
(See also Award course, Bachelor's degree.)

Delivery mode
Indicates how students receive the instruction for a unit of study. The delivery mode must be recorded for each unit as distinct from the attendance mode of the student, i.e. an internal student may take one or more units by distance mode and an external student may attend campus for one or more units.

Distance education
Where subject matter is delivered in a more flexible manner, such as correspondence notes, and student may only attend campus if required. (See also Extended semester, Distance education, International – off shore.)

Intensive on campus
Core content is delivered with support learning in an intensive (one or more days) format on campus. Participation is usually compulsory. Previously this may have been called residential, block mode, or weekend workshop.

On campus (normal)
Attendance of scheduled lectures, tutorials etc at a campus of the University.

Department
(See School.)

Department of Education, Science and Training (DEST)
The Commonwealth Government department responsible for higher education.

Differential HECS
(See Higher Education Contribution Scheme (HECS).)

Diploma
The award granted following successful completion of diploma course requirements. A diploma course usually requires less study than a degree course. (See also Award course.)

Direct admissions
For some courses, applications may be made directly to the University. Applications are received by faculties or the International Office, and considered by the relevant department or faculty body. Decisions are recorded and letters are forwarded to applicants advising them of the outcome. (See also Admission, UAC.)

Disability information
Students may inform the University of any temporary or permanent disability which affects their life as a student. Disability information is recorded but it is only available to particular authorised users because of its sensitive nature.

Disciplinary action
Undertaken as the result of academic or other misconduct, e.g. plagiarism, cheating, security infringement, criminal activity.

Discipline
A defined area of study, for example, chemistry, physics, economics.

Discipline group
A DEST code used to classify units of study in terms of the subject matter being taught or being researched.

Discontinuation (course)
(See Enrolment variation.)

Discontinuation (unit of study)
(See Enrolment variation.)

Dissertation
A written exposition of a topic which may include original argument substantiated by reference to acknowledged authorities. It is a required unit of study for some postgraduate award courses in the faculties of Architecture and Law.

Distance education
Where a student does not attend campus on a daily basis for a given course or unit of study. (See also Delivery mode, Extended semester.)

Doctorate
A high-level postgraduate award. A doctorate course normally involves research and coursework; the candidate submits a thesis that is an original contribution to the field of study. Entry to a doctorate course often requires completion of a master's degree course. Note that the doctorate course is not available in all departments at the University. (See also Award course, PhD.)

Domestic Student
A student who is not an international student. (See also Local student.)

Double degree
A double degree is a program where students are permitted by participating faculties (and/or by specific resolutions within a single award) to transfer between courses in order to complete two awards.

Downgrade
Where a student enrolled in a PhD reverts to a master's by research, either on the recommendation of the University on the basis that the research they are undertaking is not at an appropriate level for a PhD; or at the student's own request, for personal or academic reasons.

E

Equivalent full-time student unit (EFTSU)
The equivalent full-time student unit (EFTSU) is a measure of student load based on the workload for a student undertaking a full year of study in a particular course. A student is then recorded as having generated one EFTSU. (See also Load, Stage.)

Equivalent full-time student load (EFTSL)
The equivalent full-time student load (EFTSL) for a year. It is a measure, in respect of a course of study, of the study load for a year of a student undertaking that course of study on a full-time basis (effective 1 January 2005).

Embedded courses
Award courses in the graduate certificate, graduate diploma and master's degree by coursework sequence which allow unit of study credit points to count in more than one of the awards, e.g. the Graduate Certificate in Information Technology, Graduate Diploma in Information Technology and Master of Information Technology.

Enrolment
A student enrols in a course by registering with the supervising faculty in the units of study to be taken in the coming year, semester or session.

Commencing
An enrolment is classified as commencing if a student has enrolled in a particular degree or diploma for the first time.

Continuing
Students already in a course at the University re-enrol each year or semester. Most continuing students are required to pre-enrol. (See also Pre-enrolment.)

Enrolment list
A list of all currently enrolled students in a particular unit of study. (See also Unit of study.)

Enrolment status
(See Course enrolment status.)

Enrolment Variation
Students may vary their enrolment at the beginning of each semester. Each faculty determines its deadlines for variations, but HECS liability depends on the HECS census date. (See also HECS.)

Examination
A set of questions or exercises evaluating on a given subject given by a department or faculty. (See Examination period, Assessment.)

Examination period
The time set each semester for the conduct of formal examinations.

Examiner (Coursework)
The person assessing either the written/oral examination, coursework assignments, presentations, etc of a student or group of students.

Exchange student
Either a student of the University of Sydney who is participating in a formally agreed program involving study at an overseas university or an overseas student who is studying here on the same basis. The International Office provides administrative support for some exchanges.

Exclusion
A faculty may ask a student whose academic progress is considered to be unsatisfactory to 'show good cause' why the student should be allowed to re-enrol. If the faculty deems the student's explanation unsatisfactory, or if the student does not provide an explanation, the student may be excluded either from a unit of study or from a course or faculty. An excluded student may apply to the faculty for permission to re-enrol. Normally, at least two years must have elapsed before such an application would be considered.

University policy relating to exclusion is set out in the University Calendar. (See also Progression, Senate appeals.)

Exemption
A decision made at a sub-unit of study level to allow a student to complete a unit of study without also completing all the prescribed components of coursework and/or assessment. (See also Credit, Waiver.)

Expulsion
The ultimate penalty of disciplinary action is to expel the student from the University. The effect of expulsion is:

- the student is not allowed to be admitted or to re-enrol in any course at the University;
- the student does not receive their results;
- the student is not allowed to graduate; and
- the student does not receive a transcript or testamur.

Extended semester
A distance-learning student may be allowed more time to complete a module or program if circumstances beyond the student's control, e.g. drought, flood or illness, affect the student's ability to complete the module or program in the specified time. (See also Distance education.)

External
(See Attendance mode, Distance education.)

External transcript
A certified statement of a student's academic record printed on official University security paper. It includes the student's name, any credit granted, all courses the student was enrolled in and the final course result and all units of study attempted within each course together with the result. It also acknowledges prizes the student has received.

Marks can be included or omitted, as required. (See also Academic transcript, Internal transcript.)

F

Faculty
A formal part of the University's academic governance structure, consisting mainly of academic staff members and headed by a dean, which is responsible for all matters concerning the award courses that it supervises. Usually, a faculty office administers the faculty and student or staff inquiries related to its courses. The University Calendar sets out the constitution of each of the University's faculties. (See also Board of Studies, Supervising faculty.)

Faculty handbook
The annual University publication for each faculty which provided detailed information about the faculty and its courses.

FEE-HELP Loan
Fee-paying students who are Australian citizens or holders of a Permanent Humanitarian Visa can gain assistance in paying their fees through the Commonwealth Government's FEE-HELP program. There is a $50,000 limit to the amount students can borrow and a 20 per cent loan fee on the amounts borrowed through FEE-HELP.

Fee-paying students
Students who pay tuition fees to the University and are not liable for HECS.

Fellows of Senate
Members of the governing body of the University.

Flexible learning
(See Delivery mode, Distance education.)

Flexible start date
Full fee-paying distance students are not restricted to the same enrolment time frames as campus-based or HECS students.

Flexible Student Information System (FlexSIS)
The computer-based Flexible Student Information System at the University of Sydney. FlexSIS holds details of courses and units of study being offered by the University and the complete academic records of all students enrolled at the University.

Formative assessment
(See Assessment.)

Full-time student
(See also Attendance pattern, EFTSU.)

G

Grade
The outcome for a unit of study linked with a mark range. For example, a mark in the range 85–100 attracts the grade 'high distinction' ('HD'). (See also Mark.)

Grade	Description	Comment
HD	High distinction	A mark of 85–100.
D	Distinction	A mark of 75–84.
CR	Credit	A mark of 65–74.
P	Pass	A mark of 50–64.
R	Satisfied requirements	This is used in pass/fail only outcomes.
UCN	Unit of study continuing	Used at the end of semester for units of study that have been approved to extend into a following semester. This will automatically flag that no final result is required until the end of the last semester of the unit of study.
PCON	Pass (concessional)	A mark of 46–49. Use of this grade is restricted to those courses that allow for a concessional pass of some kind to be awarded. A student may re-enrol in a unit of study for which the result was PCON. Each faculty will determine and state in its course regulations what proportion, if any, may count – e.g. "no more than one sixth of the total credit points for a course can be made up from PCON results".
F	Fail	A mark of 0–49. This grade may be used for students with marks of 46–49 in those faculties which do not use PCON.
AF	Absent fail	Includes non-submission of compulsory work (or non-attendance at compulsory labs, etc) as well as failure to attend an examination.
W	Withdrawn	Not recorded on an external transcript. This is the result that obtains where a student applies to discontinue a unit of study by the HECS census date (i.e. within the first four weeks of enrolment).
DNF	Discontinued not to count as failure	Recorded on external transcript. This result applies automatically where a student discontinues after the HECS census date but before the end of the seventh week of the semester (or before half of the unit of study has run, in the case of units of study which are not semester-length). A faculty may determine that the result of DNF is warranted after this date if the student has made out a special case based on illness or misadventure.
INC	Incomplete	This result is used when examiners have grounds (such as illness or misadventure) for seeking further information or for considering additional work from the student before confirming the final result. Except in special cases approved by the Academic Board, this result will be converted to a normal permanent passing or failing grade either: by the dean at the review of examination results conducted pursuant to section 2(4) of the Academic Board policy 'Examinations and Assessment Procedures'; or automatically to an AF grade by the third week of the immediately subsequent academic session. Deans are authorised to approve the extension of a MINC grade for individual students having a valid reason for their incomplete status.
UCN	Incomplete	A MINC or INC grade is converted, on the advice of the dean, to UCN when all or many students in a unit of study have not completed the requirements of the unit. The students may be engaged in practicum or clinical placements, or in programs extending beyond the end of semester (e.g. honours).

Graduand
A student who has completed all the requirements for an award course but has not yet graduated. (See also Graduation, Potential graduand.)

Graduate
A person who holds an award from a recognised tertiary institution. (See also Graduand, Graduation.)

Graduate Certificate
(See Award course.)

Graduate Diploma
(See Award course.)

Graduate entry degree
A bachelor's, or undergraduate degree, that requires another undergraduate degree as a prerequisite of entry. Examples of graduate entry degrees at the University of Sydney include: the Medical Program; Graduate Law and the Bachelor of Dentistry.

Graduation
The formal conferring of awards either at a ceremony or in absentia. (See also In absentia, Potential graduand.)

Graduation ceremony
A ceremony where the Chancellor confers awards upon graduands.

Group work
Means a formally established project to be conducted by a number of students in common, resulting in a single piece of assessment or a number of associated pieces of assessment. (See also Legitimate cooperation.)

Grand Weighted Average Mark (GWAM)
Is the WAM calculated over all units of study undertaken in a degree course (except those "Discontinued – Not to count as failure" and those with only a "Satisfied Requirements" result), weighted according to credit point value and the year-levels (1, 2, 3 or 4) of the units of study. The GWAM may be expressed as:

$$GWAM = \frac{\sum (Mark \times Credit\ Points \times Year)}{\sum (Credit\ Points \times Year)}$$

H

Handbook
(See Faculty handbook.)

Head of department (HOD)
The head of the academic unit which has responsibility for the relevant unit of study, or equivalent program leader.

Higher doctorates
(See Award course.)

HECS (Higher Education Contribution Scheme)
Higher Education Contribution Scheme (HECS)
The Higher Education Contribution Scheme (HECS) was the previous Commonwealth Government student loan scheme. It ceased to operate on 1 January, 2005 and was replaced by HECS-HELP (see below).

HECS-HELP Loan
Commonwealth supported students who are Australian citizens or holders of a Permanent Humanitarian Visa can choose to pay their contributions upfront or to obtain a HECS-HELP loan from the Commonwealth. A HECS-HELP loan is repaid through the tax system once the student is working and their income reaches a threshold (currently around $35 000). Students who choose to pay their student contribution upfront receive a 20 per cent discount. The student's contribution is calculated twice a year (before each semester).

Honorary degrees
A degree *honoris causa* (translated from the Latin as 'for the purpose of honouring') is conferred on a person whom the University wishes to honour. Long-standing full-time members of the University's academic staff who are not graduates of the University may be considered by Senate, upon their retirement, for admission ad eundem gradum, to an appropriate degree of the University.

Honours
Some degrees may be completed 'with Honours'. This may involve either the completion of a separate honours year or additional work in the later years of the course or meritorious achievement over all years of the course. Honours are awarded in a class (Class I, Class II – which may have two divisions or, Class III).

NSW Higher School Certificate (HSC)
The NSW Higher School Certificate (HSC), which is normally completed at the end of year 12 of secondary school. The UAI (Universities Admission Index) is a rank out of 100 that is computed from a student's performance in the HSC.

I

In absentia
Latin for 'in the absence of'. Awards are conferred in absentia when graduands do not, or cannot, attend the graduation ceremony scheduled for them. Those who have graduated in absentia may later request that they be presented to the Chancellor at a graduation ceremony. (See also Graduation.)

Instrumental supervisor/teacher
All students at the Sydney Conservatorium of Music and BMus students on the Camperdown Campus have an instrumental teacher appointed. (See also Advisor, Associate supervisor, Research supervisor, Supervision.)

Internal mode
(See Attendance mode.)

Internal transcript
A record of a student's academic record for the University's own internal use. It includes the student's name, student identifier (SID), address, all courses in which the student was enrolled and the final course result, and all units of study attempted within each course together with the unit of study result. (See also Academic transcript, External transcript.)

International student
Any student who is not an Australian or New Zealand citizen or a permanent resident of Australia is an international student. An international student is required to hold a visa that allows study in Australia and may be liable for international tuition fees.

Fee-paying
A private International Student who is liable to pay tuition fees for their studies with the University.

Fee-paying – Outgoing exchange
An international fee-paying student undertaking short term study at a recognised overseas institution with which the University has a student exchange agreement. Exchange study counts towards the student's University of Sydney award and students remain enrolled in their University of Sydney course during the period of exchange.

International – cross-institutional
An international fee paying student undertaking non-award study at the University on a cross-institutional basis. They are liable to pay fees for the study they undertake at the University, but there is no compliance reporting requirement, which rests with their 'home' institution.

International – Sponsored
A private international student who is fully sponsored for his/her tuition; his/her sponsorship may also cover Overseas Health Cover and Compulsory Subscriptions.

Offshore studies
International offshore students undertake their program of study at one of the University's offshore campuses and hence do not enter Australia; therefore they do not require a visa. The are distinct from international students who are on outbound exchange programs as they never enter Australia during their program of study.

Short course
An international fee-paying student undertaking a short course with the University of Sydney comprising such programs as international development programs, executive training or study visits. The study undertaken by these students is non-award and generally a student visa is not required.

Sponsored award
An international student sponsored by the Australian government, undertaking a program of study at the University. Currently Australian Development Scholarships holders, funded by AusAID, are the only students in this category. These students are fully sponsored for their tuition and other costs such as travel and health cover, and are paid a stipend.

Study Abroad
An international student who is undertaking short-term study at the

University under the Study Abroad scheme. Study Abroad students must have completed at least one year of study towards a degree at a recognised institution in their home country and are continuing towards the degree of their home institution. (See also Local student, Student type.)

J

Joining fee
Students enrolling for the first time pay a joining fee in addition to the standard subscription for the University of Sydney Union or equivalent student organisation. (See also Compulsory subscription.)

L

Learning Entitlement
Each student has a seven year full-time period during which they can remain Commonwealth supported. This seven year period is called their 'learning entitlement'.

Leave
See Course leave.

Legitimate cooperation
Any constructive educational and intellectual practice that aims to facilitate optimal learning outcomes through interaction between students. (See also Group work.)

Life membership
Under some circumstances (e.g. after five full-time years of enrolments and contributions) students may be granted life membership of various organisations. This means they are exempt from paying yearly fees. (See also Compulsory subscriptions.)

Load
The sum of the weights of all the units of study in which a student is enrolled. The weight is determined by the proportion of a full year's work represented by the unit of study in the degree or diploma for which the student is a candidate. Student load is measured in terms of Equivalent full-time student units (EFTSU). (See also Equivalent full-time student units (EFTSU).)

Local Student
Either an Australian or New Zealand citizen or Australian permanent resident. New Zealand citizens are required to pay their Higher Education Contribution Scheme (HECS) fees upfront. (See also Commonwealth-supported student, Domestic student, International student.)

M

Major
A field of study, chosen by a student, to represent their principal interest. this would consist of specified units of study from later stages of the award course. Students select and transfer between majors by virtue of their selection of units of study. One or more majors may be awarded upon the graduand's assessment of study. (See also Award course, Minor, Stream.)

Major timetable clash
The term used when a student attempts to enrol in units of study which have so much overlap in the teaching times that it has been decided that students must not enrol in the units simultaneously.

Mark
An integer (rounded if necessary) from 0 to 100 indicating a student's performance in a unit of study. (See also Grade.)

Master's degree
A postgraduate award. Master's degree courses may be offered by coursework, research only or a combination of coursework and research. Entry to the course often requires completion of an honours year at an undergraduate level. (See also Award course.)

Method of candidature
A course is either a research course or a coursework course and so the methods of candidature are 'research' and 'coursework'. (See also Course – Coursework, Course – Research.)

Minor
Studies undertaken to support a Major. Requiring a smaller number of credit points than a major students select and transfer between minors (and majors) by virtue of their selection of units of study. One or more minors may be awarded upon the graduand's assessment of study. (See also Award course, Major, Stream.)

Mixed mode
(See Attendance mode.)

MPhil
The Master of Philosophy (MPhil) is a master's by research degree offered by some (but not all) of the University's faculties. (See also Award course, Master's degree.)

Mutually exclusive units of study
(See Prohibited combinations of units of study.)

MyUni
The University of Sydney's student portal system. It provides students with access to information about the University and its courses, including access to email, library services, student support services, student self-administration and e-learning software such as Blackboard and WebCT.

N

Non-award course
(See Course.)

Non-standard session
A teaching session other than the standard February and August sessions – e.g. Summer School, in which units of study are delivered and assessed in an intensive mode during January. (See also Semester, Session.)

O

Orientation Week
Orientation or 'O Week', takes place in the week before lectures begin in Semester One. During O Week, students can join various clubs, societies and organisations, register for courses with departments and take part in activities provided by the University of Sydney Union.

P

Part-time student
(See Attendance mode, Attendance pattern, Equivalent full-tme student units (EFTSU).)

Permanent home address
The address used for all official University correspondence with a student, both inside and outside of semester time (e.g. during semester breaks), unless the student provides a different overridden by semester address for use during the semester. (See also Semester address.)

PhD
The Doctor of Philosophy (PhD) and other doctorate awards are the highest awards available at the University. A PhD course is normally purely research-based; the candidate submits a thesis that is an original contribution to the field of study. (See also Award course, Doctorate.)

Plagiarism
Presenting another person's ideas, findings or work as one's own by copying or reproducing them without the acknowledgement of the source. (See also Academic dishonesty.)

Postgraduate
A term used to describe a course leading to an award such as graduate diploma, a master's degree or PhD which usually requires prior completion of a relevant undergraduate degree (or diploma) course. A 'postgraduate' is a student enrolled in such a course. (See also Course – Coursework, Course – Research.)

Postgraduate Education Loans Scheme (PELS)
An interest-free loans facility for eligible students who are enrolled in fee-paying, postgraduate non-research courses. It is similar to the deferred payment arrangements available under the Higher Education Contribution Scheme (HECS). This scheme was replaced by the FEE-HELP scheme on 1 January 2005. (See FEE-HELP Loan.)

Potential graduand
A student who has been identified as being eligible to graduate on the satisfactory completion of their current studies. (See also Graduand, Graduation.)

Pre-enrolment
Pre-enrolment – also known as provisional re-enrolment – takes place in October, when students indicate their choice of unit of study enrolment for the following year. After results are approved, pre-enrolment students are regarded as enrolled in those units of study for which they are qualified. Their status is 'enrolled' and remains so provided they pay any money owing and comply with other requirements by the due date. Students who do not successfully pre-enrol in their units of study for the next regular session are required to attend the University on set dates during the January/February enrolment period. (See also Enrolment.)

Prerequisite
A unit of study that is required to be successfully completed before another unit of study can be attempted. Prerequisites can be mandatory (compulsory) or advisory. (See also Assumed knowledge, Corequisite, Waiver, Qualifier.)

Prizes
Awarded in recognition of outstanding performance, academic achievement or service to the community or University.

Probationary candidature
A student who is enrolled in a postgraduate course on probation for a period of time up to one year. The head of department is required to consider the candidate's progress during the period of probation and make a recommendation for normal candidature or otherwise to the faculty.

Professional practice
Students undertake placement in a professional practice as a part of their course requirements. May require University approved supervision. Professional placements are located in a wide range of professional practices environments, and may not require additional criteria to be fulfilled.

Progression
Satisfactory progression is satisfying all course and faculty rules (normally assessed on an annual basis) to enable the completion of the chosen award within the (maximum) completion time allowed. (See also Exclusion.)

Prohibited combinations of units of study
When two or more units of study contain a sufficient overlap of content, enrolment in any one such unit prohibits enrolment in any other identified unit. (See also unit of study.)

Provisional re-enrolment
(See Pre-enrolment.)

Q

Qualification
An academic attainment recognised by the University.

Qualifier
A mandatory (compulsory) prerequisite unit of study which must have a grade of pass or better. (See also Assumed knowledge, Corequisite, Prerequisite, Waiver.)

R

Recycling
The submission for assessment of one's own work, or of work which substantially the same, which has previously been counted towards the satisfactory completion of another unit of study, and credited towards a university degree, and where the examiner has not been informed that the student has already received credit for that work.

Registration
In addition to enrolling with the faculty in units of study, students must register with the department responsible for teaching each unit. This is normally done during Orientation Week. Note that unlike enrolment, registration is not a formal record of units attempted by the student.

Research course
(See Course – Research.)

Research supervisor
A supervisor is appointed to each student undertaking a research postgraduate degree. The supervisor will be a full-time member of the academic staff or a person external to the University recognised for their association with the clinical teaching or the research work of the University. A research supervisor is commonly referred to as a supervisor. (See also Advisor, Associate supervisor, Instrumental supervisor/teacher, Supervision.)

Result processing
Refers to the processing of assessment results for units of study. For each unit of study, departments tabulate results for all assessment activities and assign preliminary results. (See also Assessment, Formative assessment, Examination period, Summative assessment.)

Result processing schedule
The result processing schedule will be determined for each academic cycle. All departments and faculties are expected to comply with this schedule. (See also Assessment, Examination period, Result processing.)

Result
The official statement of a student's performance in each unit of study attempted as recorded on the academic transcript, usually expressed as a mark and grade. (See also Grade, Mark.)

Research Training Scheme (RTS)
The RTS provides Commonwealth-funded higher degree by research (HDR) students with an 'entitlement' to a HECS exemption for the duration of an accredited HDR course, up to a maximum period of four years full-time equivalent study for a doctorate by research and two years full-time equivalent study for a master's by research.

S

Scholarships
Financial or other form of support made available to enable students to further their studies. (See also Bursaries.)

School
A school or academic unit shall encourage and facilitate teaching, scholarship and research and coordinate the teaching and examining duties of members of staff in the subjects or courses of study with which it is concerned.

Semester
A half-yearly teaching session whose dates are determined by the Academic Board. Normally all undergraduate sessions will conform to the semesters approved by the Academic Board. Any offering of an undergraduate unit not conforming to the semester dates (non-standard session) must be given special permission by the Academic Board. (See also Session, Non-standard session.)

Semester address
The address to which all official University correspondence is sent during semester time, if it is different to the permanent address.

Senate
The governing body of the University. (See the University Calendar for more details of its charter and powers.)

Senate appeals
Senate appeals are held for those students who, after being excluded by a faculty from a course, appeal to the Senate for readmission. While any student may appeal to the Senate against an academic decision, such an appeal will normally be heard only after the student has exhausted all other avenues, i.e. the department, faculty, board of study and, in the case of postgraduates, the Committee for Graduate Studies. (See also Exclusion.)

Session
Any period of time during which a unit of study is taught. A session differs from a semester in that it need not be a six-month teaching period, but it cannot be longer than six months. Each session maps to either Semester One or Two for DEST reporting purposes. Session offerings are approved by the relevant dean, taking into account all the necessary resources, including teaching space and staffing. The Academic Board must approve variation to the normal session pattern. (See also Semester, Non-standard teaching period.)

Session address
(See Semester address.)

Short course
A fee paying student undertaking a short course with the University of Sydney comprising professional development, executive training etc. The study undertaken by these students is a non-award course.

Show cause
(See Progression, Exclusion.)

Special consideration
Candidates who suffer serious illness or misadventure which may affect performance in any assessment, may request that they be given special consideration in relation to the determination of their results.

Sponsorship
Financial support of a student by a company or government body.

Stage
A normal full-time course of study taken in a year. (See also Course rules, EFTSU, Progression.)

Stream
A defined award course, which requires the completion of set units of study as specified by the course rules for the particular stream, in addition to the core program specified by the course rules. A stream will appear with the award course name on testamurs, e.g. Bachelor of Engineering in Civil Engineering (Construction Management). (See also Award course, Major, Minor.)

Student
Student means a person enrolled as a candidate for an award course or unit of study.

Student identifier (SID)
A nine-digit number which uniquely identifies a student at the University.

Student ID Card
All students who enrol are issued with an identification card. The card includes the student's name, SID, the course code, a library borrower's bar code and a passport-style photo. The card identifies the student as eligible to attend classes and must be displayed at formal examinations. It must be presented to secure student concessions and to borrow books from all sections of the University Library.

Student progress rate (SPR)
A calculation which measures the rate at which load undertaken is passed annually in each award program.

Student type
Student type identifies whether a student is local or international and the type of study the student is undertaking. (See also International student, Domestic student, Exchange student.)

Study Abroad program
A scheme administered by the International Office which allows international students who are not part of an exchange program to take units of study at the University of Sydney, but not towards an award program. In most cases the units of study taken here are credited towards an award at their home institution. (See also Exchange student.)

Subject area
A unit of study may be associated with one or more subject areas. The subject area can be used to define prerequisite and course rules, e.g. the unit of study 'History of Momoyama and Edo Art' may count towards the requirements for the subject areas 'Art History and Theory' and 'Asian Studies'.

Summative assessment
See Assessment.

Summer School
(See Sydney Summer School.)

Supervising faculty
The faculty which has the responsibility for managing the academic administration of a particular course, i.e. the interpretation and administration of course rules, approving students' enrolments and variations to enrolments. Normally the supervising faculty is the faculty offering the course. However, in the case of combined courses, one of the two faculties involved will usually be designated the supervising faculty. Further, in the case where one course is jointly offered by two or more faculties (e.g. the Liberal Studies course), a joint committee may make academic decisions about candidature and the student may be assigned a supervising faculty for administration.

Supervision
Refers to a one-to-one relationship between a student and a nominated member of the academic staff or a person specifically appointed to the role. (See also Advisor, Associate supervisor, Instrumental supervisor/teacher, Research supervisor.)

Suppression of results
Results for a particular student can be suppressed by the University when the student has an outstanding debt to the University; or the student is facing disciplinary action. A student may also request a suppression for personal reasons.

Suspension
(See Course leave.)

Sydney Summer School
A program of accelerated, intensive study running for approximately six weeks during January and February each year. Both undergraduate and postgraduate units are offered. Summer School provides an opportunity for students at Sydney and other universities to catch up

on needed units of study, to accelerate completion of a course or to undertake a unit that is outside their award course. All units attract full fees and enrolled students are also liable for compulsory subscriptions. Some fee-waiver scholarships are available.

Semester Weighted Average Mark (SWAM)
Is the WAM calculated over all units of study undertaken in a semester (except those 'Discontinued – Not to count as failure' and those with only a 'Satisfied Requirements' result), weighted according to credit point value. The SWAM may be expressed as:

$$SWAM = \frac{\sum (Mark \times Credit\ points)}{\sum (Credit\ points)}$$

T

Teaching department
(See School.)

Teaching end date
Official finish date of formal timetabled classes.

Teaching start date
Official commencement date of formal timetabled classes.

Terminated
Term used when a student's candidature has been officially closed because they are not able to complete the Course requirements. (See also Candidature.)

Testamur
A certificate of award provided to a graduand, usually at a graduation ceremony. The Award conferred will be displayed along with other appropriate detail.

Thesis
A major work that is the product of an extended period of supervised independent research. (See also Course – Research.)

Timetable
The schedule of lectures, tutorials, laboratories and other academic activities that a student must attend.

Transcript
(See Academic transcript.)

Transfer
(See Course transfer.)

Tuition fees
Tuition fees may be charged to students in designated tuition fee-paying courses. Students who pay fees are not liable for HECS.

U

Universities Admissions Centre (UAC)
The UAC receives and processes applications for admission to undergraduate courses at recognised universities in NSW and the ACT. Most commencing, local undergraduate students at the University apply through the UAC.

Universities Admission Index (UAI)
A measure of overall academic achievement in the HSC that assists universities in ranking applicants for university selection. The UAI is based on the aggregate of scaled marks in ten units of the HSC, and is a number between 0.00 and 100.00 with increments of 0.05.

Under examination
Indicates that a research student has submitted their written work (thesis) for assessment, and is awaiting the finalisation of the examiners' outcome and recommendation.

Undergraduate
A term used to describe both a course leading to a diploma or bachelor's degree and a student enrolled in such a course.

Unit of study
Unit of study or unit means a stand-alone component of an award course. Each unit of study is the responsibility of a department. (See also Prohibited combinations of unit of study.)

Unit of study enrolment status
The enrolment status indicates whether the student is still actively attending the unit of study (i.e. currently enrolled) or is no longer enrolled. (See also Discontinuation or Cancellation.)

Unit of study level
Units of study are divided into Junior, Intermediate, Senior, Honours, Year 5, and Year 6. Most majors consist of 32 Senior credit points in a subject area (either 3000 level units of study or a mix of 2000 and 3000 level units of study).

University
Unless otherwise indicated, University in this document refers to the University of Sydney.

University Medal
A faculty may recommend the award of a University Medal to a student qualified for the award of an undergraduate honours degree (or some master's degrees), whose academic performance is judged to be outstanding.

Upgrade
Where a student enrolled in a master's by research course is undertaking research at such a standard that either the University recommends that the student upgrade their degree to a PhD, or the student seeks to upgrade to a PhD and this is supported by the University.

USYDnet
The University of Sydney's intranet system. It provides access to other services such as directories (maps, staff and student, organisations), a calendar of events (to which staff and students can submit entries), and a software download area.

V

Variation of enrolment
(See Enrolment variation.)

Vice-Chancellor and Principal
The chief executive officer of the University, responsible for its leadership and management. The Vice-Chancellor and Principal is head of both academic and administrative divisions.

W

Waiver
In a prescribed course, a faculty may waive the prerequisite or corequisite requirement for a unit of study or the course rules for a particular student. Unlike credit, waivers do not involve a reduction in the number of credit points required for a course. (See also Credit, Exemption.)

Winter School
An intensive session offered by the University during the mid-year break.

Weighted average mark (WAM)
This mark uses the unit of study credit point value in conjunction with an agreed 'weight'. The formula for this calculation is:

$$WAM = \frac{\sum (W_c \times M_c)}{\sum (W_c)}$$

Where Wc is the weighted credit point value – ie, the product of the credit point value and the level of weighting of 1, 2, 3, or 4 for a first, second, third or fourth year unit of study respectively; and where Mc is the greater of 45 or the mark out of 100 for the unit of study.

The mark is the actual mark obtained by the student for the unit of study, or in the case of a failing grade with no mark – 0. Pass/fail assessed subjects and credit transfer subjects (from another institution) are excluded from these calculations; however, the marks from all attempts at a unit of study are included. (Effective from 1 January 2004.)

In addition, faculties may adopt other average mark formulae for specific progression or entry requirements. If such a formula is not specified in the faculty resolutions, the formula outlined above is used. (See also WAM weight.)

WAM weight
A weight assigned to each unit of study to assist in the calculation of WAMs.

Y

Year of first enrolment (YFE)
The year in which a student first enrols at the University. (See also Commencement date.)

Youth Allowance
Youth Allowance is payable to a full-time student or trainee aged 16–24 years of age who is enrolled at an approved institution such as a school, college, TAFE or university, and undertaking at least 15 hours a week face-to-face contact.

Index by name

Index of units of study

2007 handbook

maps

Quick links:
www.facilities.usyd.edu.au/maps/index.shtml
Campuses
Bicycle map
Precincts
Disability access
Parking layout

The University of Sydney

Camperdown and Darlington campuses

University buildings

O6 Aeronautical Engineering Building
J4 Anderson Stuart Building
G3 Badham Building
H3 Bank Building
L2 Baxter's Lodge
L8 Biochemistry and Microbiology Building
E6 Blackburn Building
E7 Bosch Building 1A
E7 Bosch Building 1B
H3 Brennan MacCallum Building
E6 Bruce Williams Pavilion
L6 Carslaw Building
F4 Chaplaincy
M8 Chemical Engineering Building
J5 Chemistry Building
N8 Civil Engineering Building
N9 Civil Engineering Workshop
K10 Clark Building
J9 Darlington Centre
J10 Darlington House
K9 Darlington Road Terraces
L10 Demountables
K5 Eastern Avenue Auditorium & Lecture Theatre Complex
L9 Economics and Business Building
H2 Edgeworth David Geology Building
G4 Education Building
G4 Education Building Annexe
H5 Edward Ford Building
N7 Electrical Engineering Building
N7 Engineering Link Building
C3 Evelyn Williams Building
K3 Fisher Library
K4 Fisher Library Stack
G2 Footbridge Theatre
C3 Gatekeeper's Lodge
J7 Gatekeeper's Lodge (City Road)
M8 Gordon Yu-Hoi Chui Building
J2 Great Hall
G3 Griffith Taylor Building
D4 HK Ward Gymnasium
F2 Heydon-Laurence Building
G2 Holme Building
N5 Information Technologies
K8 Institute Building
N5 International House
F2 JRA McMillan Building
D3 JD Stewart Building
F3 John Woolley Building
F1 Mackie Building
H3 MacLaurin Hall
H2 Macleay Building
G1 Margaret Telfer Building
J6 Madsen Building
H4 Manning House
H4 Manning Squash Courts
D3 McMaster Annexe
D3 McMaster Building
O6 Mechanical Engineering Building
A2 Medical Foundation Building
K8 Merewether Building
E1 No.1–3 Ross Street
M7 Old School Building
F4 Old Teachers' College
H3 Pharmacy Building
H6 Physics Annexe
G5 Physics Building
N8 PNR Building
E6 Queen Elizabeth II Research Institute
H5 RC Mills Building
F2 RD Watt Building
D4 RMC Gunn Building
M9 Raglan Street Building
N7 Rose Street Building
E2 Ross Street Building
G2 Science Road Cottage
E1 Selle House
M10 Services Building
N6 Seymour Centre
K10 Shepherd Centre
O6 Shepherd Street Carpark
K9 Storie Dixson Wing
F5 The Arena Sports Centre
J3 The Quadrangle
J5 Transient Building
L10 University Computing Centre
J10 University Garage
M9 University Sports & Aquatic Centre
D3 Veterinary Science Conference Centre
E6 Victor Coppleson Building
F3 Wallace Theatre
K7 Wentworth Building
E7 Western Avenue Carpark
M6 WH Maze Building
M6 Wilkinson Building

Academic colleges (offices)

H5 Health Sciences
F4 Humanities and Social Sciences
N8 Sciences and Technology

Childcare centres

K11 Boundary Lane
F9 Carillon Avenue
H1 Laurel Tree House
N9 Union

Colleges and residential accommodation

J10 Darlington House
K9 Darlington Road Terraces
N5 International House
L10 Mandelbaum House
A4 Sancta Sophia College
C8 St Andrew's College
B5 St John's College
L6 St Michael's College
G7 St Paul's College
E1 Selle House
D10 Sydney University Village
F7 Wesley College
G8 Women's College

Computer access centres

H3 Brennan
G4 Education
K3 Fisher
N7 Link
L6 McGrath (Carslaw)
H3 Pharmacy

Cultural venues

H2 Macleay Museum
J3 Nicholson Museum
N6 Seymour Centre
K7 Sir Hermann Black Gallery
M6 Tin Sheds Gallery
J2 War Memorial Art Gallery Faculties (offices)
F2 Agriculture, Food and Natural Resources
M6 Architecture
H3 Arts
K8 Economics & Business
G4 Education and Social Work
N7 Engineering
H5 Medicine
H3 Pharmacy
L6 Science
D3 Veterinary Science

Libraries

M6 Architecture
G3 Badham
H5 Burkitt-Ford
K3 Curriculum Resources
N8 Engineering
K3 Fisher
J6 Madsen
L6 Mathematics
E7 Medical
N6 Music
H6 Physics
H5 Schaeffer Fine Arts

Retail

H3 Australia Post Office
J9 Darlington Centre
G2 Holme Building
H4 Manning House
F5 The Arena Sports Centre
M9 University Copy Centre
K7 University Health Service
M9 University Sports & Aquatic Centre
M9 University Co-op Bookshop
C3 Valentine Charlton Cat Centre
C3 Veterinary Hospital & Clinic
K7 Wentworth Building

Security

M10 Emergency Services
M10 Lost Property
M10 Traffic & Parking

Sports and recreational venues

K2 Fisher Tennis Courts
D4 HK Ward Gymnasium
H5 Lawn Tennis Courts
H4 Manning Squash Courts
F5 The Arena Sports Centre
G5 The Square
E5 University Oval No1
E3 University Oval No2
M9 University Sports & Aquatic Centre

Unions and associations (offices)

K7 Students' Representative Council (SRC)
M9 Sydney University Postgraduate Representative Association (SUPRA)
M9 Sydney University Sport
G2 University of Sydney Union

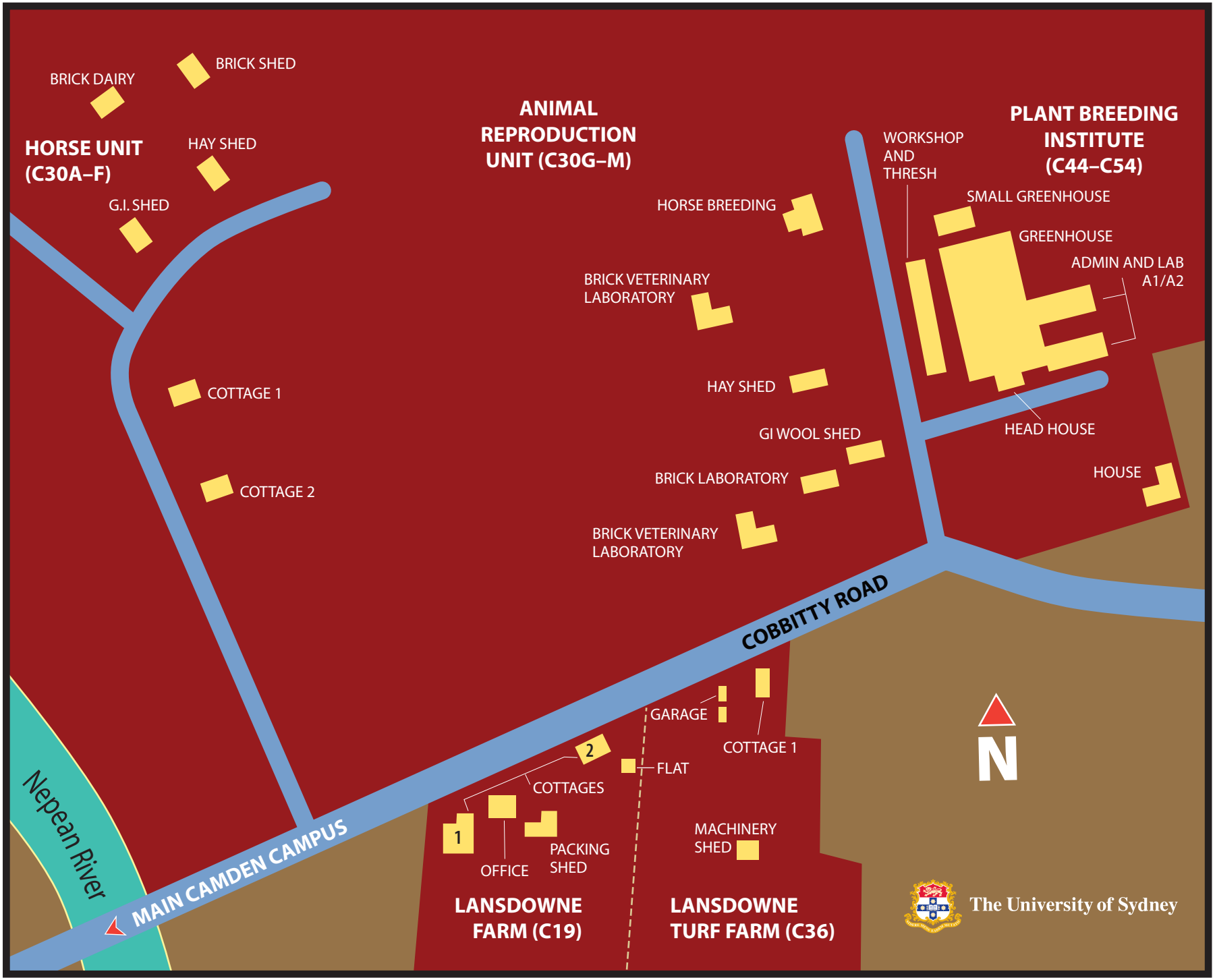
University administration and Services

M10 Advancement Services
H3 Alumni Relations Office
F3 Business Liaison Office
F1 Careers Centre
G1 Cashier
D10 Centre for Continuing Education
H3 Chancellor
L10 Computing Centre
H2 Executive Offices
J3 Information Centre
L10 Information and Communications Technology
L9 International Office
K8 Office of Development
G1 Personnel
M10 Printing Services (UPS)
H2 Publications Office
H3 Research Office
M10 Room Bookings & Venue Management
F1 Scholarships Unit
L5 Student Centre
M10 Student Housing
G4 Student Services Unit
K8 Summer School
H3 University Relations (Vice Principal)
C3 Veterinary Hospital & Clinic
H2 Vice-Chancellor

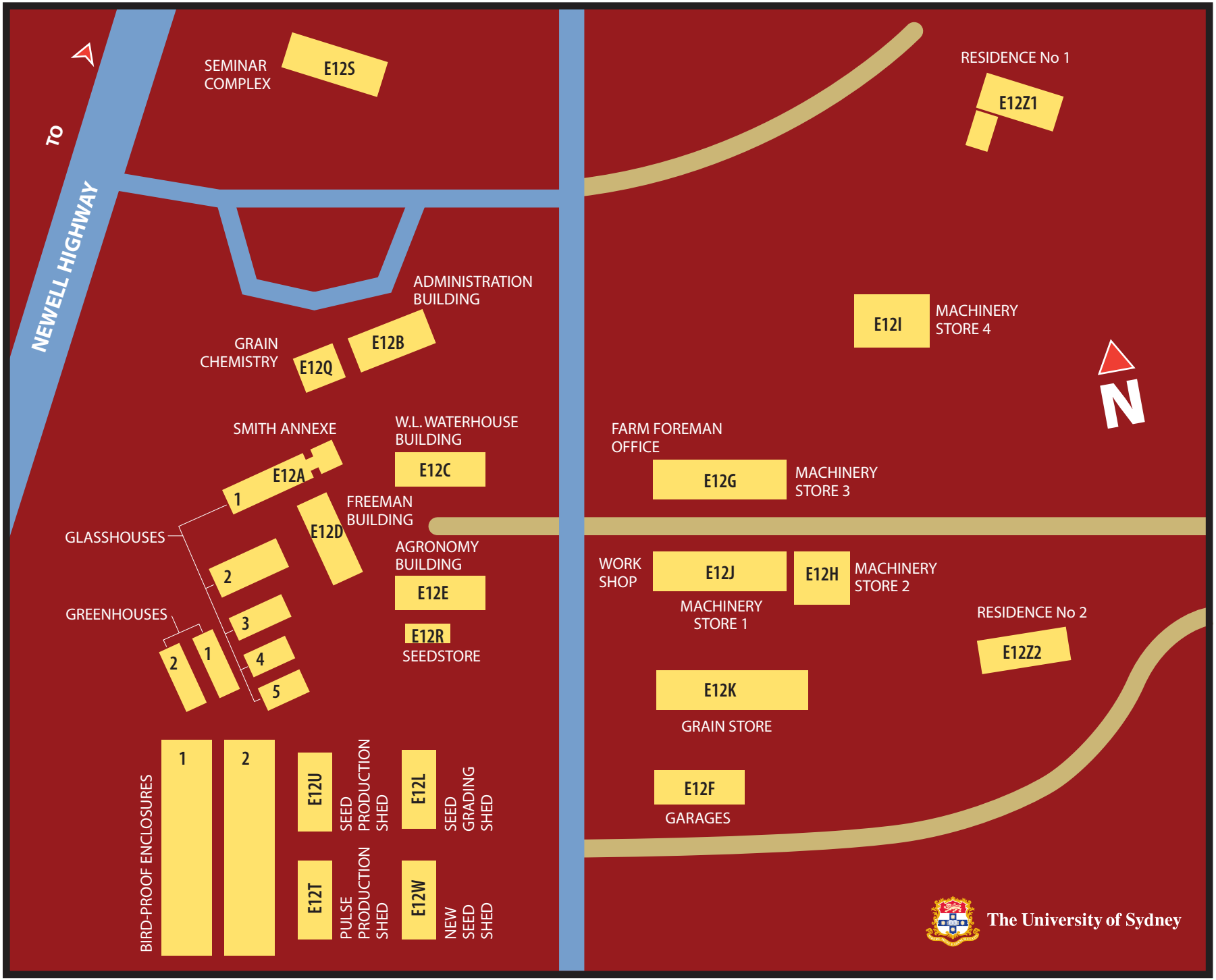
CAMDEN
MAIN CAMPUS

The University of Sydney

CAMDEN
CAMPUS
COBBITTY



NARRABRI
CAMPUS



Course planner

Year	Semester	Unit of study 1 & credit points		Unit of study 2 & credit points		Unit of study 3 & credit points		Unit of study 4 & credit points		Total credit points
1	1									
	2									
2	summer									
	1									
	winter									
	2									
3	summer									
	1									
	winter									
	2									
4	summer									
	1									
	winter									
	2									
5	summer									
	1									
	winter									
	2									
								Total credit points		