

FACULTY OF AGRICULTURE  
AND ENVIRONMENT  
**HANDBOOK 2015**

This copy is for  
staff use only

# Contents

<b>Welcome</b>	<b>1</b>	<b>Bachelor of Science in Agriculture</b>	<b>43</b>
<b>Undergraduate</b>	<b>3</b>	Units of study	43
Progress through the years	3	Year 1	43
<b>Bachelor of Environmental Systems</b>	<b>5</b>	Year 2	45
Course rules	5	Year 3*	46
Bachelor of Environmental Systems	5	Table D - Year 3 Electives	47
Bachelor of Environmental Systems (Honours)	5	Year 4^	51
Course resolutions	5	Table E - Year 4 Specialisations	52
<b>Bachelor of Environmental Systems</b>	<b>7</b>	Agricultural Chemistry	52
Units of study table	7	Agricultural Economics	53
Honours	9	Agricultural Genetics	53
<b>Bachelor of Environmental Systems</b>	<b>11</b>	Agronomy	53
Units of study	11	Animal Production	53
Year 1	11	Entomology	54
Year 2	13	Environmetrics	54
Year 3	16	Food Science	55
Table AS2 Agricultural Systems Stream	17	Forest Science	56
Table NTS2 Natural Terrestrial Systems Stream	19	Horticulture	56
Honours	21	Hydrology	56
<b>Bachelor of Food and Agribusiness</b>	<b>23</b>	Soil Science	57
Course rules	23	Table F - Other Year 4 electives	58
Bachelor of Food and Agribusiness	23	<b>Bachelor of Agricultural Economics</b>	<b>61</b>
Bachelor of Food and Agribusiness (Honours)	23	Course rules	61
Course resolutions	23	Bachelor of Agricultural Economics	61
<b>Bachelor of Food and Agribusiness</b>	<b>25</b>	Bachelor of Agricultural Economics (Honours)	61
Units of study table	25	Course resolutions	61
Electives	26	<b>Bachelor of Agricultural Economics</b>	<b>63</b>
<b>Bachelor of Food and Agribusiness</b>	<b>29</b>	Units of study table	63
Units of study	29	<b>Bachelor of Agricultural Economics</b>	<b>73</b>
Year 1	29	Units of study	73
Year 2	31	Year 2	73
Year 3	32	Year 3	74
Year 4	33	Year 4	75
Electives	34	Agricultural Economics major	83
Table FA1	34	Non-Agricultural Economics majors	84
Table FA2	35	Accounting	84
<b>Bachelor of Science in Agriculture</b>	<b>37</b>	Agribusiness	86
Course rules	37	Agricultural Finance	87
Bachelor of Science in Agriculture	37	Agricultural Marketing	88
Bachelor of Science in Agriculture (Honours)	37	Commercial Law	90
Course resolutions	37	Econometrics	90
<b>Bachelor of Science in Agriculture</b>	<b>39</b>	Compulsory senior units	90
Units of study table	39	Economics	91
		Finance	92
		Geography	93
		Government and International Relations	96



<i>Management</i>	96	<i>Part 3: Candidature</i>	159
<i>Marketing</i>	98	<i>Part 4: Requirements</i>	159
<i>Psychology</i>	99	<i>Part 5: Enrolment and progression</i>	159
<b>Bachelor of Resource Economics</b>	<b>103</b>	<i>Part 6: Examination</i>	159
Course rules	103	<i>Part 7: Other</i>	160
Bachelor of Resource Economics	103	<b>Agricultural Economics and Science in</b>	<b>161</b>
Bachelor of Resource Economics (Honours)	103	<b>Agriculture</b>	
<i>Course resolutions</i>	103	<i>Doctor of Agricultural Economics and Doctor of</i>	161
<b>Bachelor of Resource Economics</b>	<b>105</b>	<i>Science in Agriculture</i>	
Units of study table	105	<b>Resolutions of the Senate</b>	<b>163</b>
<b>Bachelor of Resource Economics</b>	<b>115</b>	Resolutions of the Senate	163
Units of study	115	<b>Resolutions of the Faculty</b>	<b>165</b>
<i>Year 2</i>	115	Resolutions of the Faculty of Agriculture and	165
<i>Year 3</i>	116	Environment for coursework awards	
<i>Year 4</i>	117	<i>Part 1: Course enrolment</i>	165
Resource Economics Major	123	<i>Part 2: Unit of study enrolment</i>	165
Non-Resource Economics majors	125	<i>Part 3: Studying and Assessment</i>	165
<i>Biology</i>	125	<i>Part 4: Progression, Results and Graduation</i>	166
<i>Chemistry</i>	125	<i>Part 5: Other</i>	166
<i>Commercial Law</i>	126	<b>Index by alpha code</b>	<b>167</b>
<i>Econometrics</i>	126	<b>Index by name</b>	<b>171</b>
<i>Economics</i>	128		
<i>Finance</i>	128		
<i>Geography</i>	129		
<i>Geology and Geophysics</i>	132		
<i>Government and International Relations</i>	134		
<i>Mathematics</i>	134		
<i>Soil Science</i>	137		
<i>Statistics</i>	138		
<b>Postgraduate coursework</b>	<b>141</b>		
Graduate Certificate in Agriculture and	141		
Environment			
Graduate Diploma in Agriculture and Environment	141		
Master of Agriculture and Environment	141		
<i>Course resolutions</i>	141		
<b>Graduate Certificate in Agriculture and</b>	<b>143</b>		
<b>Environment</b>			
<b>Graduate Diploma in Agriculture and</b>	<b>145</b>		
<b>Environment</b>			
<b>Master of Agriculture and Environment</b>	<b>147</b>		
<b>Units of study descriptions</b>	<b>149</b>		
<i>Table A units of study</i>	149		
<i>Specialisation electives</i>	150		
<i>Other electives</i>	153		
<b>Doctor of Philosophy</b>	<b>157</b>		
<b>Master of Philosophy</b>	<b>159</b>		
Master of Philosophy	159		
<i>Course resolutions</i>	159		
<i>Part 1: Preliminary</i>	159		
<i>Part 2: Admission requirements</i>	159		

# Welcome



Welcome to the Faculty of Agriculture and Environment (FAE). We think you'll enjoy our research-led teaching, and appreciate it more as the years pass! As we constantly hear from our alumni and from industry, degrees from the FAE are your passport to a fantastic career.

The FAE has amongst the best facilities of any comparable faculty in Australia. New facilities at Camden – our Centre for Carbon, Water and Food – and at Narrabri – our I.A.Watson International Grains Research Centre – wonderfully complement our headquarter facilities at Australian Technology Park, Redfern. Each of these facilities has been developed specifically to house our outstanding researchers and teachers and to provide the best possible learning spaces for our students.

Our newest degree – the Bachelor of Food and Agribusiness (BFAB) – is certainly fabulous. Combining outstanding teaching in business from our sister faculty, with our strength in the science of food production, this degree will set students up to be part of what all experts are predicting will be a boom industry for coming decades. Interest in the quality and safety of the food we eat is at an all time high. Everyone wants to know that the systems to produce that food are environmentally sustainable. With its embedded internship program, the BFAB degree is a response to consistent calls from industry, government and other employers for graduates with skills that only the FAE can impart.

Our degree programs in Agricultural Science and Environmental Systems remain at the top of their class within Australia. We make no apologies for aiming to be the best in research and provide the best education in these fields. We believe this is what students want – to be taught by the best, in the best facilities with the best support around. We thus integrate our teaching with our research-intensive sites in the Snowy Mountains and on the Liverpool Plains. Our teaching focus is providing knowledge that will underpin solutions to the most significant and challenging issues of our time. Our advanced students also have the opportunity to complete part of their studies at some of the world's best universities in Europe, the USA and the UK, if they wish. The very latest in technologies for quantifying key elements of sustainability – carbon, water and nutrient cycles – are key parts of our teaching and students emerge from our faculty, ready to contribute to industry and society.

**Professor Mark Adams**

*Dean*



---

# Undergraduate

The following undergraduate degrees are offered by the faculty:

- Bachelor of Agricultural Economics (BAgrEc) \*
- Bachelor of Environmental Systems (BEnvSys)
- Bachelor of Environmental Systems (BEnvSysHons)
- Bachelor of Food and Agribusiness (BFoodAgrib)
- Bachelor of Resource Economics (BResEc) \*
- Bachelor of Science in Agriculture (BSciAgr)

\* Last intake 2014

## 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-year, second-year 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 degree coordinator must be obtained before you can proceed to a unit of study unless you have passed the necessary prerequisites.





# Bachelor of Environmental Systems

## Course rules

### Bachelor of Environmental Systems

### Bachelor of Environmental Systems (Honours)

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

## Course resolutions

### 1 Course codes

Code	Course title
BPENVSYS-01	Bachelor of Environmental Systems
BHENVSYS-01	Bachelor of Environmental Systems (Honours)

### 2 Attendance pattern

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

### 3 Streams

- (1) The Bachelor of Environmental Systems is available in the following streams:
  - (a) Agricultural Systems; and
  - (b) Natural Terrestrial Systems.
- (2) Completion of one stream is a requirement of the course. Candidates should seek advice from the degree coordinator on which stream to take, prior to selecting second year units of study.

### 4 Admission to candidature

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

### 5 Requirements for award

- (1) The units of study that may be taken for the course are set out in the Bachelor of Environmental Systems table of units of study. The Dean may approve some variation in units of study required for the degree for exceptionally talented students.
- (2) To qualify for the award of the pass degree, a candidate must complete 144 credit points, including:
  - (a) 102 credit points of core units of study
  - (b) 18 credit points of elective second year units and 24 credit points of elective third year units in a single stream.
- (3) To qualify for the award of international specialisation, a candidate must complete a minimum of 48 credit points in approved units of study for two semesters at an approved university. Once a student has applied for and been accepted for International Exchange, the student may then apply for the International Specialisation. For detailed information on

the application procedure, requirements and approved universities, please see the Faculty website: [http://sydney.edu.au/agriculture/current\\_students](http://sydney.edu.au/agriculture/current_students)

### 6 Weighted average mark (WAM)

- (1) For the Bachelor of Environmental Systems, the Faculty of Agriculture and Environment uses a Year 2/3 WAM that includes all 2000 level, 3000 level units of study and 4000 level units of study taken to fulfil requirements of the pass degree.
- (2) The WAM calculations use the following formula:

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

where Wc is the unit of study credit points x the unit weighting and Mc is the mark achieved for the unit. The mark used for units with a grade AF is zero. Pass/fail units and credited units from other institutions are not counted. All units carry a weighting of one, except the individual research components of undergraduate degrees, which carry a weighting of two.

### 7 Requirements for the Honours degree

- 7.1 To enter the honours year, all candidates must have:
  - 7.1.1 (a) qualified for the award of a relevant pass degree from the Faculty of Agriculture and Environment, or the Faculty of Science, or
  - 7.1.2 (b) be a pass graduate holding an equivalent qualification from another institution, and
  - 7.1.3 (c) achieved a Year 2/3 WAM of at least 65 (or the equivalent). For those candidates entering from another institution, to be determined by the Degree Coordinator.
- 7.2 Candidates for the Bachelor of Environmental Systems Honours are required to complete the following units of study.
  - 7.2.1 (a) A 24 cp research project comprising AFNR4101 Research Project A and AFNR4102 Research Project B, and
  - 7.2.2 (b) ENSY4001 Scientific Method and Communication, and
  - 7.2.3 (c) Three 6 cp units of study from:
    - (i) the list of Year 3 Bachelor of Environmental Systems core and elective units, subject to meeting prerequisites, which have not been previously completed by the candidate, and/or
    - (ii) any other Level 4XXX unit offered by the Faculty of Agriculture and Environment, subject to Department permission being granted
- 7.3 The level of honours to be awarded is determined by the HWAM, which is the weighted average mark for the six units comprising the student's approved Honours course. All 6 cp units have a weighting of 6/72=1/12. The 12 cp units, AFNR4101 and AFNR4102, each have a weighting of 24/72=1/3. The levels of Honours to be awarded are:

Level of honours	HWAM
First Class	mark >= 80
Second Class, Division 1	75 - 79
Second Class, Division 2	70 - 74
Third Class	65 - 69
Fail*	mark <65
Absent fail	mark <65

\*In these cases the award of a pass degree may be recommended.

### 8 Transitional provisions

- (1) These resolutions apply to persons who commenced their candidature after 1 January, 2011 and persons who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2013 may complete the requirements in accordance with the resolutions





in force at the time of their commencement, provided that requirements are completed by 1 January, 2018. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.

# Bachelor of Environmental Systems

## Units of study table

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Year 1</b>			
Year 1 will have the following 48 credit point structure:			
<b>AGEN1001</b> Shaping our Landscapes	6	<b>N</b> AFNR1001	Semester 1
<b>BIOL1001</b> Concepts in Biology	6	<b>A</b> HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). <b>N</b> BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911	Semester 1 Summer Main
or			
<b>BIOL1911</b> Concepts in Biology (Advanced)	6	<b>P</b> 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit <b>N</b> BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>CHEM1001</b> Fundamentals of Chemistry 1A	6	<b>A</b> 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. <b>N</b> CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903	Semester 1
or			
<b>CHEM1101</b> Chemistry 1A	6	<b>A</b> HSC Chemistry and Mathematics <b>N</b> CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901	Semester 1 Summer Main
or			
<b>CHEM1901</b> Chemistry 1A (Advanced)	6	<b>P</b> HSC Chemistry result of 80 or more <b>N</b> CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>ENVX1002</b> Introduction to Statistical Methods	6	<b>C</b> Prohibitions: ENVX1001	Semester 1
<b>AGEC1006</b> Economic Environment of Agriculture	6	<b>A</b> HSC Mathematics <b>N</b> AGEC1004, AGEC1003	Semester 2
<b>AGEN1002</b> Sustaining our Landscapes	6	<b>A</b> School Year 12 level knowledge of mathematics, some biology and chemistry.	Semester 2
<b>AGEN1004</b> Applied Biology for Ag and Environment	6	<b>N</b> BIOL1002	Semester 2
<b>AGEN1006</b> Biological Chemistry	6	<b>P</b> CHEM1001 or CHEM1101 or CHEM1901 <b>N</b> CHEM1002	Semester 2
<b>Year 2</b>			
Year 2 will have the following structure: 36 credit points of core units including:			
<b>AGEN2001</b> Plant Function	6	<b>P</b> (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry	Semester 1
<b>ENVX2001</b> Applied Statistical Methods	6	<b>P</b> ENVX1001 or ENVX1002 or BIOM1003 or MATH1011 or MATH1015	Semester 1
<b>SOIL2003</b> Soil Properties and Processes	6		Semester 1
<b>AGEN2005</b> Plant Systems Biology	6	<b>P</b> AGEN2001 or BIOL2023 or BIOL2923	Semester 2
<b>ENVX3001</b> Environmental GIS	6	<b>P</b> AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology	Semester 2
<b>LWSC2002</b> Introductory Hydrology	6	<b>P</b> 6cp of Junior Geoscience or AGEN1002	Semester 2
And 12 credit points of elective units.			
<b>AREC2001</b> Econ of Biological Production Systems	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 1
<b>GENE2002</b> Veterinary and Agricultural Genetics 2	6	<b>A</b> Knowledge of biology, chemistry and statistics from, or equivalent to that in, the 1st year Units of Study in the degrees in which this Unit is available. <b>P</b> At least one of (BIOL1001, BIOL1002, BIOL1101, BIOL1901, BIOL1911, VETS1018) <b>N</b> GENE2001	Semester 1
<b>GEOS1001</b> Earth, Environment and Society	6	<b>N</b> ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902	Semester 1
<b>AREC2002</b> Commodity Market and Price Analysis	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 2



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AGRO3004</b> Managing Agro-Ecosystems	6	P (BIOL2023 or BIOL2923 or PLNT2003 or AGEN 2001) and SOIL2003.	Semester 2
<b>ENTO2001</b> Introductory Entomology	6	P 12 cp of first year biology N BIOL2917, BIOL2017	Semester 2
<b>MICR2024</b> Microbes in the Environment	6	P 12 cp of first year Biology N MICR2021, MICR2022, MICR2921, MICR2922	Semester 2
<b>BIOL2024</b> Ecology and Conservation	6	A BIOL1002 or BIOL1902 P 12cp Junior BIOL; or 6cp Junior BIOL and (MBLG1001 or MBLG1901). N BIOL2924	Semester 2
<b>AREC2003</b> Concepts in Enviro and Resource Economics	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 1
<b>SOIL2004</b> The Soil Resource	6		Semester 2
<b>Year 3</b>			
Year 3 will have the following structure: 24 credit points of core units including:			
<b>SOIL3009</b> Contemporary Field and Lab Soil Science	6	P SOIL2003	Semester 1
<b>LWSC3007</b> Advanced Hydrology and Modelling	6	P LWSC2002	Semester 1
<b>ENSY3001</b> Biosphere-Atmosphere Interactions	6	P AGEN2005 or BIOL2023 or BIOL2923	Semester 2
<b>AGCH3033</b> Environmental Chemistry	6	A SOIL2003, LWSC2002 P 12 cp of Junior Chemistry N CHEM2404	Semester 2
And 24 credit points from either Table AS2 or Table NTS2.			
<b>Table AS2 Agricultural Systems Stream</b>			
Two of:			
<b>AFNR3001</b> Agro-ecosystems in Developing Countries	6	<i>Note: Department permission required for enrolment</i>	Semester 1
<b>AGRO4003</b> Crop and Pasture Agronomy	6	P AGRO3004	Semester 1
<b>AGRO4004</b> Sustainable Farming Systems	6	P AGRO3004	Semester 1
<b>ENVI3111</b> Environmental Law and Ethics	6	P 12 credit points of intermediate units of study N ENVI3911	Semester 1
<b>ENVX3002</b> Statistics in the Natural Sciences	6	P ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922	Semester 1
<b>AREC2004</b> Benefit-Cost Analysis	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 2
and two of			
<b>ENTO4003</b> Integrated Pest Management	6	P ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921.	Semester 2
<b>ENVX4001</b> GIS, Remote Sensing and Land Management	6	P ENVX3001 or GEOS2111 or GEOS2911 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>SOIL3010</b> The Soil at Work	6	P SOIL2003 or SOIL2004	Semester 2
<b>AREC3004</b> Economics of Water and Bio-Resources	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1
<b>PLNT3001</b> Plant, Cell and Environment <i>This unit of study is not available in 2015</i>	6	P 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics N PLNT3901	Semester 2
<b>Table NTS2 Natural Terrestrial Systems Stream</b>			
Two of			
<b>ENSY3002</b> Fire in Australian Ecosystems	6	P AGEN2005 or BIOL2023 or BIOL2923	Semester 1
<b>ENVI3111</b> Environmental Law and Ethics	6	P 12 credit points of intermediate units of study N ENVI3911	Semester 1
<b>ENVX3002</b> Statistics in the Natural Sciences	6	P ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922	Semester 1
and two of			
<b>BIOL3007</b> Ecology	6	P 12 credit points of Intermediate BIOL; or 6 credit points of Intermediate BIOL and (MBLG2072 or MBLG2972). N BIOL3907	Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>BIOL3009</b> <b>Terrestrial Field Ecology</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> 12 credit points of Intermediate BIOL; or 6 credit points of Intermediate BIOL and (MBLG2072 or MBLG2972). <b>N</b> BIOL2009, BIOL2909, BIOL3909 <i>Note: Department permission required for enrolment</i> <i>This unit cannot be combined with more than one other BIOL field unit during the degree.</i> <i>Departmental permission is required for entry into this unit of study. Entry into the unit is based on placement availability and selection is competitive based on academic performance in the pre-requisite units of study. Academic performance in any Senior BIOL units of study may also be considered. This unit is only available in EVEN numbered years (e.g. 2014, 2016...), but students are offered alternative Senior field units in ODD numbered years.</i>	Intensive August
<b>ENSY3003</b> <b>Forest Ecosystem Science</b>	6	<b>P</b> Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage.	Semester 2
<b>ENVI3112</b> <b>Environmental Assessment</b>	6	<b>P</b> (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units <b>N</b> ENVI3912, ENVI3004, ENVI3002	Semester 2
<b>PLNT3001</b> <b>Plant, Cell and Environment</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics <b>N</b> PLNT3901	Semester 2

## Honours

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
The Honours Year will have the following 48 credit point structure:			
<b>AFNR4101</b> <b>Research Project A</b>	12	<b>P</b> 144 credit points of level 1000-3000 units of study	Semester 1
<b>ENSY4001</b> <b>Scientific Method and Communication</b>	6	<b>C</b> AFNR4101 <b>N</b> AFNR5904, AFNR5901 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>AFNR4102</b> <b>Research Project B</b>	12	<b>P</b> AFNR4101	Semester 2
And 18 credit points of Year 3 Bachelor of Environmental Systems core units, and elective units from either Table ATS2 or Table NTS2 which have not been previously completed by the candidate and or any other Level 4XXX unit offered by the Faculty subject to Department permission.			



# Bachelor of Environmental Systems

## Units of study

### Year 1

Year 1 will have the following 48 credit point structure:

#### AGEN1001

##### Shaping our Landscapes

**Credit points:** 6 **Teacher/Coordinator:** Dr Peter Ampt **Session:** Semester 1 **Classes:** 2x1hr lect, 1x2hr tut, 4x1 day (6.5hr) field (ave 2hrs/week) **Prohibitions:** AFNR1001 **Assessment:** 1x2hr exam (40%), Field class reports (10%), Group work participation (10%), Journal (10%), Problem based learning project (30%) **Practical field work:** Preparation, revision and private study 3hrs/week **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to help students develop understanding of our non-urban landscapes and the physical, biological, economic and cultural factors that have shaped them, with particular emphasis on the interaction between production and environment. It is a core first year unit for students in BScAgr, BEnvSys, BAgEc, BResEc and BAnVetBioSc. The unit begins with a review of the current global issues around population, food, agriculture and environment and the place of Australia in this global context. Australia's current production (plant and animal based) and environmental systems and landscapes are described with an emphasis on the physical, biological, economic and cultural factors that have shaped them, concluding with an account of future production and environment scenarios. At the end of this unit, students should be able to describe global production and environment issues and key Australian landscapes and production systems, explain the factors that have shaped them and apply this understanding to a specific location and production system. They should analyse the situation of natural resource managers and evaluate the options available to them to maintain or improve profitable production and achieve sustainability. The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

##### Textbooks

To be advised during semester.

#### BIOL1001

##### Concepts in Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1, Summer Main **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prohibitions:** BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments tests and lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Concepts in Biology is an introduction to the major themes of modern biology. The unit covers fundamental cell biology, with a particular emphasis on cell structure and function; the foundations of molecular biology from the role of DNA in protein synthesis to the genetics of organisms; and the theory of evolution and principles of phylogenetic analysis, including how these are used to interpret the origins of the diversity of extant organisms. Practical classes focus on students designing experiments, making and recording their observations and communicating their findings. The unit emphasises how biologists carry out scientific investigations, from the molecular and cellular level to the level of ecosystems. This unit of study provides a good foundation for intermediate biology units of study.

##### Textbooks

Knox R B et al. Biology, An Australian Focus. 4th ed. McGraw-Hill. 2010

or

#### BIOL1911

##### Concepts in Biology (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit **Prohibitions:** BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 **Assessment:** One 2-hour exam, assignments, tests, lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

Concepts in Biology (Advanced) has the same overall structure as BIOL1001 but material is discussed in greater detail and at a more advanced level. Students enrolled in BIOL1901 participate in alternative components, which include a separate lecture and practical stream from BIOL1001. The content and nature of these components may vary from year to year.

##### Textbooks

As for BIOL1001.

#### 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 9 weeks. **Prohibitions:** CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903 **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 (60%), laboratory work (15%), online assignments (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or

#### 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 9 weeks. **Prohibitions:** CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901 **Assumed knowledge:** HSC Chemistry and Mathematics **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

##### Textbooks

A booklist is available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or



## CHEM1901

### Chemistry 1A (Advanced)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1-hour lectures and one 1-hour tutorial per week; one 3-hour practical per week for 9 weeks. **Prerequisites:** HSC Chemistry result of 80 or more **Prohibitions:** CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

## ENVX1002

### Introduction to Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop **Session:** Semester 1 **Classes:** 2x1 hr lectures/wk, 1x1 hr tutorial/wk, 1x2 hr computer practical/wk **Corequisites:** Prohibitions: ENVX1001 **Assessment:** 1 A Exam during the Exam period (50%), 2 A Practical Tests (10% each), 2 A Assessment Tasks (10% each) and 8 Online Quizzes (1.25% each). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a core first year unit for the BEnvSys, BScAgr, BFoodAgr, BVetBiol and BAnVetBioSc degrees. It provides the foundation quantitative and statistical skills that are needed in other units in the degrees and for further study in applied statistics. In the first portion of the unit the emphasis is on the role of statistics in scientific research, describing data and its variability, and probability. In the second part the focus is on sample designs and framing scientific 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 final part of the unit is on the use of calculus for modelling biological and environmental data, for example the use of linear and non-linear functions. In the practicals the emphasis is on applying theory to analysing real datasets using the spreadsheet package Excel and the statistical package Genstat.

#### Textbooks

Recommended readings: -Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton). -Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

## AGEC1006

### Economic Environment of Agriculture

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prohibitions:** AGECE1004, AGECE1003 **Assumed knowledge:** HSC Mathematics **Assessment:** 1x2hr exam (55%) and 1x50 min mid-semester exam (25%) and workshop papers (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

To give students an overview of the structure, viability and importance of the agricultural sector in the Australian economy. It is a core unit of study in the BScAgr, BHortSc and BAnVetBioSc degrees. It is designed to give an understanding of the basic economic principles and how they relate to Australian agriculture. Students will look at basic economic theory and concepts and then apply these concepts to solve simplified versions of real problems faced by the agriculture and resource sectors. Students will look at the relationship between these concepts and the concepts learnt within their science related courses. Students will be able to analyse economic concepts and apply these concepts to real world scenarios. They will be able to

synthesis and comprehend the relationship between the economic and science disciplines. The students will gain skills through workshop based tasks, information literacy and communication skills through the presentation of the workshop reports and discussion throughout the workshop.

#### Textbooks

HE Drummond and JW Goodwin, Agricultural Economics, 3rd edn (Prentice-Hall, 2011)

## AGEN1002

### Sustaining our Landscapes

**Credit points:** 6 **Teacher/Coordinator:** Professor Mark Adams (Coordinator), Professor Alex McBratney, Dr Taryn Turnbull, A/Prof Tihomir Ancev **Session:** Semester 2 **Classes:** 3 x lectures + 1 x tutorial per week for weeks 1-6 & 11-13, 1x tutorial per week only for weeks 7-10, 1 x compulsory 2.5 day weekend field trip between weeks 6 & 7 **Assumed knowledge:** School Year 12 level knowledge of mathematics, some biology and chemistry. **Assessment:** 1 x 2hr exam (50%), 4 x tutorial exercises (24%), 1 x field trip report (26%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The quest for sustainability is integral to all land management. The earth's natural systems - especially cycles of water, carbon and nutrients - are critical to economic, social and many other aspects of the world in which we live. As a country dependent on export of commodities, Australia must contend with very significant external forces that shape how we manage land.

This unit of study provides students with critical knowledge and understanding of the economic, biophysical, and chemical principles that must be considered in assessing sustainability, and applies that knowledge to assessing how current Australian landscapes might be managed in the future. Beginning with an exploration of the meaning of sustainability and how scientific and economic methodology is applied to its study, students will progressively engage with more complex and challenging content. By the end of the unit, students will have explored major elements of sustainability and be able to apply their understanding to articulate critical questions that need to be asked when presented with simplistic approaches or ideas. A major field trip will focus on introducing students to quantitative measurement of key processes and developing a greater depth of knowledge of sustainability "in the field". A range of typical Australian landscapes will be considered, ranging from the high country and forests to intensive irrigated agriculture. The field trip and tutorial exercises are intended to help students gain skills in rigorous analysis of the relevant literature and in preparing short pieces of writing. Students direct experience of and exposure to the science and economics of ecological sustainability. Students will work in small groups during field and tutorial sessions.

#### Textbooks

A Critique for Ecology R.H. Peters, 1991, Cambridge University Press  
Biogeochemistry : An Analysis of Global Change W.H. Schlesinger 1997, Academic Press

## AGEN1004

### Applied Biology for Ag and Environment

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Prof. Michael D'Ágostino, Prof. David Guest, A/Prof. Luciano Gonzalez, A/Prof. Michael Kertesz, Prof. Rosanne Taylor, Dr Catherine Herbert **Session:** Semester 2 **Classes:** 1x2 hr lecture/workshop per week, 1x3.5 hr Practical per week **Prohibitions:** BIOL1002 **Assessment:** Practical Participation and Quizzes (10%), Plant ID Portfolio (20%), Group video and presentation (30%), Individual viva-voce exam (10%), End of semester exam (30%) **Practical field work:** Practical and field report preparation. Class preparation, material revision/private study **Mode of delivery:** Normal (lecture/lab/tutorial) day

Building on the fundamentals of biology introduced in 1st semester biology (BIOL1001 or equivalent), this unit runs alongside 2nd semester chemistry where students learn the fundamentals of organic chemistry and the major biomolecules. In this unit, students will gain an understanding of how biological processes and systems function. Students will be introduced to the major plant, animal and microbial systems, how they interact, and how an understanding of environmental influences is key to effective and sustainable management of the biosphere. Topics will be introduced that will emphasise the specific importance of the major biological processes and through lectures, practicals and field trips, students will gain an in-depth understanding

of basic plant, animal and microbial physiology, biochemistry, energy flows and biological interactions, and the importance of these in determining the resilience of organisms, communities, ecosystems and the biosphere. Students will be able to contextualize this knowledge so that they can determine appropriate management strategies for productivity and the conservation and rehabilitation of natural systems.

#### Textbooks

Recommended reference books (purchase of text book is not essential. Reference materials will be provided): - Sadava D, Hillis D, Heller C, Berenbaum M 2012, Life: the science of biology, 10th edition, WH Freeman and Co, Gordonsville VA.

### AGEN1006

#### Biological Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr Claudia Keitel (Coordinator), Dr Thomas Roberts, Dr. Feike Dijkstra, A/Prof. Balwant Singh, A/Prof. Adam Bridgeman **Session:** Semester 2 **Classes:** 3x1-hr lectures/wk, 1x1-hr tutorial/wk 1 x 3-hr practical/wk **Prerequisites:** CHEM1001 or CHEM1101 or CHEM1901 **Prohibitions:** CHEM1002 **Assessment:** Three quizzes (3x5%), 1 x Problem solving exercise (10%), Final exam (60%), Laboratory-based assessment (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study expands on the basic chemical concepts taught in first semester (CHEM1001). The unit will cover the structure and behaviour of organic and inorganic compounds relevant to chemical reactions in biological systems. The unit will introduce students to organic molecules (hydrocarbons, alcohols, aldehydes and ketones, aromatic compounds, organic acids) and inorganic chemistry (e.g. acid-base and redox reactions, solubility, metal complexes) as well as the structures and reactions of major biological macromolecules (e.g. carbohydrates, lipids, proteins and nucleic acids). In weeks 1-7, lectures, tutorials and laboratory work are conducted in co-operation with the School of Chemistry, Faculty of Science. In weeks 8-13, lectures, tutorials and laboratory work will be undertaken in the Faculty of Agriculture and Environment. Lectures, tutorials and laboratory work are integrated, providing students with a theoretical and practical basis for further studies in the management of biological systems. This 6 credit point unit consists of approximately 80 hours directed learning.

#### Textbooks

Reference books; Blackman, Bottle, Schmid, Mocerino and Wille Chemistry and SI Chemical Data (package), 2nd Edition, 2012 (John Wiley) ISBN: 9781118234228

### Year 2

Year 2 will have the following structure: 36 credit points of core units including:

### AGEN2001

#### Plant Function

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell (Coordinator), Dr Thomas Roberts **Session:** Semester 1 **Classes:** 2x1-hr lectures, 1x 3-hr practical per week **Prerequisites:** (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry **Assessment:** 1x 1hr mid-semester exam (20%), 1x 2hr final exam (40%), 1000w essay (10%), Five practical reports (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

#### Textbooks

Taiz L, Zeiger E (2010) Plant Physiology 5th ed.

### ENVX2001

#### Applied Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), A/Prof Willem Vervoort, A/Prof Peter Thomson **Session:** Semester 1 **Classes:** 2x1 hr lectures/wk, 1x1 hr tutorial/wk, 1x2 hr computer practical/wk **Prerequisites:** ENVX1001 or ENVX1002 or BIOM1003 or MATH1011 or MATH1015 **Assessment:** 1 Exam during the Exam period (50%), 2 Practical Tests (2x10%), 2 Assessment Tasks (2x10%) and 8 Online Quizzes (8x1.25%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is a core 2nd year unit for students in the BEnvSys, BScAgr and BAVBSc degrees. It consists of two parts. In the first part students will learn the basics of experimental design and investigate how to use an ANOVA to analyse experiments with more than 2 treatment levels, multiple factors and different blocking designs. In the second part an introduction to a branch of mathematics called linear algebra is given with an emphasis on the applications to statistics and modelling. In this part the students will learn to model relationships between response and predictor variables using regression, and find patterns in datasets with many variables using principal components. During the practicals two software packages; Genstat and Excel, will be used to analyse real datasets. At the end of this unit, students will have learnt how to design and experiment and how to analyse data using ANOVA, regression and principal components, the basic methods needed for their future studies and careers.

#### Textbooks

No textbooks are recommended but useful reference books are:

-Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton).  
-Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

### SOIL2003

#### Soil Properties and Processes

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Prof Alex McBratney, A/Prof. Stephen Cattle **Session:** Semester 1 **Classes:** 3x1hr lectures and 1x3hr practical/week, commencing week 1, and a compulsory field excursion to be held on the Thursday and Friday in the week preceding the first semester. **Assessment:** Soil description report (10%), Quizzes (or Essay) (15%), Practical exercise book (20%), Practical exam (15%) and Written exam (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the fundamental concepts within pedology, soil physics and soil chemistry. These concepts are part of the grounding principles that underpin crop and animal production, nutrient and water cycling, and environmental sustainability taught by other units of study in the Faculty. Students will participate in a two-day field excursion in the first week of semester to examine some common soils of the Sydney Basin, they will also learn to describe soil, and measure soil chemical and physical properties in the field. Referring to common soil profiles of the Sydney Basin, students will concentrate on factors affecting soil formation, the rudiments of soil description, and analysis of soil properties that are used in soil classification. Students will also develop knowledge of the physics of water and gas movement, soil strength, soil chemical properties, inorganic and organic components, nutrient cycles and soil acidity in an agricultural context. At the end of this unit students will become familiar with the factors that determine a soil's composition and behaviour, and will have an understanding of the most important soil physical and chemical properties. Students will develop communication skills through essay, report and practical exercises. The final report and laboratory exercise questions are designed to develop team work and collaborative efforts.

#### Textbooks

Campbell, K.O. & Bowyer, J.W. (eds) (1988). The Scientific Basis of Modern Agriculture. Sydney University Press.  
White, R.E. (2006). Principles and Practice of Soil Science: the Soil as a Natural Resource. 4th ed., Blackwell Science, Oxford.  
Charman, P.E.V. & Murphy, B.W. (2000). Soils: Their properties and management. 2nd ed. Oxford University Press, Melbourne.

### AGEN2005

#### Plant Systems Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant (Coordinator), Dr Thomas Buckley **Session:** Semester 2 **Classes:** 3x1-hr lectures/tutorials per week plus 1 x 2 day field trip **Prerequisites:** AGEN2001 or BIOL2023 or BIOL2923 **Assessment:** 1x 2hr final exam (50%), 1000w essay (30%), 1x practical report (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study will provide students with an understanding of the plant metabolic network, its regulation and how metabolic control is integral to an ability to adapt to environmental change. It is a core unit for students enrolled in the Bachelor of Science in Agriculture and Bachelor of Environmental Systems. From the perspective of energy flows, this unit will outline a framework for the plant metabolic network



at the physiological, chemical and molecular levels. Students will become familiar with network complexity and its regulation through the use of the latest bioinformatics and analytical tools. Students will gain first-hand experience in the assessment of plant health and management of resource availability in both cropping and natural systems by participating in a 2-day field trip in week 11 of semester to institutes and facilities in major Australian research hubs. Information will be interpreted at a range of scales from the cellular to the whole plant, demonstrating the importance of metabolism to plants and to broader biospheric processes. At the completion of this unit, students will be able to articulate the major components of the plant metabolic network, its regulation in response to changes in resource availability and to make informed management decisions for the optimization of the productivity and resilience of Australian ecosystems.

### ENVX3001 Environmental GIS

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** Three-day field trip, (2 lec & 2 prac/wk). **Prerequisites:** AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology **Assessment:** One 15 min presentation (10%), 3500w prac report (35%), 1500w report on trip excursion (15%), 2 hr exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to impart knowledge and skills in spatial analysis and geographical information science (GISc) for decision-making in an environmental context. The lecture material will present several themes: principles of GISc, geospatial data sources and acquisition methods, processing of geospatial data and spatial statistics. Practical exercises will focus on learning geographical information systems (GIS) and how to apply them to land resource assessment, including digital terrain modelling, land-cover assessment, sub-catchment modelling, ecological applications, and soil quality assessment for decisions regarding sustainable land use and management. A 3 day field excursion during the mid-semester break will involve a day of GPS fieldwork at Arthursleigh University farm and two days in Canberra visiting various government agencies which research and maintain GIS coverages for Australia. By the end of this UoS, students should be able to: differentiate between spatial data and spatial information; source geospatial data from government and private agencies; apply conceptual models of spatial phenomena for practical decision-making in an environmental context; apply critical analysis of situations to apply the concepts of spatial analysis to solving environmental and land resource problems; communicate effectively results of GIS investigations through various means- oral, written and essay formats; and use a major GIS software package such as ArcGIS.

#### Textbooks

Burrough, P.A. and McDonnell, R.A. 1998. Principles of Geographic Information Systems. Oxford University Press: Oxford.  
Clarke, K. C. 2003. Getting Started With Geographic Information Systems. 4th Edition. Prentice Hall: Upper Saddle River, New Jersey.

### LWSC2002 Introductory Hydrology

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 2 **Classes:** Lec 2hr/wk; practical: 3hr/wk; field work: 25hr/wk (for 3 days only) **Prerequisites:** 6cp of Junior Geoscience or AGEN1002 **Assessment:** 1x 2 hr exam (50%), laboratory and practical reports (3x10%), field trip report (20%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces students to hydrology and water management in the context of Australian integrated catchment management. It particularly focuses on the water balances, rainfall runoff modeling, analysis and prediction of streamflow and environmental flows, water quality and sustainable practices in water management. Through theoretical work and case studies, the students will engage with problems related water quantity and quality in Australia and the world. The unit builds on knowledge gained in AGEN 1001 and AGEN 1002, and establishes the foundation for later units in the hydrology and water area. The unit provides one of the essential building blocks for a career related to water management and hydrology. The unit consists of two parts; the first part will involve a series of lectures, tutorials, practical exercises and case studies. The second part of the unit

consists of a field excursion to regional NSW. During the field excursions, which are aligned with the ENVX3001 unit in the AVCC week, students will engage with current water problems and engage in basic hydrometric and water quality data collection. The data will be used later to analyse catchment condition and water quantity issues.

After completion of this unit, you should be able to:

Explain the different processes in the hydrological cycle

Measure and interpret hydrometric and basic water quality data

Elucidate the processes involved in generation of streamflow from rainfall.

Distinguish the link between water quantity and water quality and its implications for water management.

Demonstrate a deeper understanding of the unique nature of Australian Hydrology

#### Textbooks

Ladson (2007) Hydrology an Australian Introduction. Oxford University press. Chapters 1 & 6, Gordon, N. D., McMahon, T. A., Finlayson, B. L., Gippel, C. J., and Nathan, R. J. (2004) Stream hydrology: an introduction for ecologists, John Wiley & Sons Inc.

And 12 credit points of elective units.

### AREC2001 Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

### GENE2002 Veterinary and Agricultural Genetics 2

**Credit points:** 6 **Teacher/Coordinator:** Prof Peter Sharp **Session:** Semester 1 **Classes:** 3 lec/wk, 3 prac/fortnightly and 1 tut/fortnightly **Prerequisites:** At least one of (BIOL1001, BIOL1002, BIOL1101, BIOL1901, BIOL1911, VETS1018) **Prohibitions:** GENE2001 **Assumed knowledge:** Knowledge of biology, chemistry and statistics from, or equivalent to that in, the 1st year Units of Study in the degrees in which this Unit is available. **Assessment:** 1x 2hr final exam (60%), 4x on-line quizzes (10%), assignment(s) (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides an introduction to the genetics and breeding of plants and animals, especially domesticated or managed "wild" species and populations. It provides an understanding for parallel and following courses. Lectures cover the basics of gene transmission and interaction, cytogenetics, molecular genetics, genomics, population and quantitative genetics, as well as the more applied aspects of plant and animal breeding and biotechnology. Practicals and tutorials emphasize, with agricultural (plant and animal), and veterinary examples, the procedures of genetic and cytogenetic analysis. Computer simulation is used to illustrate the principles of population genetics, quantitative inheritance and selection programs. The unit of study also provides exposure to current plant and animal breeding and biotechnology practices and creates awareness of ethical issues relating to these developments.

#### Textbooks

Essential Cell Biology - Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter, Edition: 4th Garland Science, Introduction to Veterinary Genetics, 3rd Edition, Frank W. Nicholas, ©2010, Wiley-Blackwell

### GEOS1001 Earth, Environment and Society

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Jody Webster, A/Prof Bill Pritchard, Prof Jonathan Aitchison, Dr Josephine Gillespie **Session:** Semester

**1 Classes:** One 2 hour lecture and one 2 hour practical per week. **Prohibitions:** ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902 **Assessment:** Exam (50%), 1500 word essay (20%), practical reports (15%), presentation (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is the gateway unit of study for Human Geography, Physical Geography, Environmental Studies and Geology. Its objective is to introduce the big questions relating to the origins and current state of the planet: climate change, environment, landscape formation, and the growth of the human population. During the semester you will be introduced to knowledge, theories and debates about how the world's physical and human systems operate. The first module investigates the system of global environmental change, specifically addressing climate variability and human impacts on the natural environment. The second module presents Earth as an evolving and dynamic planet, investigating how changes take place, the rate at which they occur and how they have the potential to dramatically affect the way we live. Finally, the third module, focuses on human-induced challenges to Earth's future. This part of the unit critically analyses the relationships between people and their environments, with central consideration to debates on population change, resource use and the policy contexts of climate change mitigation and adaptation.

### AREC2002

#### Commodity Market and Price Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 1x50min Mid-semester Test (20%), 1xGroup Assignment (1000wd equiv) (20%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AGRO3004

#### Managing Agro-Ecosystems

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Brett Whelan (Coordinator), Dr Daniel Tan, Dr Lachlan Ingram, Prof. Michael D'Acchio. **Session:** Semester 2 **Classes:** 1x 2hr lecture/wk; 1x 2hr tutorial/practical each week. Half-day field trips during weeks 3, 9, 10, 11 (no lecture or tutorial those weeks). **Prerequisites:** (BIOL2023 or BIOL2923 or PLNT2003 or AGEN 2001) and SOIL2003. **Assessment:** 3x quizzes (30%), 1 x Viva Voce (30%), 1x 2hr exam (40%). **Practical field work:** Half-day field trips during weeks 3, 9, 10, 11 **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide a solid introductory understanding of the biology and management of cropping systems, with a focus on major Australian broad acre crops. The course examines a typical crop cycle, with an emphasis on cereals, especially wheat. An overview of the main crops grown in Australia is presented. The relationship between crop growth and soil and aerial environments is discussed, and the importance of water and water-use efficiency is highlighted. The physiology of crops--including germination, photosynthesis, vegetative and reproductive growth and development, transpiration, photosynthate partitioning, and mineral nutrient acquisition and use--is studied as the basis of crop yield and production. Biological processes associated with seed (grain) development are described. Weed management, pasture management, and precision agriculture are discussed in theoretical and practical terms, and an introduction to crop adaptation and breeding is presented. Successful students will attain the ability to appreciate and analyse some of the most important limitations to crop yield and production in Australia and how those limitations can be minimized or overcome through science-based planning and management practices.

#### Textbooks

Reference Books;

Pratley, J. (ed) (2003) Principles of Field Crop Production. 4th Edition, Oxford Univ. Press, Melbourne.

Connor DJ, Loomis RS, Cassman KG (2011) Crop Ecology: Productivity and Management in Agricultural Systems, 2nd Ed. Cambridge Univ Press, Cambridge.

Marschner, P. (ed) (2012) Mineral Nutrition of Higher Plants. 3rd Edition, Academic Press, London.

### ENTO2001

#### Introductory Entomology

**Credit points:** 6 **Teacher/Coordinator:** Dr Tanya Latty **Session:** Semester 2 **Classes:** (2x1hour lecture, 1x3hour practical, 1x1hour insect collection)/week, commencing week 1. **Prerequisites:** 12 cp of first year biology **Prohibitions:** BIOL2917, BIOL2017 **Assessment:** 1 x 2hr exam (50%), lab quizzes and manual (20%), 1 x insect collection (30%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

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: 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.

### MICR2024

#### Microbes in the Environment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** 2 lec, 3h prac/wk **Prerequisites:** 12 cp of first year Biology **Prohibitions:** MICR2021, MICR2022, MICR2921, MICR2922 **Assessment:** 1 x 2hr exam (60%), 4 x quizzes (15%), lab skills assessment (5%) and 1 x lab project report (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

Willey et al. 2011. Prescott/Harley/Klein's Microbiology 8th ed. McGraw-Hill

### BIOL2024

#### Ecology and Conservation

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Peter Banks **Session:** Semester 2 **Classes:** Two lectures and one 3-hour practical per week. **Prerequisites:** 12cp Junior BIOL; or 6cp Junior BIOL and (MBLG1001 or MBLG1901). **Prohibitions:** BIOL2924 **Assumed knowledge:** BIOL1002 or BIOL1902 **Assessment:** Practical reports/presentations (50%), one 2-hour exam (50%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study examines the ecological principles driving the major ecosystems of the world and ecological processes behind the world's major conservation issues. It aims to develop in students the core foundations for an understanding of Ecology and its application in conservation. Lectures will focus on the ecology of the major terrestrial and marine biomes of the world. Application of ecological theory and methods to practical conservation problems will be integrated throughout the unit of study. Practical sessions will provide hands-on experience in ecological sampling and data handling to understand the ecology of marine and terrestrial environments, as well as

ecological simulations to understand processes. This unit of study provides a suitable foundation for senior biology units of study.

*Textbooks*

Recommended: Essentials of Ecology 3rd edition (2008). Townsend, CR, Begon, M, Harper, JL. John Wiley & Sons  
Recommended: The Ecological World View (2010) Krebs, CJ; CSIRO Publishing

### AREC2003

#### Concepts in Enviro and Resource Economics

**Credit points:** 6 **Session:** Semester 1 **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 1x50min Mid-semester Test (20%), 2x1000wd Assignments (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the concepts in microeconomics to provide insights into efficient and sustainable resource management. The primary focus of this unit 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 introductory material on economic valuation of environmental assets and benefit cost analysis is included.

### SOIL2004

#### The Soil Resource

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Stephen Cattle (Coordinator), Prof Alex McBratney, A/Prof Balwant Singh **Session:** Semester 2 **Classes:** (2x1 hr lec, 1x2 hr pracs)/wk, 25 hr (5 days) fieldtrip in the week immediately preceding the start of Semester 2 **Assessment:** Fieldtrip participation (5%), soil survey mapping report (30%), laboratory report and poster presentation (25%), three group tutorials (20%), viva voce exam (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will familiarise students with the description and mapping of soil types in the Australian landscape, with common analytical methods for soil and with the various forms of degradation that may alter the quality and function of soil. It is an applied soil science unit that builds on the fundamental soil science concepts learned in the SOIL2003 unit. The first practical component of the unit, a five-day soil survey, will give students experience in soil description and classification in the field, and soil samples collected during this survey will be subsequently analysed for a variety of attributes by the students in laboratory practicals. In the lecture series, topics including soil type distribution, soil quality, soil function, soil fertility and soil degradation will be discussed and linked to practical sessions. By the end of this unit, students will be able to construct maps of soil properties and soil type distribution, describe primary soil functions, soil attributes and types of soil degradation in an agricultural context, and be able to recognize and communicate the ability of a soil profile to sustain plant growth. Students will gain research and inquiry skills by collecting, analysing and interpreting soil survey data, and will gain communication skills by having to prepare and present a poster.

## Year 3

Year 3 will have the following structure: 24 credit points of core units including:

### SOIL3009

#### Contemporary Field and Lab Soil Science

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (Coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, A/Prof Budiman Minasny, Dr Damien Field **Session:** Semester 1 **Classes:** (2 lec, 2 prac or 1 lec, 3 prac )/wk, 6-day field excursion north-western NSW commencing 15 days prior to beginning of Semester 1 **Prerequisites:** SOIL2003 **Assessment:** 1 x viva voce exam (40%), soil physics written assessments (20%), soil chemistry written assessments (20%), soil judging (12%), pedology written assessments (8%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a theoretical and empirical unit providing specialised training in three important areas of contemporary soil science, namely pedology, soil chemistry and soil physics. The key concepts of these sub-disciplines will be outlined and strengthened by hands-on training in essential field and laboratory techniques. All of this is synthesized by placing it in the context of soil distribution and use in North-Western New South Wales. The unit is motivated by the teaching team's

research in this locale. It builds on students' existing soil science knowledge gained in SOIL2003. After completion of the unit, students should be able to articulate the advantages and disadvantages of current field & laboratory techniques for gathering necessary soil information, and simultaneously recognise key concepts and principles that guide contemporary thought in soil science. Students will be able to synthesise soil information from a multiplicity of sources and have an appreciation of the cutting edge areas of soil management and research. By investigating the contemporary nature of key concepts, students will develop their skills in research and inquiry. Students will develop their communication skills through report writing and will also articulate an openness to new ways of thinking which augments intellectual autonomy. Teamwork and collaborative efforts are encouraged in this unit.

*Textbooks*

Textbooks: D. Hillel. 2004. Introduction to Environmental Soil Physics. Elsevier Science, San Diego, CA, USA, R. Schaetzl and S. Anderson 2005. Soils: Genesis and Geomorphology. Cambridge University Press, New York, NY, USA, D.L. Sparks 2003 Environmental Soil Chemistry (2nd edn). Academic Press, San Diego, CA, USA

### LWSC3007

#### Advanced Hydrology and Modelling

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 1 **Classes:** 2 hr lectures/wk, 3 hr practical/wk **Prerequisites:** LWSC2002 **Assessment:** 4 x Practical assessments and reports (50%), take-home exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to allow students to examine advanced hydrological modeling and sampling designs focusing on catchment level responses and uncertainty. This unit builds on the theoretical knowledge gained in LWSC2002. Students will learn how to develop their own simulation model of catchment hydrological processes in R and using SWAT and review the possibilities and impossibilities of using simulation models for catchment management. Students will further investigate optimal sampling techniques for water quality data based on understanding the variability in hydrological responses. At the end of this unit, students will be able to calibrate and evaluate a catchment model, articulate advantages and disadvantages of using simulation models for catchment management, justify the choice of a simulation model for a particular catchment management problem, identify issues in relation to uncertainty in water quality and quantity, develop an optimal water quality sampling scheme. The students will gain research and inquiry skills through research based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation and personal and intellectual autonomy through working in groups.

*Textbooks*

Textbooks (Recommended reading)  
Beven, K.J. Rainfall-Runoff modeling, The Primer, John Wiley and Sons, Chichester, 2001

### ENSY3001

#### Biosphere-Atmosphere Interactions

**Credit points:** 6 **Teacher/Coordinator:** Dr Margaret Barbour **Session:** Semester 2 **Classes:** 2h lecture/discussion per week, 5 x 5h practicals/fieldtrips alternate weeks **Prerequisites:** AGEN2005 or BIOL2023 or BIOL2923 **Assessment:** 1x oral presentation (15%), 1x 2000w essay (20%), 1x practical report (30%), 1x model and report (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to allow students to examine the exchange of carbon, water, energy and greenhouse gases between the terrestrial biosphere and the atmosphere, with particular focus on environmental and land use change. It is a core unit for students in BEnvSys and builds on knowledge gained in SOIL2003, LWSC2002 and AGEN2001. Students will develop an integrative understanding of the physical, chemical and biological processes that govern interactions between terrestrial landscapes and the atmosphere, drawing on examples from both managed and natural ecosystems. Students will apply state-of-the-art measurement techniques to quantify and interpret regulation of exchange processes, and develop a simple environmentally-driven, process-based model of exchange. At the

end of this unit, students will be able to 1) evaluate the effects of land use change and environmental change on processes regulating the exchange of greenhouse gases between the biosphere and atmosphere; 2) perform a controlled-environment experiment to demonstrate links between carbon and water cycles, then analyse and interpret results; 3) design and implement a process-based model of exchange of carbon, water and energy between the biosphere and atmosphere to predict ecosystem response to environmental change by integrating environmental data, mathematical models and model parameters. The students will gain research and inquiry skills through a practical group project, communication skills through workshops, group discussions and an oral presentation, and information literacy through web-based literature searches and computer model development.

#### Textbooks

Students will be drawing on current research literature for content.

### AGCH3033

#### Environmental Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr. Feike Dijkstra (Coordinator); Dr. Claudia Keitel; Dr. Malcolm Possella/Prof. Balwant Singh **Session:** Semester 2 **Classes:** 2 lec & 3hr prac/wk **Prerequisites:** 12 cp of Junior Chemistry **Prohibitions:** CHEM2404 **Assumed knowledge:** SOIL2003, LWSC2002 **Assessment:** Research Proposal (40%), Prac Report (40%), Presentation (15%), Class Participation (5%) **Practical field work:** Practical reports and essay writing. Preparation reading for practical or field trips, preparation for group presentation, exam preparation. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This course provides basic concepts in environmental chemistry underpinning many of the environmental problems humans are faced with, with a focus on agricultural and natural ecosystems.

AGCH3033 is a core unit for the BEnvSys degree and an elective unit suitable for the BScAgr, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry and biology.

Sources, reactions and fate of chemical species will be investigated in air, water, soil and biota. Case studies about human impacts on the environment will be integrated in the lectures, laboratory classes and field trip.

At the end students have an understanding of chemical concepts that are at the root of many environmental problems in agricultural and natural ecosystems. This unit will provide students with tools to identify and assess the chemistry behind environmental problems and will guide students in developing methods to manage these problems.

Students will enhance their skills in problem definition, assessing sources of information, team-work and effectively communicating environmental issues from a chemical perspective through laboratory reports and oral presentation.

#### Textbooks

Reference Books: Andrews et al. 2004. An Introduction to Environmental Chemistry.  
Van Loon and Duffy. 2010. Environmental Chemistry: A Global Perspective.  
Hanrahan. 2011. Key Concepts in Environmental Chemistry.

And 24 credit points from either Table AS2 or Table NTS2.

### Table AS2 Agricultural Systems Stream

Two of:

#### AFNR3001

##### Agro-ecosystems in Developing Countries

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 1x18 days fieldtrip before start of semester 1 **Assessment:** Project Proposal (10%), Project Report (60%), Project Presentation (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit provides students with a direct contact with the agricultural reality of a developing country through a fieldtrip. Active learning in the field through contacts with farmers, public servants, cooperatives, private firms and NGOs should then motivate a critical reflection on the constraints to agricultural development in these environments.

The fieldtrip will be organized around central themes (for example, technology adoption, sustainable use of resources, access to credit, land use change) that will be introduced in a short series of seminars (held on main campus ahead of the departure and intended to provide a first introduction to some of the questions that are expected to be addressed in the field) and will constitute the focus of group work once back to main campus.

Although there are no formal prerequisites, the unit is directed to students that have completed most of the second year units in their degrees.

N.B. Department permission required for enrolment. Please note that, in practice, this unit will run prior to the start of semester 1 with all classes and the fieldtrip being scheduled during that period.

### AGRO4003

#### Crop and Pasture Agronomy

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan(Coordinator), A/Prof Brett Whelan, Dr Rosalind Deaker, Dr Lachlan Ingram **Session:** Semester 1 **Classes:** 12x2 h lectures/weeks 1-13; 4x2 h practicals/weeks 8, 11-13; Field excursions: week preceding start of semester and 6 (subject to weather) **Prerequisites:** AGRO3004 **Assessment:** 2 Data Analysis Projects (2x50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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. The unit also covers precision agriculture, legume science, rangeland science and crop protection. This unit includes a one-week excursion to cotton growing areas in northern NSW and Qld, specialist intensive instruction provided by the Cotton RDC, a three day excursion to the Cooma rangelands and a series of workshops, tutorials that provides analysis and synthesis of the major farming systems in this industry. Pasture production is also considered in the context of farming systems.

### AGRO4004

#### Sustainable Farming Systems

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** Negotiated practicals and workshops (63h) **Prerequisites:** AGRO3004 **Assessment:** Final Exam (50%), 3 Assignments (3x10%), Data Analysis Project (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to provide students with training in the professional skills required to practice agronomy. The unit principally builds on theoretical and applied knowledge gained in third year agronomy (AGRO3004). In this unit students will integrate their knowledge of plant physiology, soil science, experimental design, and biometry to address applied problems in agronomy, namely the issue of sustainability. Students will develop their ability to establish conclusions towards making recommendations for long term sustainability of crop and pasture systems. By implementing and managing a major field and/or glasshouse experiment(s) students will develop their research and inquiry skills. Team work is strongly encouraged in this unit and the integration and reporting of research findings will facilitate critical thinking and development of written communication skills. After completing this unit, students should be able to confidently design and manage a glasshouse/field experiment, and interpret and communicate their findings, by integrating knowledge from across disciplinary boundaries.

### ENVI3111

#### Environmental Law and Ethics

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** 12 credit points of intermediate units of study **Prohibitions:** ENVI3911 **Assessment:** Exam (40%) Essays (40%, 20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Shared Teaching Arrangements: This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1)

environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). Environmental regulation and governance plays an important role in regulating human impacts on the environment. The law and governance part of this unit provides an introduction and overview to environmental regulation. We investigate key environmental issues through an examination of legal policies, legislation and case law at a variety of scales (international, national and state/local). This unit also highlights the ways in which environmental law and governance is increasingly interconnected to other areas of environmental studies. 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.

### ENVX3002

#### Statistics in the Natural Sciences

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), Dr Floris Van Ogtrop (Coordinator). A/Prof Peter Thompson **Session:** Semester 1 **Classes:** 2x2 hr workshop/wk, 1x3 hr computer practical/wk **Prerequisites:** ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922 **Assessment:** 1 Å Exam during the Exam period (50%), 5 Å AssessmentTasks (5x10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the analysis of data they may face in their future careers, in particular data that are not well behaved, they may be non-normal, there may be missing observations or they may be correlated in space and time. In the first part, students will learn how to analyse and design experiments based on the general linear model. In the second part, they will learn about the generalisation of the general linear model to accommodate non-normal data with a particular emphasis on the binomial and poisson distributions, in addition to modelling non-linear relationships. In the third part linear mixed models will be introduced which provide the means to analyse datasets that do not meet the assumptions of independent and equal errors, for example data that is correlated in space and time. At the end of this unit, students will have learnt a range of advanced statistical methods and be equipped to apply this knowledge to analyse data that they may encounter in their future studies and careers.

#### Textbooks

##### Recommended readings:

-Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton).  
-Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

### AREC2004

#### Benefit-Cost Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 1x200wd Oral Presentation (5%), 1xGroup-work Essay (1000wd equiv) (20%), 1x50min Mid-semester Test (25%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Foundational concepts in welfare economics, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures, are analysed in detail and applied to project evaluation and policy assessment. Procedures of conducting a benefit-cost analysis are presented, and tools of non-market valuation for public goods and 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.

and two of

### ENTO4003

#### Integrated Pest Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Tanya Latty **Session:** Semester 2 **Classes:** 1x2hr lecture, 1x3hr practical/week, commencing week 1.

**Prerequisites:** ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921. **Assessment:** 1x2hr exam (40%), 1 x case study (20%), 1 x group assignment (20%), 1 x insect collection (20%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The focus of this unit is the development and adoption of integrated pest management (IPM) within Australian agriculture. It builds on the knowledge gained in second year entomology (BScAgr and BHortSc) and is a core unit for the entomology specialty (BScAgr). Applied entomology deals with the control of insect pests and the use of beneficial insects. The biology of major pest (herbivores and disease vectors) and beneficial (predators, parasitoids, pollinators) insect groups is covered in depth. Students will compare the advantages and disadvantages of different pest control strategies and evaluate the importance of insect ecology, control methods and socio-economic factors to successful adoption of integrated pest management. Field trips will demonstrate the practical application of IPM concepts presented in lectures. Research, inquiry and information literacy skills will be improved through critical review of current literature and compilation of a case study. Students will practice their communication skills and develop personal and intellectual autonomy through a group project, in-class discussion and a self-directed insect collection.

#### Textbooks

Required: Bailey, PT (Ed.) 2007. Pests of field crops and pastures. CSIRO Publishing, Collingwood, Vic. 520 pp.  
Recommended: Llewellyn, R. (Ed.) 2002. The Good Bug Book. 2nd edition, Australasian Biological Control, Richmond, NSW. 110 pp.  
Pedigo, LP and Rice, ME. 2009. Entomology and Pest Management, 6th edn. Pearson Prentice Hall, 784 pp.

### ENVX4001

#### GIS, Remote Sensing and Land Management

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** 2x1-hr lectures/week weeks 1-6, 1x1 project weeks 7-11, 1xÅ hour presentation scheduled for weeks 12 and 13, 1x3-hr practical/week weeks 1-6. **Prerequisites:** ENVX3001 or GEOS2111 or GEOS2911 **Assessment:** 1x Å hour presentation (5%) weeks 12 and 13, Practical work reports (50%) weekly weeks 1-6, 1x2500w project report (45%) due by week 13. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

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 actualize it using integrated GIS and RS techniques.

#### Textbooks

Reference Textbook: Jesen J. R. 2006. Remote sensing of the environment: an earth resource perspective. 2nd ed. Pearson Prentice Hall Upper Saddle, New Jersey.  
Rees W.G. 2001. Physical principles of remote sensing. 2nd ed. Cambridge University Press, Cambridge, United Kingdom.

### SOIL3010

#### The Soil at Work

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, Dr Damien Field, Prof David Guest, A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** Problem-based unit: each student completes 1 problem as part of a team, involving multiple team meetings; 4 x 4 hr soil biology workshops **Prerequisites:** SOIL2003 or SOIL2004 **Assessment:** Introduction to the problem group presentation (10%); Status of the problem group report (10%); How to tackle the problem seminar (20%) - team seminars, before fieldwork, analyses done; Results seminar (20%) - team seminars; Final group report (25%); Activities diary for group (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a problem-based applied soil science unit addressing the physical, chemical and biological components of soil function. It is

designed to allow students to identify soil-related problems in the real-world and by working in a group and with an end-user, to suggest short and long-term solutions to problems such as fertility, resilience, carbon management, structural decline, acidification, salinisation and contamination. The soil biology workshops will allow student groups to incorporate relevant measurements of soil biota in their experiments. Students will gain some understanding of the concept of sustainability, and will be able to identify the causes of problems by reference to the literature, discussion with landusers and by the design and execution of key experiments and surveys. Students will gain a focused knowledge of the key soil drivers to environmental problems and will have some understanding on the constraints surrounding potential solutions. By designing and administering strategies to tackle real-world soil issues, students will develop their research and inquiry skills and enhance their intellectual autonomy. By producing reports and seminars that enables understanding by an end-user, students will improve the breadth of their communication skills. This is a core unit for students majoring or specialising in soil science and an elective unit for those wishing to gain an understanding of environmental problem-solving. It utilises and reinforces soil-science knowledge gained in SOIL2003 and SOIL2004, as well as generic problem-solving skills gained during the degree program.

#### Textbooks

Reference book: I.W.Heathcote 1997. Environmental Problem Solving: A Case Study Approach. McGraw-Hill, New York, NY, USA.

### AREC3004

#### Economics of Water and Bio-Resources

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester Test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit develops knowledge and skills in natural resource economics built on previously gained economics training. The economics of dynamic natural systems is studied through application of advanced modelling approaches. Particular emphasis is given to the economic mechanisms for managing water and biological resources including property rights, water allocation and water markets. Key policy instruments (taxes, quotas, standards) are analysed. Institutional and policy aspects will also be considered via analysis of water policy reform in Australia and elsewhere.

### PLNT3001

#### Plant, Cell and Environment

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones **Session:** Semester 2 **Classes:** Workshops and discussions 2 hr/wk; laboratories: alternate weeks 30 hr total (6 pracs; 5 hr each) **Prerequisites:** 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics **Prohibitions:** PLNT3901 **Assessment:** 1x 2hr exam (40%), 2x reports (30%), 1x essay (15%), 1x group presentation (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study of comprises lectures/workshops and practical sessions that will explore how plants function and interact with their environment. Classes will examine the mechanisms plants have evolved to adapt and acclimate to varied and variable environments. We will address how plants adapt to their light environment and how they respond to common abiotic stresses (e.g. drought, salinity) and biotic stresses (herbivory) and how they interact with other organisms. Emphasis will be placed on integration of plant responses from molecular through to whole plant scales. You will need to draw on knowledge from intermediate units of study and explore the published literature to successfully integrate information from areas unfamiliar to yourself. The purpose of this Unit of Study is to develop an understanding of current directions in Plant Science at an advanced level. When you have successfully completed this unit of study, you should be able to: be familiar with modern approaches of physiology, biophysics and molecular biology in the study of plant function; understand how domains of knowledge interact to describe plant function; understand how plants function in stressful environments;

carry out a small research project; draft a manuscript for publication in a peer-reviewed journal.

#### Textbooks

Students will be drawing on the current research literature for content. A Study Guide for the unit will be available for purchase during the first week of semester from the Copy Centre at a cost to be advised.

## Table NTS2 Natural Terrestrial Systems Stream

Two of

### ENSY3002

#### Fire in Australian Ecosystems

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell **Session:** Semester 1 **Classes:** 2x1hr lectures, 1x3hr practical/wk **Prerequisites:** AGEN2005 or BIOL2023 or BIOL2923 **Assessment:** 1x 2h exam (40%), 1x 2000-2500w essay (20%), 3x practical reports (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is intended to describe fundamental scientific knowledge relating to fire behaviour and ecological and social effects of bushfire in Australian ecosystems. The student will gain a greater understanding of how fire has shaped the landscape and the people. It is an elective unit that builds on basic knowledge gained in junior-level biology and chemistry and intermediate-level plant biology and soil science subjects. Firstly, fire behaviour including the elements of weather, fuel and landscape will be explained and examined in relation to predictive modelling and climate change. Secondly, the fire response of flora, fauna, fungi and microorganisms will be described at a range of different scales and analysed against a background of current land management practices in Australia. Social aspects of bushfire will be discussed and analysed according to contemporary policies and practices. At the end of this unit, students will be able to apply fire behaviour and ecological principles for planning purposes and to integrate scientific information from a range of sources to assess fire impacts on the environment and human communities. The students will gain research, literacy and communication skills through field-based data collection, essay and report writing and oral presentations.

#### Textbooks

A reading list will be provided consisting of selected book chapters, journal articles and other publications

### ENVI3111

#### Environmental Law and Ethics

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** 12 credit points of intermediate units of study **Prohibitions:** ENVI3911 **Assessment:** Exam (40%) Essays (40%, 20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Shared Teaching Arrangements: This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). Environmental regulation and governance plays an important role in regulating human impacts on the environment. The law and governance part of this unit provides an introduction and overview to environmental regulation. We investigate key environmental issues through an examination of legal policies, legislation and case law at a variety of scales (international, national and state/local). This unit also highlights the ways in which environmental law and governance is increasingly interconnected to other areas of environmental studies. 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.

## ENVX3002

### Statistics in the Natural Sciences

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), Dr Floris Van Ogtrop (Coordinator). A/Prof Peter Thompson **Session:** Semester 1 **Classes:** 2x2 hr workshop/wk, 1x3 hr computer practical/wk **Prerequisites:** ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922 **Assessment:** 1 Å Exam during the Exam period (50%), 5 Å Assessment Tasks (5x10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the analysis of data they may face in their future careers, in particular data that are not well behaved, they may be non-normal, there may be missing observations or they may be correlated in space and time. In the first part, students will learn how to analyse and design experiments based on the general linear model. In the second part, they will learn about the generalisation of the general linear model to accommodate non-normal data with a particular emphasis on the binomial and poisson distributions, in addition to modelling non-linear relationships. In the third part linear mixed models will be introduced which provide the means to analyse datasets that do not meet the assumptions of independent and equal errors, for example data that is correlated in space and time. At the end of this unit, students will have learnt a range of advanced statistical methods and be equipped to apply this knowledge to analyse data that they may encounter in their future studies and careers.

#### Textbooks

Recommended readings:

-Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton).  
-Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

and two of

## BIOL3007

### Ecology

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Dieter Hochuli **Session:** Semester 2 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** 12 credit points of Intermediate BIOL; or 6 credit points of Intermediate BIOL and (MBLG2072 or MBLG2972). **Prohibitions:** BIOL3907 **Assessment:** One 2-hour exam, group presentations, one essay, one project report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit explores the dynamics of ecological systems, and considers the interactions between individual organisms and populations, organisms and the environment, and ecological processes. Lectures are grouped around four dominant themes: Interactions, Evolutionary Ecology, The Nature of Communities, and Conservation and Management. Emphasis is placed throughout on the importance of quantitative methods in ecology, including sound planning and experimental designs, and on the role of ecological science in the conservation, management, exploitation and control of populations. Relevant case studies and examples of ecological processes are drawn from marine, freshwater and terrestrial systems, with plants, animals, fungi and other life forms considered as required. Students will have some opportunity to undertake short term ecological projects, and to take part in discussions of important and emerging ideas in the ecological literature.

#### Textbooks

Begon M, Townsend CR, Harper JL (2005) Ecology, From individuals to ecosystems. Wiley-Blackwell.

## BIOL3009

### Terrestrial Field Ecology

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Glenda Wardle **Session:** Intensive August **Classes:** Note: One 6-day field trip held in the pre-semester break (July 20 - July 25 inclusive) and four 4-hour practical classes during weeks 1-4 of semester 2. **Prerequisites:** 12 credit points of Intermediate BIOL; or 6 credit points of Intermediate BIOL and (MBLG2072 or MBLG2972). **Prohibitions:** BIOL2009, BIOL2909, BIOL3909 **Assessment:** Discussions and quiz (10%), research project proposal and brief presentation (10%), sampling project report (20%), specimen collection (10%), research project report (50%). **Mode of delivery:** Block mode

*Note: Department permission required for enrolment. Note: This unit cannot be combined with more than one other BIOL field unit during the degree. Departmental permission is required for entry into this unit of study. Entry into*

*the unit is based on placement availability and selection is competitive based on academic performance in the pre-requisite units of study. Academic performance in any Senior BIOL units of study may also be considered. This unit is only available in EVEN numbered years (e.g. 2014, 2016...), but students are offered alternative Senior field units in ODD numbered years.*

This field course provides practical experience in terrestrial ecology suited to a broad range of careers in ecology, environmental consulting and wildlife management. Students learn a broad range of ecological sampling techniques and develop a detailed understanding of the logical requirements necessary for manipulative ecological field experiments. The field work incorporates survey techniques for plants, small mammals and invertebrates and thus provides a good background for ecological consulting work. Students attend a week-long field course and participate in a large-scale research project as well as conducting their own research project. Invited experts contribute to the lectures and discussions on issues relating to the ecology, conservation and management of Australia's terrestrial flora and fauna.

## ENSY3003

### Forest Ecosystem Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant **Session:** Semester 2 **Classes:** 2 lectures/week, 1 tut/fortnight, 1 field excursion (2 days) in week 6 of semester **Prerequisites:** Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage. **Assessment:** One 2hr exam (50%), one 2000w essay (40%), one oral presentation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study enables students to understand the management and conservation of trees and forests in a changing climate. It is an elective unit for students enrolled in advanced topics for the Bachelor of Environmental Systems course program. Beginning with an introduction to the unique chemical, physical and ecological characteristics of trees, this unit then focuses on policy development and management prescriptions driven by fundamental processes of ecosystem function. At the end of this unit students will be able to articulate critical evaluations of scientific and policy based documents in relation to research and management of trees in the Australian landscape. Students will be given the opportunity to gain firsthand knowledge of Australian forest management by participating in a 2 day field excursion (in week 6 of semester) combined with industry, government, research and conservation groups. At the end of this unit, students will be able to articulate strengths, weaknesses and improvements to the management of Australian forests for the purposes of production, conservation and climate change adaptation. Students will gain an intricate knowledge of tree function and be able to relate this understanding to the management of trees and forests in a changing environment. Students will develop skills to enable effective communication with industry, conservation and governmental groups.

## ENVI3112

### Environmental Assessment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus **Session:** Semester 2 **Classes:** One 2-hour lecture per week and one 2-hour tutorial per week. **Prerequisites:** (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units **Prohibitions:** ENVI3912, ENVI3004, ENVI3002 **Assessment:** Literature review, individual report, presentation (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study focuses on environmental impact assessment as part of environmental planning. It seeks to establish a critical understanding of environmental planning and the tools available to improve environmental outcomes. The unit of study addresses the theory and practice of environmental impact statements (EIS) and environmental impact assessment processes (EIA) from scientific, economic, social and cultural value perspectives. Emphasis is placed on gaining skills in group work and 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.

**PLNT3001****Plant, Cell and Environment***This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones **Session:** Semester 2 **Classes:** Workshops and discussions 2 hr/wk; laboratories: alternate weeks 30 hr total (6 pracs; 5 hr each) **Prerequisites:** 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics **Prohibitions:** PLNT3901 **Assessment:** 1x 2hr exam (40%), 2x reports (30%), 1x essay (15%), 1x group presentation (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study of comprises lectures/workshops and practical sessions that will explore how plants function and interact with their environment. Classes will examine the mechanisms plants have evolved to adapt and acclimate to varied and variable environments. We will address how plants adapt to their light environment and how they respond to common abiotic stresses (e.g. drought, salinity) and biotic stresses (herbivory) and how they interact with other organisms. Emphasis will be placed on integration of plant responses from molecular through to whole plant scales. You will need to draw on knowledge from intermediate units of study and explore the published literature to successfully integrate information from areas unfamiliar to yourself. The purpose of this Unit of Study is to develop an understanding of current directions in Plant Science at an advanced level. When you have successfully completed this unit of study, you should be able to: be familiar with modern approaches of physiology, biophysics and molecular biology in the study of plant function; understand how domains of knowledge interact to describe plant function; understand how plants function in stressful environments; carry out a small research project; draft a manuscript for publication in a peer-reviewed journal.

*Textbooks*

Students will be drawing on the current research literature for content. A Study Guide for the unit will be available for purchase during the first week of semester from the Copy Centre at a cost to be advised.

## Honours

The Honours Year will have the following 48 credit point structure:

**AFNR4101****Research Project A**

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 1 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** 144 credit points of level 1000-3000 units of study **Assessment:** Research proposal, literature review. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit aims to develop a student's ability to undertake a major research project in an area of specialization. The unit builds on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. This unit is a corequisite with AFNR4102 and each student will work with an academic supervisor in an area of specialization and develop a well defined research project to be executed. The research project is undertaken to advance the students ability to build well-developed research skills, a strong analytical capacity, and the ability to provide high quality research results demonstrating a sound grasp of the research question. Working with an academic supervisor students will develop their ability to define a research project including the producing of testable hypotheses, identifying existing knowledge from reviewing the literature and the design and execution of a research strategy towards solving the research question. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the development of experimental programs. Students will improve their written and planning skills by composing a research project proposal and the writing of a comprehensive literature review.

**ENSY4001****Scientific Method and Communication**

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 1 Lec/wk, 1 (3hr) Workshop/wk **Corequisites:** AFNR4101 **Prohibitions:** AFNR5904, AFNR5901 **Assessment:** Submission of 4 written

Workshop reports (Deconstructing a research proposal, Critique of Scientific and Popular Article, From research to publication, Scientific Poster (Draft)) (4x25%) **Practical field work:** 60 hrs preparation for workshops and revision. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study aims to develop a student's ideas about the nature of scientific research, and how it is achieved and the findings communicated. Through attending lectures and workshops students will consider what research is and how it is directed through knowing the scientific method, achieved through good experimental design, and interpreted using critical evaluation. Students will be required to deconstruct and evaluate their research proposals, know what it means to write for the sciences, and how research findings are communicated to the scientific community and wider public. This unit will develop skills in reading scientific literature and the need for a well defined research question and suitable research framework. Students will enhance their intellectual and personal autonomy through evaluating and preparing critiques of research writing and communication.

*Textbooks*

Bjorn Gustavii, HOW TO WRITE AND ILLUSTRATE A SCIENTIFIC PAPER, 2008, Cambridge

**AFNR4102****Research Project B**

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 2 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** AFNR4101 **Assessment:** Oral presentation, research paper, poster. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is a continuation of the major research project initiated in AFNR4101 and continues to build on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. Working with their academic supervisor in the area of specialization the student will continue to pursue the defined research project towards presenting final results and conclusions. The research results are presented in a format of a research paper as submitted to a research journal. The research paper and corrected literature review is combined and presented together as a thesis. Students will continue to build their research skills, develop strong analytical capacity, demonstrate a sound grasp of the topic, and an ability to interpret results in a broad framework. Working with an academic supervisor students will develop their ability to produce results of high quality, draw reliable conclusions and identify future areas avenues of research. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the managing the research program. Students will improve their communication skills through oral presentation of their research findings, the production of a poster detailing their research findings and the writing of a research paper.

And 18 credit points of Year 3 Bachelor of Environmental Systems core units, and elective units from either Table ATS2 or Table NTS2 which have not been previously completed by the candidate and or any other Level 4XXX unit offered by the Faculty subject to Department permission.





# Bachelor of Food and Agribusiness

## Course rules

### Bachelor of Food and Agribusiness

### Bachelor of Food and Agribusiness (Honours)

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

## Course resolutions

### 1 Course codes

Code	Course title
BUFDAGBU-01	Bachelor of Food and Agribusiness

### 2 Attendance pattern

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

### 3 Admission to candidature

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

### 4 Requirements for award

- (1) The units of study that may be taken for the course are set out in table of units of study for the Bachelor of Food and Agribusiness. The Dean may approve some variation in units of study required for the degree for exceptionally talented students.
- (2) To qualify for the award of the pass degree, a candidate must successfully complete 192 credit points, including:
  - (a) 156 credit points of core units of study including an internship (12 credit points) and a research project (24 credit points); and
  - (b) 36 credit points of electives from Year 3 or Year 4 units of study.
- (3) A maximum of 6 credit points in Year 4 may be taken from units outside of the Table (including from other faculties), to count as Year 4 electives.
- (4) To qualify for the award of international specialisation, a candidate must complete a minimum of 48 credit points in approved units of study for two semesters at an approved university. Once a student has applied for and been accepted for International Exchange, the student may then apply for the International Specialisation. For detailed information on the application procedure, requirements and approved universities, please see the Faculty website: [http://sydney.edu.au/agriculture/current\\_students](http://sydney.edu.au/agriculture/current_students)

### 5 Majors

- (1) It is a requirement of the course that all students complete the following majors:
  - (a) Agribusiness; and
  - (b) Food Science

- (2) Outside of the internship (12 credit points) and the research project (24 credit points), students will complete 66 credit points of core units of study to achieve a major in Agribusiness and 66 credit points of core units of study to achieve a major in Food Science.

### 6 Requirements for the Honours degree

- (1) All candidates for the degree are considered for the award of the degree with honours. Honours is awarded to meritorious candidates.
- (2) To qualify for the award of honours a candidate must have:
  - (a) Achieved a weighted average mark (WAM) of 65 for all 2000 and 3000 level units of study completed in years 2 and 3 of the degree except those 3000 level units of study taken to fulfil part of the requirements for year 4.
  - (b) Achieved a WAM in year 4 of 65 for all 3000, 4000 and 5000 units of study completed to fulfil the requirements for year 4. The year 4 WAM is calculated from 48 credit points and includes 24 credit points of research project units as well as 12 credit points from the internship. The remaining 12 credit points will be made up of 3000, 4000 or 5000 level units selected as electives.
- (3) The overall honours mark shall be the average of the year 2/3 WAM and the year 4 WAM.

Honours is awarded in the following classes:

Class of honours	Overall honours mark	Minimum WAM Years 2/3
First Class	mark $\geq$ 75	65
Second Class, Division 1	70 $\leq$ mark $<$ 75	65
Second Class, Division 2	65 $\leq$ mark $<$ 70	65
Honours not awarded	mark $<$ 65	n/a

### (7) Award of the degree

- (1) The Bachelor of Food and Agribusiness is awarded as either Pass or Honours. The honours degree is awarded in classes ranging from First Class to Second Class according to the conditions specified in Resolution 6.3
- (2) Candidates for the award of the Honours degree who do not meet the requirements, but who have otherwise satisfied the course requirements, will be awarded the pass degree.





# Bachelor of Food and Agribusiness

## Units of study table

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
All students complete an Agribusiness major and a Food Science major.			
<b>Year 1</b>			
Year 1 will have a minimum of 48 credit points comprised of:			
<b>BIOL1001 Concepts in Biology</b>	6	<b>A</b> HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). <b>N</b> BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911	Semester 1 Summer Main
or			
<b>BIOL1911 Concepts in Biology (Advanced)</b>	6	<b>P</b> 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit <b>N</b> BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>BUSS1001 Understanding Business</b>	6	<b>N</b> ECOF1003 <i>This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).</i>	Semester 1 Semester 2
BUSS1001 is scheduled for Semester 1			
<b>CHEM1001 Fundamentals of Chemistry 1A</b>	6	<b>A</b> 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. <b>N</b> CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903	Semester 1
or			
<b>CHEM1101 Chemistry 1A</b>	6	<b>A</b> HSC Chemistry and Mathematics <b>N</b> CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901	Semester 1 Semester 2 Summer Main
or			
<b>CHEM1901 Chemistry 1A (Advanced)</b>	6	<b>P</b> HSC Chemistry result of 80 or more <b>N</b> CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>ENVX1002 Introduction to Statistical Methods</b>	6	<b>C</b> Prohibitions: ENVX1001	Semester 1
<b>AGEC1006 Economic Environment of Agriculture</b>	6	<b>A</b> HSC Mathematics <b>N</b> AGEC1004, AGEC1003	Semester 2
<b>AGEN1004 Applied Biology for Ag and Environment</b>	6	<b>N</b> BIOL1002	Semester 2
<b>AGEN1006 Biological Chemistry</b>	6	<b>P</b> CHEM1001 or CHEM1101 or CHEM1901 <b>N</b> CHEM1002	Semester 2
<b>BUSS1030 Accounting, Business and Society</b>	6	<b>N</b> ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 <i>This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.</i>	Semester 1 Semester 2
BUSS1030 is scheduled for semester 2			
<b>Year 2</b>			
Year 2 will have a minimum of 48 credit points comprised of:			
<b>AGEC2102 Agribusiness Marketing</b>	6	<b>P</b> AGEC1006 or AGEC1102 or RSEC1031	Semester 1
<b>AGEN2001 Plant Function</b>	6	<b>P</b> (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry	Semester 1
<b>AGEN2002 Fresh Produce Management</b>	6	<b>A</b> HSC Maths and Biology <b>P</b> 12 credit points of junior Biology and 12 credit points of junior Chemistry	Semester 1
<b>BUSS1002 The Business Environment</b>	6	<b>P</b> ECOF1003 or BUSS1001 <b>N</b> ECOF1004, CISS2001 <i>This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).</i>	Semester 1 Semester 2
BUSS1002 is scheduled for Semester 1			
<b>AGEN2003 Innovation in Food Supply Chains</b>	6	<b>N</b> AGEN1005	Semester 2
<b>AGEN2006 Animal Production and Management</b>	6	<b>A</b> HSC Maths (2 unit) and Biology <b>P</b> 12 credit points of junior Biology and 12 credit points of junior Chemistry	Semester 2
<b>MICR2024 Microbes in the Environment</b>	6	<b>P</b> 12 cp of first year Biology <b>N</b> MICR2021, MICR2022, MICR2921, MICR2922	Semester 2



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>FINC2011</b> Corporate Finance I	6	<b>A</b> ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) <b>N</b> FINC2001 <i>Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.</i>	Semester 1 Semester 2 Summer Early Winter Main
FINC2011 is scheduled for Semester 2			
<b>Year 3</b>			
Year 3 will have a minimum of 48 credit points comprised of:			
<b>AGCH3025</b> Chemistry and Biochemistry of Foods	6	<b>A</b> Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry <b>N</b> AFNR5102, AGCH3017, AGCH3024	Semester 1
<b>AGEN3001</b> Food Product Development	6	<b>A</b> Junior Biology and Chemistry <b>P</b> AGEN2001, AGEN2002 and AGEN2006	Semester 1
And two elective units from Table FA1			
<b>AGEN3003</b> Global Food Security	6	<b>A</b> Junior Statistics and Biology <b>P</b> AGEN2002, AGEN2003, and AGEN2006	Semester 2
<b>AGEN3004</b> Food Processing and Value Adding	6	<b>A</b> Junior Biology and Chemistry <b>P</b> AGEN2001 and MICR2024	Semester 2
The units of study AGEN3003 Global Food Security and AGEN3004 Food Processing & Value Adding will be delivered in intensive mode at the beginning of second semester prior to AGEN3002 Industry Internship. The placement of units of study in the degree program may change pending further review.			
<b>Year 4</b>			
Year 4 will have a minimum of 48 credit points comprised of:			
<b>AFNR4101</b> Research Project A	12	<b>P</b> 144 credit points of level 1000-3000 units of study	Semester 1
and 12 credit points of electives from Table FA2.			
<b>AFNR4102</b> Research Project B	12	<b>P</b> AFNR4101	Semester 2
and 12 credit points of electives from Table FA2.			

## Electives

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Table FA1</b>			
Students may only select one 1000 Level unit of study from Table FA1. A maximum 60 credit points of 1000 level units of study may be included to satisfy the requirements of the degree.			
<b>ACCT1006</b> Accounting and Financial Management	6	<b>P</b> ACCT1005 or BUSS1030 <b>N</b> ACCT1003, ACCT1004, ACCT1001, ACCT1002	Semester 1 Semester 2
<b>CLAW1001</b> Foundations of Business Law	6		Semester 1 Semester 2
<b>FINC2012</b> Corporate Finance II	6	<b>P</b> FINC2011 or FINC2001 <b>N</b> FINC2002	Semester 1 Semester 2 Summer Main
<b>INFS1000</b> Digital Business Innovation	6	<b>N</b> INFO1000, ISYS1003	Semester 1 Semester 2 Summer Main
<b>MKTG2112</b> Consumer Behaviour	6	<b>P</b> MKTG1001 (or MKTG2001) <b>N</b> MKTG2002	Semester 1 Semester 2
<b>WORK1003</b> Foundations of Work and Employment	6	<i>This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.</i>	Semester 1 Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Table FA2</b>			
Students may only select two 2000 level units of study from Table FA2.			
<b>ACCT2011</b> Financial Accounting A	6	<b>P</b> (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) and (ECMT1010 or BUSS1020) <b>N</b> ACCT2001	Semester 1 Semester 2
<b>ACCT2012</b> Management Accounting A	6	<b>P</b> (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) <b>N</b> ACCT2002	Semester 1 Semester 2
<b>ACCT3013</b> Financial Statement Analysis	6	<b>P</b> (ACCT2011 or ACCT2001) and (FINC2011 or FINC2001) <b>N</b> ACCT3003	Semester 1
<b>AGCH3026</b> Food Biotechnology	6	<b>A</b> Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry <b>N</b> AGCH3005, AGCH3003, AGCH4006, AFNR5103	Semester 1
or			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AREC3001</b> Production Modelling and Management	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
or			
<b>AREC3002</b> Agricultural Markets	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
<b>AVBS4002</b> Dairy Production and Technology	6	P Assumed Knowledge: Enrolled students are expected to have some understanding of key components of the dairy production system, including basic knowledge of animal physiology and nutrition.	Semester 2
<b>AVBS4004</b> Food Safety Assessment and Management	6	P AVBS3001, AVBS4001, Animal and Veterinary Bioscience years 1-3	Semester 2
<b>AVBS4008</b> Intensive Animal Industries	6	P (Animal and Veterinary Bioscience years 1-3) OR (Bachelor of Science in Agriculture years 1-3)	Semester 2
<b>AVBS4012</b> Extensive Animal Industries	6	P Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3	Semester 1
<b>BUSS2220</b> Small Business Structures and Taxation <i>This unit of study is not available in 2015</i>	6	P 48 credit points in junior and senior units N ACCT3014, CLAW2207, ACCT3013, CLAW2205, CLAW3206, CLAW3207, ACCT3099, CLAW2211, ACCT2012, CLAW2202, CLAW3201, ACCT3032, CLAW2209, ACCT3011, CLAW2203, CLAW3202, ACCT3098, CLAW2210, ACCT3012, CLAW2204, CLAW3204, ACCT3031, CLAW2208, ACCT2011, CLAW2201, CLAW2212	Semester 2
<b>BUSS3500</b> Integrated Business Applications	6	P For the Bachelor of Commerce: Completed a minimum of 120 credit points including the following units of study: (BUSS1001 or ECOF1003), (BUSS1002 or ECOF1004), (BUSS1030 or ACCT1005), (BUSS1040 or ECON1001) and (BUSS1020 or ECMT1010 or equivalent); For the Bachelor of Commerce (Liberal Studies): Completed a minimum of 168 credit points including the following units of study: (BUSS1001 or ECOF1003) and (BUSS1002 or ECOF1004). N ECOF3001 <i>Note: Department permission required for enrolment</i> <i>This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).</i>	Intensive February Intensive July Semester 1 Semester 2
<b>CLAW2201</b> Corporations Law	6	P Any 4 full semester junior units of study including CLAW1001 N CLAW2001	Semester 1 Semester 2
<b>FINC3011</b> International Financial Management	6	P FINC2012 or FINC2002 N FINC3001	Semester 1
<b>FINC3015</b> Financial Valuation: Case Study Approach	6	P FINC2012 or FINC2002 N FINC3005	Semester 1
<b>FINC3020</b> Financial Risk Management	6	A FINC3017 P FINC2012	Semester 2
<b>IBUS2101</b> International Business Strategy	6	P 36 junior credit points N IBUS2001	Semester 1 Semester 2 Summer Late
<b>MKTG2113</b> Marketing Research	6	P MKTG1001 N MKTG1002	Semester 1
<b>PHYS5031</b> Ecological Econ & Sustainable Analysis	6		Semester 1
<b>PHYS5033</b> Environmental Footprints and IO Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 1 Semester 2
<b>PHYS5034</b> Life Cycle Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 2
<b>WORK2205</b> Human Resource Processes	6	P 24 credit points of junior units of study including (WORK1003 or WORK1002) N WORK2005 <i>This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.</i>	Semester 1
<b>WORK2209</b> Managing Organisational Change <i>This unit of study is not available in 2015</i>	6	P 40 credit points worth of units of study N WORK2009	Semester 2
<b>WORK2210</b> Strategic Management	6	P 40 credit points worth of units of study N WORK2010 <i>This is the compulsory unit of study for the Management major.</i>	Semester 2
<b>WORK2211</b> Human Resource Strategies <i>This unit of study is not available in 2015</i>	6	P 40 credit points of units of study including (WORK1003 or WORK1002) N WORK2011, IREL2011	Semester 2
<b>WORK2218</b> Managing Organisational Behaviour	6	P 24 junior credit points <i>This is the compulsory unit of study for the Management major.</i>	Semester 1



# Bachelor of Food and Agribusiness

## Units of study

All students complete an Agribusiness major and a Food Science major.

### Year 1

Year 1 will have a minimum of 48 credit points comprised of:

#### BIOL1001

##### Concepts in Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1, Summer Main **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prohibitions:** BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments tests and lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Concepts in Biology is an introduction to the major themes of modern biology. The unit covers fundamental cell biology, with a particular emphasis on cell structure and function; the foundations of molecular biology from the role of DNA in protein synthesis to the genetics of organisms; and the theory of evolution and principles of phylogenetic analysis, including how these are used to interpret the origins of the diversity of extant organisms. Practical classes focus on students designing experiments, making and recording their observations and communicating their findings. The unit emphasises how biologists carry out scientific investigations, from the molecular and cellular level to the level of ecosystems. This unit of study provides a good foundation for intermediate biology units of study.

##### Textbooks

Knox R B et al. Biology, An Australian Focus. 4th ed. McGraw-Hill. 2010

or

#### BIOL1911

##### Concepts in Biology (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit **Prohibitions:** BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 **Assessment:** One 2-hour exam, assignments, tests, lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

Concepts in Biology (Advanced) has the same overall structure as BIOL1001 but material is discussed in greater detail and at a more advanced level. Students enrolled in BIOL1901 participate in alternative components, which include a separate lecture and practical stream from BIOL1001. The content and nature of these components may vary from year to year.

##### Textbooks

As for BIOL1001.

#### BUSS1001

##### Understanding Business

**Credit points:** 6 **Teacher/Coordinator:** Professor Marcus O'Connor **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5 hr lecture and 1x 1.5 hr tutorial per week **Prohibitions:** ECOF1003 **Assessment:** participation (15%), essay (20%), case study (20%), and final exam (45%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).*

This unit of study is the first of two junior core units aimed at introducing students to the internal and external contexts in which

business operates in the twenty-first century. It also aims to lay the foundations for effective communication (written and oral), critical analysis, problem solving, and team work skills, which are essential to achieving program learning goals. In this unit, students will build an understanding of the dynamics of business through the lens of the company and its stakeholders. Business ethics is also introduced as key learning goal.

BUSS1001 is scheduled for Semester 1

#### 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 9 weeks. **Prohibitions:** CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903 **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 (60%), laboratory work (15%), online assignments (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or

#### 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 9 weeks. **Prohibitions:** CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901 **Assumed knowledge:** HSC Chemistry and Mathematics **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

##### Textbooks

A booklist is available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or

#### CHEM1901

##### Chemistry 1A (Advanced)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1-hour lectures and one 1-hour tutorial per week; one 3-hour practical per week for 9 weeks. **Prerequisites:** HSC Chemistry result of 80 or more **Prohibitions:** CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### ENVX1002

#### Introduction to Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop **Session:** Semester 1 **Classes:** 2x1 hr lectures/wk, 1x1 hr tutorial/wk, 1x2 hr computer practical/wk **Corequisites:** Prohibitions: ENVX1001 **Assessment:** 1 Å Exam during the Exam period (50%), 2 Å Practical Tests (10% each), 2 Å Assessment Tasks (10% each) and 8 Online Quizzes (1.25% each). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a core first year unit for the BEnvSys, BScAgr, BFoodAgrib, BVetBiol and BAnVetBioSc degrees. It provides the foundation quantitative and statistical skills that are needed in other units in the degrees and for further study in applied statistics. In the first portion of the unit the emphasis is on the role of statistics in scientific research, describing data and its variability, and probability. In the second part the focus is on sample designs and framing scientific 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 final part of the unit is on the use of calculus for modelling biological and environmental data, for example the use of linear and non-linear functions. In the practicals the emphasis is on applying theory to analysing real datasets using the spreadsheet package Excel and the statistical package Genstat.

#### Textbooks

Recommended readings: -Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton). -Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

### AGEC1006

#### Economic Environment of Agriculture

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prohibitions:** AGECE1004, AGECE1003 **Assumed knowledge:** HSC Mathematics **Assessment:** 1x2hr exam (55%) and 1x50 min mid-semester exam (25%) and workshop papers (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

To give students an overview of the structure, viability and importance of the agricultural sector in the Australian economy. It is a core unit of study in the BScAgr, BHortSc and BAnVetBioSc degrees. It is designed to give an understanding of the basic economic principles and how they relate to Australian agriculture. Students will look at basic economic theory and concepts and then apply these concepts to solve simplified versions of real problems faced by the agriculture and resource sectors. Students will look at the relationship between these concepts and the concepts learnt within their science related courses. Students will be able to analyse economic concepts and apply these concepts to real world scenarios. They will be able to synthesis and comprehend the relationship between the economic and science disciplines. The students will gain skills through workshop based tasks, information literacy and communication skills through the presentation of the workshop reports and discussion throughout the workshop.

#### Textbooks

HE Drummond and JW Goodwin, Agricultural Economics, 3rd edn (Prentice-Hall, 2011)

### AGEN1004

#### Applied Biology for Ag and Environment

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Prof. Michael D'Azocchio, Prof. David Guest, A/Prof. Luciano Gonzalez, A/Prof. Michael Kertesz, Prof. Rosanne Taylor, Dr Catherine Herbert **Session:** Semester 2 **Classes:** 1x2 hr lecture/workshop per week, 1x3.5 hr Practical per week **Prohibitions:** BIOL1002 **Assessment:** Practical Participation and Quizzes (10%), Plant ID Portfolio (20%), Group video and presentation (30%), Individual viva-voce exam (10%), End of semester exam (30%) **Practical field work:** Practical and field report preparation. Class preparation, material revision/private study **Mode of delivery:** Normal (lecture/lab/tutorial) day

Building on the fundamentals of biology introduced in 1st semester biology (BIOL1001 or equivalent), this unit runs alongside 2nd semester chemistry where students learn the fundamentals of organic chemistry and the major biomolecules. In this unit, students will gain an understanding of how biological processes and systems function. Students will be introduced to the major plant, animal and microbial systems, how they interact, and how an understanding of environment influences is key to effective and sustainable management of the biosphere. Topics will be introduced that will emphasise the specific importance of the major biological processes and through lectures, practicals and field trips, students will gain an in-depth understanding of basic plant, animal and microbial physiology, biochemistry, energy flows and biological interactions, and the importance of these in determining the resilience of organisms, communities, ecosystems and the biosphere. Students will be able to contextualize this knowledge so that they can determine appropriate management strategies for productivity and the conservation and rehabilitation of natural systems.

#### Textbooks

Recommended reference books (purchase of text book is not essential Å reference materials will be provided): - Sadava D, Hillis D, Heller C, Berenbaum M 2012, Life: the science of biology, 10th edition, WH Freeman and Co, Gordonsville VA.

### AGEN1006

#### Biological Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr Claudia Keitel (Coordinator), Dr. Thomas Roberts, Dr. Feike Dijkstra, A/Prof. Balwant Singh, A/Prof. Adam Bridgeman **Session:** Semester 2 **Classes:** 3x1-hr lectures/wk, 1x1-hr tutorial/wk 1 x 3-hr practical/wk **Prerequisites:** CHEM1001 or CHEM1101 or CHEM1901 **Prohibitions:** CHEM1002 **Assessment:** Three quizzes (3x5%), 1 x Problem solving exercise (10%), Final exam (60%), Laboratory-based assessment (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study expands on the basic chemical concepts taught in first semester (CHEM1001). The unit will cover the structure and behaviour of organic and inorganic compounds relevant to chemical reactions in biological systems. The unit will introduce students to organic molecules (hydrocarbons, alcohols, aldehydes and ketones, aromatic compounds, organic acids) and inorganic chemistry (e.g. acid-base and redox reactions, solubility, metal complexes) as well as the structures and reactions of major biological macromolecules (e.g. carbohydrates, lipids, proteins and nucleic acids). In weeks 1-7, lectures, tutorials and laboratory work are conducted in co-operation with the School of Chemistry, Faculty of Science. In weeks 8-13, lectures, tutorials and laboratory work will be undertaken in the Faculty of Agriculture and Environment. Lectures, tutorials and laboratory work are integrated, providing students with a theoretical and practical basis for further studies in the management of biological systems. This 6 credit point unit consists of approximately 80 hours directed learning.

#### Textbooks

Reference books; Blackman, Bottle, Schmid, Mocerino and Wille Chemistry and SI Chemical Data (package), 2nd Edition, 2012 (John Wiley) ISBN: 9781118234228

### BUSS1030

#### Accounting, Business and Society

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Paul Blayney; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prohibitions:** ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 **Assessment:** Tutorial contribution (15%), written assessment (10%), mid-semester examination (25%) and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.*

This unit investigates the fundamentals of accounting and aims to provide a broad understanding of the role of accounting in the context of business and society. The format of the unit is designed to show that there are many uses of accounting data. The focus moves from accountability to decision making; both functions are explained through examples such as the 'double entry equation', and from an output (financial statements) perspective. Some more technical aspects of accounting are outlined, including the elements of assets, liabilities, revenues and expenses within simple, familiar scenarios. Besides developing an understanding of the role of accounting via conventional financial reports, recent developments including the discharge of accountability by companies through the release of corporate social and environmental reports and the global financial crisis, are explored through an accounting lens.

BUSS1030 is scheduled for semester 2

## Year 2

Year 2 will have a minimum of 48 credit points comprised of:

### AGEC2102

#### Agribusiness Marketing

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/fortnight **Prerequisites:** AGE1006 or AGE1102 or RSEC1031 **Assessment:** Group presentation (15%), 1x2000wd case study (25%), and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an introductory understanding of agribusiness marketing in a modern context. The unit will provide students in the Sciences degrees with an understanding of how the economic theory taught in first year in AGE1006 can be treated in an applied context. For BAgREc students, it is an intermediate level unit in the Agribusiness major.

Students will study the theory relating to the firm-level marketing mix and marketing strategy. The emphasis will be on 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 to demonstrate how marketing decisions are made along the marketing chain. At the end of this unit students will be able to use marketing theory to analyse the steps in the marketing chain and be aware of the forces for change within that chain.

By completing this unit, students should have improved their ability to master key theories, identify and frame problems, organise knowledge, carry out individual and group research, and synthesise information. They should also have improved their information literacy skills, and communication skills through group presentations and individual research.

### AGEN2001

#### Plant Function

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell (Coordinator), Dr Thomas Roberts **Session:** Semester 1 **Classes:** 2x1-hr lectures, 1x 3-hr practical per week **Prerequisites:** (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry **Assessment:** 1x 1hr mid-semester exam (20%), 1x 2hr final exam (40%), 1000w essay (10%), Five practical reports (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

#### Textbooks

Taiz L, Zeiger E (2010) Plant Physiology 5th ed.

### AGEN2002

#### Fresh Produce Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Kim-Yen Phan-Thien **Session:** Semester 1 **Classes:** 2 x 1 hr lecture per week **Prerequisites:** 12 credit points of junior Biology and 12 credit points of junior Chemistry **Assumed knowledge:** HSC Maths and Biology **Assessment:** 1 x mid-term exam (20%), 1 x 2 hr final exam (30%), 3 x Laboratory Reports (3 x 10% each), 1 x Assignment (20%) **Practical field work:** 6 x excursions/ practical sessions per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

In this unit of study, students will critically examine the science underpinning the management and handling of fresh food products in Australia and internationally. The unit primarily addresses the challenges facing fresh produce by looking at the main specialized product categories and related business and technologies within the food industry. Students will develop the core skills required to ensure the maintenance of quality during the handling, storage and marketing of perishable foods derived from plants and animals. Students will be able to integrate knowledge of the physiology, technological and economic aspects of fresh produce management to determine the optimal storage and handling conditions that are essential for food safety and the maximization of the consumer experience. Case study examples will be drawn from fruits and vegetables, grain, dairy and meat products. Students will study all operations from harvesting through to consumer evaluation in order to be able to critically evaluate their performance. Industry quality assurance schemes and government regulation will be examined, with particular reference to food safety. The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation. Personal and intellectual autonomy will be developed through group and individual work.

#### Textbooks

No prescribed textbooks

### BUSS1002

#### The Business Environment

**Credit points:** 6 **Teacher/Coordinator:** Omer Konakci **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** ECOF1003 or BUSS1001 **Prohibitions:** ECOF1004, CISS2001 **Assessment:** media summary and analyses (55%), tutorial participation (10%), and final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).*

This unit of study is the second of two junior core units aimed at introducing students to the external and internal contexts in which business operates in the twenty-first century while developing effective problem solving, critical analysis and communication skills. In this unit, students will build an understanding of the economic, political and regulatory, socio-cultural, and technological factors that impact on the external context of the commercial landscape while developing an awareness of potential of risk and change. An awareness of corporate social responsibility and sustainability is also introduced as a key learning goal.

BUSS1002 is scheduled for Semester 1

### AGEN2003

#### Innovation in Food Supply Chains

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Robyn McConchie **Session:** Semester 2 **Classes:** 2 x 1 hr lecture per week, 6 x excursions/practical sessions per semester **Prohibitions:** AGEN1005 **Assessment:** 1x mid semester exam (20%), 1x 2hr final exam (30%), 2x Assignments (2 x25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to allow students to critically examine the theory and functions underpinning food supply chains in Australia and internationally, and the challenges facing their operation. The unit builds on a theoretical understanding of business gained in BUSS 1001 Understanding Business (or equivalent). The unit is designed to develop the student's capacity to determine market requirements, or niches, and to develop innovative production, supply and management strategies for fresh animal and plant products to fulfill the requirements. The unit has a focus on the sustainability of the

system in the face of environmental challenges and the burgeoning global population. In the first half of the semester, students will investigate the theoretical background and historical development of food supply chain management (SCM) in order to understand the role and relationships of links in supply chains, including the consumer. In the second half of the semester, students will examine specific food supply chains to understand their unique characteristics and review recent developments in view of changing market forces. Students will review SCM in the context of global and domestic food policies and food security. At the end of this unit, students will be able to understand and describe food SCM theory, management and function, and the challenges facing successful food SCM operation. Students will understand the concepts that underpin the formation and operation of food supply chains and be able to critically evaluate their performance. Students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation and personal and intellectual autonomy through working in groups.

#### Textbooks

No recommended reference books. All reference materials will be provided and listed from library

### AGEN2006

#### Animal Production and Management

**Credit points:** 6 **Teacher/Coordinator:** Professor Michael D'Occhio, Associate Professor Luciano Gonzalez **Session:** Semester 2 **Classes:** 2 x 1 hr lectures per week **Prerequisites:** 12 credit points of junior Biology and 12 credit points of junior Chemistry **Assumed knowledge:** HSC Maths (2 unit) and Biology **Assessment:** 1 x mid-term exam (20%), 1 x 2 hr final exam (30%), 2 x Assignments (2 x 25% each) **Practical field work:** 10 x excursions/ practical sessions per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to develop the student's ability to critically examine and evaluate the production and management of animals used for food and fibre in Australia and internationally. The unit will focus on new and emerging issues in animal production, including productivity, welfare, remote monitoring and management, animals in the environment, and meeting specifications in an ever-evolving marketplace. The identification, selection and breeding of animals that are optimally suited to production systems is a focus. New thinking and innovations that are being used to address scientific, industry and social expectation challenges will be a feature of the unit and case studies will be used throughout to examine interactions between these factors and their impact on management practices. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through online discussion postings, laboratory reports and presentations, and personal and intellectual autonomy through working in groups. At the successful completion of the unit, students will have the core knowledge and skills to enable them to lead developments in production animal industries in Australia and overseas.

#### Textbooks

No prescribed textbooks

### MICR2024

#### Microbes in the Environment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** 2 lec, 3h prac/wk **Prerequisites:** 12 cp of first year Biology **Prohibitions:** MICR2021, MICR2022, MICR2921, MICR2922 **Assessment:** 1 x 2hr exam (60%), 4 x quizzes (15%), lab skills assessment (5%) and 1 x lab project report (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

Wiley et al. 2011. Prescott/Harley/Klein's Microbiology 8th ed. McGraw-Hill

### FINC2011

#### Corporate Finance I

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early, Winter Main **Classes:** 1 x 2hr lecture and 1 x 1hr tutorial per week **Prohibitions:** FINC2001 **Assumed knowledge:** ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) **Assessment:** Mid-semester exam (20%), major assignment (30%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day  
*Note:* Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.

This unit provides an introduction to basic concepts in corporate finance and their application to (1) valuation of risky assets including stocks, bonds and entire corporations, (2) pricing of equity securities, and (3) corporate financial policy decisions including dividend, capital structure and risk management policies. Emphasis is placed on the application of the material studied and current practices in each of the topic areas.

FINC2011 is scheduled for Semester 2

### Year 3

Year 3 will have a minimum of 48 credit points comprised of:

### AGCH3025

#### Chemistry and Biochemistry of Foods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Roberts (Coordinator), Prof Les Copeland, **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x4-hr practical fortnightly **Prohibitions:** AFNR5102, AGCH3017, AGCH3024 **Assumed knowledge:** Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry **Assessment:** 1x2hr exam (40%) and 6 x lab reports (6x10%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study aims to give students an understanding of the properties of food constituents, and the interactions between these constituents during food processing, storage and digestion. The unit will develop an understanding of the relationship between form and functionality of constituents and the concept of fitness-for-purpose (i.e., quality) in converting agricultural products into foods. Students will gain an appreciation of the relationship between chemical composition and properties of macroconstituents (carbohydrates, proteins, lipids) and microconstituents (vitamins, minerals, antioxidants, flavour and anti-nutritional chemicals) and their functions in plant- and animal-based foods. The material presented in lectures and practical classes will enable students to develop research and inquiry skills and an analytical approach in understanding the biochemistry of foods, food processing and storage. On completing this unit, students will be able to describe the chemical and biochemical properties of major food constituents, and demonstrate an understanding of the functionality of these constituents in food processing and nutrition. Students will have gained experience in laboratory techniques used in industry for the analysis of some food products, and information literacy and communication skills from the preparation of practical reports.

#### Textbooks

Lecture and laboratory notes will be made available through Blackboard. There is no recommended textbook.

### AGEN3001

#### Food Product Development

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Robyn McConchie (Coordinator), Dr Brian Jones, Dr Kim-Yen Phan-Thien, Dr Thomas Roberts, Professor Les Copeland **Session:** Semester 1 **Classes:** 2 x 1 hr lectures per week **Prerequisites:** AGEN2001, AGEN2002 and AGEN2006 **Assumed knowledge:** Junior Biology and Chemistry **Assessment:** 1 x mid-term exam (20%), 1 x 2 hr final exam (30%), Three Practical Reports (3 x 10% each), 1 x Assignment (20%) **Practical field work:** 6 x excursions/practical sessions per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

In this unit of study, students will gain a theoretical and practical understanding of the development of novel food products, using traditional and novel food ingredients. The processes of food product development will be studied in the context of existing and projected

national and international legal, regulatory, economic, environmental and social constraints. The processes of market trend analysis, product innovation, prototype development, product testing and the formal presentation of a new product will be critically analyzed. Students will gain an understanding of product specification, food formulation, food ingredient technology, and ingredient interactions. Nutritional and health implications relating to food products will be emphasized. The students will gain research and inquiry skills through research-based group projects, laboratory classes and excursions to relevant food ingredient and processing businesses.

#### Textbooks

No prescribed textbooks

And two elective units from Table FA1

### AGEN3003

#### Global Food Security

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Robyn McConchie (Coordinator), Associate Professor Inakwu Odeh, Professor Robert Park, Professor Richard Trethowan **Session:** Semester 2 **Classes:** Intensive Unit - 20 x 1 hr lectures **Prerequisites:** AGEN2002, AGEN2003, and AGEN2006 **Assumed knowledge:** Junior Statistics and Biology **Assessment:** 1 x 2 hr final exam (30%), Group Presentation (30%), 1 x Assignment (40%) **Practical field work:** 6 x excursions/practical sessions over 4 weeks (weeks 1 - 4) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study will examine the political landscape of both food and farming, in both rich and poor countries and examine the factors that contribute to a food insecure world. In 2011 the global population reached seven billion people and is predicted to reach nine billion people by 2050. Ninety three percent of this population increase will occur in lower-income countries, presenting the global challenge of how we are going to sustainably feed, clothe and house nine billion people in an ecologically sustainable manner. By 2050, it has been estimated that we will need to provide 50% more food, 50% more energy, and 30% more fresh water without further degrading our natural resource base. Global food security will be discussed in a systems context and with reference to the players such as governments, communities, scientists, farmers, agribusiness and food companies, environmentalists and health professionals and how policy can be shaped to deliver innovative technologies and approaches to increase food production on limited arable land and without relying on increased water and fertiliser use. Issues such as strategies to minimise waste and the impact and frequency of climate stress and shocks on food security will be discussed. Case studies will be used throughout the unit. Students will gain research and inquiry skills through a major research based project. At the successful completion of the unit, students will have the core knowledge and skills to enable them to critically analyse policy, development and research goals and settings and their impact on global and regional food security.

#### Textbooks

No prescribed textbooks

### AGEN3004

#### Food Processing and Value Adding

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Robyn McConchie (Coordinator), Dr Kim-Yen Phan-Thien, Dr Thomas Roberts, Professor Les Copeland, Associate Professor Michael Kertesz **Session:** Semester 2 **Classes:** Intensive Unit - 20 x 1 hr lectures **Prerequisites:** AGEN2001 and MICR2024 **Assumed knowledge:** Junior Biology and Chemistry **Assessment:** 1 x mid-term exam (30%), 1 x 2 hr final exam (30%), 4 x Practical Reports (4 x 10% each) **Practical field work:** 6 x excursions/practical sessions over 4 weeks (weeks 1 - 4) **Mode of delivery:** Normal (lecture/lab/tutorial) day

In this unit of study, students will develop skills and knowledge in food processing methods. Methods examined include fermentation, dehydration, refrigeration and freezing, heating and pasteurization, and irradiation. The effects of these treatments on the quality, safety and nutrient content of foods, commercial food processing principles and methods, microbial growth, spoilage and the control of spoilage will be discussed. Students will also study the principles of food packaging and packaging requirements for the preservation of food qualities. The unit will include lectures, laboratory sessions, group work and discussions, and visits to food processing plants. New thinking and innovations that are being used to address scientific,

industry and social expectation challenges will be a feature of the unit. Relevant case studies will be used throughout. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through online discussion postings, laboratory reports and presentations. At the successful completion of the unit, students will have the core knowledge and skills to enable them to critically evaluate food processing practices and to design appropriate strategies for the development of value-added food products.

#### Textbooks

No prescribed textbooks

The units of study AGEN3003 Global Food Security and AGEN3004 Food Processing & Value Adding will be delivered in intensive mode at the beginning of second semester prior to AGEN3002 Industry Internship. The placement of units of study in the degree program may change pending further review.

### Year 4

Year 4 will have a minimum of 48 credit points comprised of:

#### AFNR4101

##### Research Project A

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 1 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** 144 credit points of level 1000-3000 units of study **Assessment:** Research proposal, literature review. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit aims to develop a student's ability to undertake a major research project in an area of specialization. The unit builds on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. This unit is a corequisite with AFNR4102 and each student will work with an academic supervisor in an area of specialization and develop a well defined research project to be executed. The research project is undertaken to advance the students ability to build well-developed research skills, a strong analytical capacity, and the ability to provide high quality research results demonstrating a sound grasp of the research question. Working with an academic supervisor students will develop their ability to define a research project including the producing of testable hypotheses, identifying existing knowledge from reviewing the literature and the design and execution of a research strategy towards solving the research question. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the development of experimental programs. Students will improve their written and planning skills by composing a research project proposal and the writing of a comprehensive literature review.

and 12 credit points of electives from Table FA2.

#### AFNR4102

##### Research Project B

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 2 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** AFNR4101 **Assessment:** Oral presentation, research paper, poster. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is a continuation of the major research project initiated in AFNR4101 and continues to build on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. Working with their academic supervisor in the area of specialization the student will continue to pursue the defined research project towards presenting final results and conclusions. The research results are presented in a format of a research paper as submitted to a research journal. The research paper and corrected literature review is combined and presented together as a thesis. Students will continue to build their research skills, develop strong analytical capacity, demonstrate a sound grasp of the topic, and an ability to interpret results in a broad framework. Working with an academic supervisor students will develop their ability to produce results of high quality, draw reliable conclusions and identify future

areas avenues of research. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the managing the research program. Students will improve their communication skills through oral presentation of their research findings, the production of a poster detailing their research findings and the writing of a research paper.

and 12 credit points of electives from Table FA2.

## Electives

### Table FA1

Students may only select one 1000 Level unit of study from Table FA1. A maximum 60 credit points of 1000 level units of study may be included to satisfy the requirements of the degree.

#### ACCT1006

##### Accounting and Financial Management

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Janine Coupe; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** ACCT1005 or BUSS1030 **Prohibitions:** ACCT1003, ACCT1004, ACCT1001, ACCT1002 **Assessment:** Tutorial work (10%), practice set (15%), mid-semester exam (25%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Accounting and Financial Management is an introduction to financial reporting, and the gateway unit to further study in accounting leading to a major in accounting. This unit builds upon the accounting context, presented in BUSS1030 Accounting, Business and Society, with the aim of developing the technical skills of recording basic business transactions through accounting systems. In addition to this technical focus, specific attention will be given to the way in which the accounting information can be used to undertake financial management and analysis, to give students the ability to produce and interpret financial reports.

#### CLAW1001

##### Foundations of Business Law

**Credit points:** 6 **Teacher/Coordinator:** Mr Giuseppe Carabetta **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Assessment:** Mid-Semester exam (20%), Case Analysis Assignment (20%), Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. Every decision in business, and every transaction and relationship, is made in the context of this legal regime. The aim of Foundations of Business Law is to introduce the students to the legal framework and regulatory systems which underlie all business activity and to expose them to the legal implications of commercial conduct. This unit of study introduces the Australian legal system and key areas of substantive business law including contracts, torts (in particular negligence and privacy), property and securities, white collar crime, intellectual property, competition and consumer law (in particular advertising, product liability and unfair contracts), business structures and operations, misleading and unconscionable conduct and dispute resolution.

#### FINC2012

##### Corporate Finance II

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 or FINC2001 **Prohibitions:** FINC2002 **Assessment:** Mid-semester exam (15%), essay (20%), and final exam (65%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on FINC2011 Corporate Finance I, by extending basic concepts in corporate financing, investing and risk management. The unit presents current theories of corporate financing and their practical application in corporate investment and capital budgeting. The unit also examines securities and securities markets with an emphasis on pricing, investment characteristics and their use by corporations to

manage risk. The securities examined include: bonds and related fixed income products; futures and options. The goal of the unit is to broaden students' knowledge of corporate finance in preparation for further study in finance in 300 level courses.

#### INFS1000

##### Digital Business Innovation

**Credit points:** 6 **Teacher/Coordinator:** Barney Tan **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr lab workshop per week **Prohibitions:** INFO1000, ISYS1003 **Assessment:** group work (10%), group project (25%), mid-semester test (25%), and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Digital Economy, with its focus on information as a key business resource, has changed the way Business Information Systems (BIS) are viewed in organisations. BIS are now seen as enablers of innovation in which people, supported by powerful technology, are considered to be the most important component. This is because problem-solving, innovation and critical thinking skills cannot be outsourced or easily acquired by competitors. This unit is designed to develop your understanding of how businesses operate. It shows how information systems support business operations and management through integration of people, business processes and systems. You will be provided with an introduction to state-of-the-art business analysis techniques, frameworks and models to assist in understanding the nature and contribution of BIS in a range of business contexts. With its emphasis on business rather than IT, this unit does not require prior IT-related experience. In this unit you will learn about the increasingly important role of IT in business and acquire valuable business analysis and problem-solving skills.

#### MKTG2112

##### Consumer Behaviour

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001) **Prohibitions:** MKTG2002 **Assessment:** ongoing work portfolio (15%), class participation (15%), project interview transcripts (individual component) (15%), final project group presentation (10%), final project group report (20%), and midterm exam (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the psychological, social, and cultural aspects of consumer behaviour on the marketing decisions of public and private organisations. Concepts and principles are drawn from disciplines such as cognitive psychology, social psychology, sociology, anthropology, and demography to discover and understand various aspects of consumer behaviour. Specific topics of study include: cultural, demographic and psychographic influences; reference group influences; household decision processes and consumption behaviour; consumer perception and learning; motivation, personality and emotion; consumer attitudes; and purchase decision processes.

#### WORK1003

##### Foundations of Work and Employment

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Associate Professor Rae Cooper; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Assessment:** quiz (10%), participation (10%), mid-semester (20%), final quiz (20%), and essay (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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.

## Table FA2

Students may only select two 2000 level units of study from Table FA2.

### ACCT2011

#### Financial Accounting A

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Eagle Zhang; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture and 1x1hr tutorial per week **Prerequisites:** (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) and (ECMT1010 or BUSS1020) **Prohibitions:** ACCT2001 **Assessment:** Group assignment (15%), mid-semester examination (35%) and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### ACCT2012

#### Management Accounting A

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Geoff Frost; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1 x 2hr lecture and 1 x 1hr tutorial per week **Prerequisites:** (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) **Prohibitions:** ACCT2002 **Assessment:** Computer assignments (10%), quizzes (10%), case study assignment (10%); SAP assignment (10%), and final examination (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### ACCT3013

#### Financial Statement Analysis

**Credit points:** 6 **Teacher/Coordinator:** Stewart Jones **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** (ACCT2011 or ACCT2001) and (FINC2011 or FINC2001) **Prohibitions:** ACCT3003 **Assessment:** tutorial participation (10%), mid-semester examination (20%), group case studies (15%), and final examination (55%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### AGCH3026

#### Food Biotechnology

**Credit points:** 6 **Teacher/Coordinator:** Prof Les Copeland (Coordinator) Associate Prof Robyn McConchie, Dr Thomas Roberts **Session:** Semester 1 **Classes:** One 4-hr class/wk, which includes a combination of lectures, tutorials and practical work **Prohibitions:** AGCH3005, AGCH3003, AGCH4006, AFNR5103 **Assumed knowledge:** Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry **Assessment:** The unit is taught in four separate modules.(4x25%); the assessment tasks vary for each module, but may include lab reports, short essays, opinion pieces, poster/oral presentations, or an exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

#### Textbooks

Lecture notes, laboratory notes and set readings will be made available for each module through Blackboard. There is no recommended textbook.

or

### AREC3001

#### Production Modelling and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

or

### AREC3002

#### Agricultural Markets

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### AVBS4002

#### Dairy Production and Technology

**Credit points:** 6 **Teacher/Coordinator:** Assoc. Professor Sergio (Yani) Garcia. Participating staff: Assoc. Prof. Kendra Kerrisk, Dr Pietro Celi, Dr Cameron Clark, Assoc. Prof. John House, Nicolas Lyons, Victoria Scott **Session:** Semester 2 **Classes:** Lectures up to 3 hrs/wk, practicals 3 hrs/wk **Prerequisites:** Assumed Knowledge: Enrolled students are expected to have some understanding of key components of the dairy production system, including basic knowledge of animal physiology and nutrition. **Assessment:** Whole farm professional report (30%), Pracs assessments, (30%), 1 hr exam (40%) **Practical field work:** Visit to commercial dairy farms and different systems of production in 3 or 4 regions of NSW (a minimum of 8 commercial farms will be

visited during the semester) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### AVBS4004

#### Food Safety Assessment and Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Gary Muscatello **Session:** Semester 2 **Classes:** lectures 3 hrs/wk, tutorial/practicals 2 hrs/wk **Prerequisites:** AVBS3001, AVBS4001, Animal and Veterinary Bioscience years 1-3 **Assessment:** 1000wd individual report (20%), 1000wd group assignment (20%), 2hr exam (50%), MCQ (10%) **Practical field work:** 2 field trips (compulsory) 16 hrs total **Mode of delivery:** Normal (lecture/lab/tutorial) day

#### Textbooks

Torrence ME & Isaacson RE (eds) 2003, Microbial food safety in animal agriculture current topics, Iowa State Press, Ames, Iowa  
D'Mello JPF (ed.) 2003, Food safety: contaminants and toxins, CABI Publishing, Wallingford

Bucic S 2006, Integrated food safety and veterinary public health, CABI Publishing, Wallingford

Jay JM, Loessner MJ, Golden DA 2005, Modern Food Microbiology, 7th edn, Springer, New York

Colville J, Berryhill, D 2007, Handbook of Zoonoses - Identification and Prevention, Elsevier Mosby, St.Louis, MO USA

### AVBS4008

#### Intensive Animal Industries

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Downing **Session:** Semester 2 **Classes:** 6 hrs/wk **Prerequisites:** (Animal and Veterinary Bioscience years 1-3) OR (Bachelor of Science in Agriculture years 1-3) **Assessment:** Written exam (50%) (Poultry and Pigs 50:50), in course evaluations and case study - Pigs (25%), Broiler growth study report and in course evaluations - Poultry (25%) **Practical field work:** Visits to an intensive pig/poultry farm, feed mill and poultry production and processing units when biosecurity restrictions allow **Mode of delivery:** Normal (lecture/lab/tutorial) day

#### Textbooks

There is no single text that adequately covers the Australian pig industry and for this reason no formal text is required. There are many sites (industry, academic institutions and government departments) on the Web which provide excellent information. Links to these will be provided. Where appropriate, relevant reference material will be identified for specific areas of the course. Often poultry specific text books are obsolete very quickly, it would be important to use trade information. The library subscribes to breeder management guides and general poultry production journals as well as specific poultry scientific journals.

### AVBS4012

#### Extensive Animal Industries

**Credit points:** 6 **Teacher/Coordinator:** Dr Russell Bush **Session:** Semester 1 **Classes:** lectures 3hrs/wk, practicals 3hrs/wk **Prerequisites:** Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3 **Assessment:** case study (10%), practical report (15%), meat grading (15%), excursion report (20%) and written exam (40%) **Practical field work:** 5 day study tour to the Riverina **Mode of delivery:** Normal (lecture/lab/tutorial) day

### BUSS2220

#### Small Business Structures and Taxation

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Brett Bondfield **Session:** Semester 2 **Classes:** Wks 2 and 10: Saturday and Sunday 9am-1pm workshops and online modules on Blackboard **Prerequisites:** 48 credit points in junior and senior units **Prohibitions:** ACCT3014, CLAW2207, ACCT3013, CLAW2205, CLAW3206, CLAW3207, ACCT3099, CLAW2211, ACCT2012, CLAW2202, CLAW3201, ACCT3032, CLAW2209, ACCT3011, CLAW2203, CLAW3202, ACCT3098, CLAW2210, ACCT3012, CLAW2204, CLAW3204, ACCT3031, CLAW2208, ACCT2011, CLAW2201, CLAW2212 **Assessment:** taxation portfolio (50%), presentation (20%), and exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### BUSS3500

#### Integrated Business Applications

**Credit points:** 6 **Teacher/Coordinator:** Geoff Harrison **Session:** Intensive February, Intensive July, Semester 1, Semester 2 **Classes:** 1x 1.5 hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** For the Bachelor of Commerce: Completed a minimum of 120 credit points including the following units of study: (BUSS1001 or ECOF1003), (BUSS1002 or ECOF1004), (BUSS1030 or ACCT1005), (BUSS1040 or ECON1001) and (BUSS1020 or ECMT1010 or equivalent); For the Bachelor of Commerce (Liberal Studies): Completed a minimum of 168 credit points including the following units of study: (BUSS1001 or ECOF1003) and (BUSS1002 or ECOF1004). **Prohibitions:** ECOF3001 **Assessment:** individual progress report (10%), group project (50%), and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: This unit of study is a compulsory part of the Bachelor of Commerce, combined Bachelor of Commerce degrees and the Bachelor of Commerce (Liberal Studies).*

Textbooks

Integrated Business Applications

### CLAW2201

#### Corporations Law

**Credit points:** 6 **Teacher/Coordinator:** Ms Juliette Overland **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Prerequisites:** Any 4 full semester junior units of study including CLAW1001 **Prohibitions:** CLAW2001 **Assessment:** Mid semester test (20%), assignment (20%), tutorial work and participation (10%), and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### FINC3011

#### International Financial Management

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2012 or FINC2002 **Prohibitions:** FINC3001 **Assessment:** 2x semester tests each (20%), tutorial participation (10%) and a final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### FINC3015

#### Financial Valuation: Case Study Approach

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture per week; 1x1hr workshop session per week **Prerequisites:** FINC2012 or FINC2002 **Prohibitions:** FINC3005 **Assessment:** Case studies (35%), group project (25%), and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### FINC3020

#### Financial Risk Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2012 **Assumed knowledge:** FINC3017 **Assessment:** Lab exercises (20%), group project (20%), mid semester exam (20%), and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### IBUS2101

#### International Business Strategy

**Credit points:** 6 **Teacher/Coordinator:** Dr Grace Yang **Session:** Semester 1, Semester 2, Summer Late **Classes:** 1 x 2hr lecture and 1x 1hr workshop per week. **Prerequisites:** 36 junior credit points **Prohibitions:** IBUS2001 **Assessment:** consulting project (30%), tutorial participation (20%), mid-term exam (15%), and final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### MKTG2113

#### Marketing Research

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 **Prohibitions:** MKTG1002 **Assessment:** group project (planning and executing market research (18%) and analysing quantitative data (18%)), tutorial participation (10%), research participation (6%), and exams (mid-semester (20%) and final (28%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### PHYS5031

#### Ecological Econ & Sustainable Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Christopher Dey **Session:** Semester 1 **Classes:** 2-hour lecture and 1-hour tutorial per week. **Assessment:** Major essay, tutorial summary, and course compilation diary (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

### PHYS5033

#### Environmental Footprints and IO Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Arne Geschke and Prof Manfred Lenzen **Session:** Semester 1, Semester 2 **Classes:** 2-hour lecture interspersed with hands-on exercises per week **Assessment:** Comprehensive diary/notes from lectures, including a quantitative example (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Minimum class size of 5 students.*

### PHYS5034

#### Life Cycle Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Christopher Dey **Session:** Semester 2 **Classes:** 2-hour lecture and 1-hour tutorial per week **Assessment:** Major essay, seminar presentation and course diary compilation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Minimum class size of 5 students.*

### WORK2205

#### Human Resource Processes

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Diane van den Broek **Session:** Semester 1 **Classes:** 1x 2 hour lecture and 1x 1hour tutorial per week **Prerequisites:** 24 credit points of junior units of study including (WORK1003 or WORK1002) **Prohibitions:** WORK2005 **Assessment:** Academic Honesty Module (0%); Tutorial Facilitation (20%); In-class multiple choice quiz (20%); Major assignment (30%); Final exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

### WORK2209

#### Managing Organisational Change

*This unit of study is not available in 2015*

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Prohibitions:** WORK2009 **Assessment:** Seminar participation (10%), essay (40%) and exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### WORK2210

#### Strategic Management

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Leanne Cutcher **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Prohibitions:** WORK2010 **Assessment:** mid-term quiz (30%), tutorial group discussion (10%), tutorial group paper (20%), case study assignment (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This is the compulsory unit of study for the Management major.*

### WORK2211

#### Human Resource Strategies

*This unit of study is not available in 2015*

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points of units of study including (WORK1003 or WORK1002) **Prohibitions:** WORK2011, IREL2011 **Assessment:** readiness assessments (30%), team strategy activities (20%), reflective journal assignment (30%), and final strategy assessment (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

### WORK2218

#### Managing Organisational Behaviour

**Credit points:** 6 **Teacher/Coordinator:** Dr Helena Nguyen **Session:** Semester 1 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 24 junior credit points **Assessment:** individual case study (30%), group presentation (15%), individual group work reflection (25%), and exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This is the compulsory unit of study for the Management major.*



# Bachelor of Science in Agriculture

## Course rules

### Bachelor of Science in Agriculture

#### Bachelor of Science in Agriculture (Honours)

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

## Course resolutions

### 1 Course codes

Code	Course title
BUSCAGRI-01	Bachelor of Science in Agriculture

### 2 Attendance pattern

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

### 3 Admission to candidature

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

### 4 Requirements for award

- (1) The units of study that may be taken for the course are set out in table of units of study for the Bachelor of Science in Agriculture. The Dean may approve some variation in units of study required for the degree for exceptionally talented students.
- (2) To qualify for the award of the pass degree, a candidate must successfully complete 192 credit points, including:
  - (a) 150 credit points of core units of study; and
  - (b) In addition, at least 12, and no more than 18 credit points from units designated as Year 4 specialisation units; and
  - (c) The remaining units from units designated as Year 3 or Year 4 electives.
  - (d) A maximum of 6 credit points in Year 3 and 6 credit points in Year 4 may be taken from units outside of the Table (including from other faculties), to count as either Year 3 or Year 4 electives.
- (3) To qualify for the award of international specialisation, a candidate must complete a minimum of 48 credit points in approved units of study for two semesters at an approved university. Once a student has applied for and been accepted for International Exchange, the student may then apply for the International Specialisation. For detailed information on the application procedure, requirements and approved universities, please see the Faculty website: [http://sydney.edu.au/agriculture/current\\_students](http://sydney.edu.au/agriculture/current_students)

### 5 Award of the degree

- (1) The Bachelor of Science in Agriculture is awarded as either Pass or with Honours. Honours are awarded in classes ranging from First Class to Second Class.

### 6 Weighted average mark (WAM)

- (1) The University has a formula for calculating a Weighted Average Mark and this is defined in the University Glossary. WAMs are used by the University as one indicator of performance. For example, WAMs can be used in assessing admission to and award of honours, eligibility for prizes and scholarships, or assessing progression through a course.
- (2) For the Bachelor of Science in Agriculture, the Faculty of Agriculture and Environment uses a Year 2/3 WAM that includes all 2000 level and 3000 level units of study, except those 3000 level units of study taken to fulfil part of the requirements for Year 4. For the BScAgr, the Year 4 WAM includes all 4000 level units of study as well as any 3000 level unit of study taken to fulfil part of the requirements for Year 4.

- (3) The WAM calculations use the following formula:

$\text{WAM} = \frac{\text{sum}(\text{Wc} \times \text{Mc})}{\text{sum}(\text{Wc})}$
---

where Wc is the unit of study credit points x the unit weighting and Mc is the mark achieved for the unit. The mark used for units with a grade AF is zero. Pass/fail units and credited units from other institutions are not counted. All units carry a weighting of one, except the individual research components of undergraduate degrees, which carry a weighting of two.

### 7 Award of the degree of Bachelor with Honours

- (1) For the degree of Bachelor of Science in Agriculture
  - 1.1 To qualify for the award of honours a student must normally:
    - (a) have a Year 2/3 WAM of at least 65; and
    - (b) complete an independent research component as part of the final year of the program with an overall honours mark of at least 65.
  - 1.2 The overall honours mark shall be the average of the Year 2/3 WAM and the Year 4 WAM.
  - 1.3 Honours is awarded in the following classes:

Level of honours	Overall honours mark	Minimum WAM Years 2/3
First Class	mark >= 75	65
Second Class, Division 1	70 <= mark < 75	65
Second Class, Division 2	65 <= mark < 70	65
Honours not awarded	mark <65	n/a

### 8 Transitional provisions

- (1) These resolutions apply to persons who commenced their candidature after 1 January, 2013 and persons who commenced their candidature prior to 1 January, 2013 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2013 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2018. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.







# Bachelor of Science in Agriculture

## Units of study table

<i>Unit of study</i>	<i>Credit points</i>	<i>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</i>	<i>Session</i>
<b>Year 1</b>			
Year 1 will have the following 48 credit point structure:			
<b>AGEN1001</b> Shaping our Landscapes	6	<b>N</b> AFNR1001	Semester 1
<b>BIOL1001</b> Concepts in Biology	6	<b>A</b> HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). <b>N</b> BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911	Semester 1 Summer Main
or			
<b>BIOL1911</b> Concepts in Biology (Advanced)	6	<b>P</b> 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit <b>N</b> BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>CHEM1001</b> Fundamentals of Chemistry 1A	6	<b>A</b> 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. <b>N</b> CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903	Semester 1
or			
<b>CHEM1101</b> Chemistry 1A	6	<b>A</b> HSC Chemistry and Mathematics <b>N</b> CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901	Semester 1 Summer Main
or			
<b>CHEM1901</b> Chemistry 1A (Advanced)	6	<b>P</b> HSC Chemistry result of 80 or more <b>N</b> CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>ENVX1002</b> Introduction to Statistical Methods	6	<b>C</b> Prohibitions: ENVX1001	Semester 1
<b>AGEN1002</b> Sustaining our Landscapes	6	<b>A</b> School Year 12 level knowledge of mathematics, some biology and chemistry.	Semester 2
<b>AGEC1006</b> Economic Environment of Agriculture	6	<b>A</b> HSC Mathematics <b>N</b> AGE1004, AGE1003	Semester 2
<b>AGEN1004</b> Applied Biology for Ag and Environment	6	<b>N</b> BIOL1002	Semester 2
<b>AGEN1006</b> Biological Chemistry	6	<b>P</b> CHEM1001 or CHEM1101 or CHEM1901 <b>N</b> CHEM1002	Semester 2
<b>Year 2</b>			
Please note in Year 2 AGEN2006 replaces AVBS1002			
Year 2 will have the following 48 credit point structure:			
<b>ENVX2001</b> Applied Statistical Methods	6	<b>P</b> ENVX1001 or ENVX1002 or BIOM1003 or MATH1011 or MATH1015	Semester 1
<b>GENE2002</b> Veterinary and Agricultural Genetics 2	6	<b>A</b> Knowledge of biology, chemistry and statistics from, or equivalent to that in, the 1st year Units of Study in the degrees in which this Unit is available. <b>P</b> At least one of (BIOL1001, BIOL1002, BIOL1101, BIOL1901, BIOL1911, VETS1018) <b>N</b> GENE2001	Semester 1
<b>AGEN2001</b> Plant Function	6	<b>P</b> (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry	Semester 1
<b>SOIL2003</b> Soil Properties and Processes	6		Semester 1
<b>AGEN2006</b> Animal Production and Management	6	<b>A</b> HSC Maths (2 unit) and Biology <b>P</b> 12 credit points of junior Biology and 12 credit points of junior Chemistry	Semester 2
<b>ENTO2001</b> Introductory Entomology	6	<b>P</b> 12 cp of first year biology <b>N</b> BIOL2917, BIOL2017	Semester 2
<b>MICR2024</b> Microbes in the Environment	6	<b>P</b> 12 cp of first year Biology <b>N</b> MICR2021, MICR2022, MICR2921, MICR2922	Semester 2
<b>AGEN2005</b> Plant Systems Biology	6	<b>P</b> AGEN2001 or BIOL2023 or BIOL2923	Semester 2
<b>Year 3*</b>			
Year 3 will have the following structure: a core (24 credit points) of			
<b>AGCH3025</b> Chemistry and Biochemistry of Foods	6	<b>A</b> Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry <b>N</b> AFNR5102, AGCH3017, AGCH3024	Semester 1



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>PPAT3003</b> Plant Disease	6	P MICR2024 or MICR2021 or MICR2921 or MICR2022 or MICR2922	Semester 1
<b>AGRO3004</b> Managing Agro-Ecosystems	6	P (BIOL2023 or BIOL2923 or PLNT2003 or AGEN 2001) and SOIL2003.	Semester 2
<b>SOIL2004</b> The Soil Resource	6		Semester 2
And 24 credit points from Table D.			
<b>Table D - Year 3 Electives</b>			
<b>AFNR3001</b> Agro-ecosystems in Developing Countries	6	<i>Note: Department permission required for enrolment</i>	Semester 1
<b>AGEC2102</b> Agribusiness Marketing	6	P AGECE1006 or AGECE1102 or RSEC1031	Semester 1
<b>ANSC3102</b> Animal Reproduction	6	A ANSC3104	Semester 1
<b>ANSC3103</b> Animal Structure and Function A	6	A AVBS1002 P 12 credit points of junior Biology	Semester 1
<b>AREC2001</b> Econ of Biological Production Systems	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 1
<b>AREC2003</b> Concepts in Enviro and Resource Economics	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 1
<b>BIOL3018</b> Gene Technology and Genomics	6	P (MBLG2072 or MBLG2972) and 6cp from either (MBLG2071 or MBLG2971) or Intermediate BIOL. N BIOL3918	Semester 1
Department Permission required for enrolment			
or			
<b>BIOL3918</b> Gene Technology and Genomics Advanced	6	P Distinction average across (MBLG2072 or MBLG2972) and 6cp from either (MBLG2071 or MBLG2971) or Intermediate BIOL. N BIOL3018	Semester 1
Department Permission required for enrolment			
<b>ECMT2150</b> Cross Section Econometrics	6	P (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 N ECMT2110	Semester 1 Semester 2
<b>ENVX3002</b> Statistics in the Natural Sciences	6	P ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922	Semester 1
<b>HORT3005</b> Production Horticulture	6	A AGEN1001 and AGEN1004 P (AGEN2001 and AGEN2005) or BIOL2023 or BIOL2923	Semester 1
<b>AGEC3102</b> Agricultural and Resource Policy	6	P (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) N AGECE3002	Semester 1
<b>AGCH3033</b> Environmental Chemistry	6	A SOIL2003, LWSC2002 P 12 cp of Junior Chemistry N CHEM2404	Semester 2
<b>ANSC3101</b> Animal Nutrition 3	6	P AVBS1002, (VETS1032 or PLNT2001 or PLNT2901) C AVBS2001 or MICR2024	Semester 2
<b>ANSC3104</b> Animal Structure and Function B	6	A AVBS1002 P ANSC3103	Semester 2
<b>AREC2002</b> Commodity Market and Price Analysis	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 2
<b>AREC2004</b> Benefit-Cost Analysis	6	P ECON1001 or AGECE1006 or AGECE1102	Semester 2
<b>AREC3001</b> Production Modelling and Management	6	P AREC2001 or AGECE2103 or ECOS2001 or ECOS2901	Semester 2
<b>ENVX3001</b> Environmental GIS	6	P AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology	Semester 2
<b>LWSC2002</b> Introductory Hydrology	6	P 6cp of Junior Geoscience or AGEN1002	Semester 2
<b>PLNT3001</b> Plant, Cell and Environment <i>This unit of study is not available in 2015</i>	6	P 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics N PLNT3901	Semester 2
<b>Year 4<sup>^</sup></b>			
Year 4 students will complete:			
<b>AFNR4101</b> Research Project A	12	P 144 credit points of level 1000-3000 units of study	Semester 1
<b>AFNR4001</b> Professional Development	6	N AGRF4000 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>AFNR4102</b> Research Project B	12	P AFNR4101	Semester 2
Year 4 students will complete one specialisation comprising two 6cp units of study and up to one elective unit from Table D, E or F.			
<sup>^</sup> A student may apply to the degree coordinator for permission to enrol in up to one (6 cp) elective University of Sydney unit of study in year 3 and up to one (6 cp) University of Sydney unit of study in year 4 which is not listed in Tables D or E. The application must (1) be made prior to enrolment in the unit (2) be submitted with a written academic justification for enrolment by the student and (3) be submitted with written approval of the relevant unit of study coordinator.			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Table E - Year 4 Specialisations</b>			
<b>Agricultural Chemistry</b>			
<b>AFNR5107</b> Principles of Biochemical Analysis	6	<b>N</b> AGCH4007	Semester 1
<b>AGCH3033</b> Environmental Chemistry	6	<b>A</b> SOIL2003, LWSC2002 <b>P</b> 12 cp of Junior Chemistry <b>N</b> CHEM2404	Semester 2
<b>Agricultural Economics</b>			
<b>AREC3001</b> Production Modelling and Management	6	<b>P</b> AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
<b>AREC3002</b> Agricultural Markets	6	<b>P</b> AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
<b>Agricultural Genetics</b>			
<b>GENE4012</b> Plant Breeding	6	<b>P</b> GENE2001, GENE4013	Semester 2
<b>GENE4015</b> Cytogenetics	6	<b>P</b> (BIOM2001 or ENVX2001) and GENE2001	Semester 2
<b>Agronomy</b>			
<b>AGRO4003</b> Crop and Pasture Agronomy	6	<b>P</b> AGRO3004	Semester 1
<b>AGRO4004</b> Sustainable Farming Systems	6	<b>P</b> AGRO3004	Semester 1
<b>Animal Production</b>			
<b>AGRO4005</b> Livestock Production Systems	6	<b>A</b> Junior plant and animal biology (or equivalent), junior chemistry biology, intermediate crop and animal production, nutrition and physiology (or equivalent). <b>P</b> 6 credit points of Junior Biology or equivalent <i>Note: Department permission required for enrolment</i>	Semester 2
<b>AGRO4006</b> New and Emerging Tech in Animal Science	6	<b>P</b> 6 credit points Junior Biology or equivalent	Semester 2
<b>Entomology</b>			
<b>ENTO4004</b> Insect Taxonomy and Systematics <i>This unit of study is not available in 2015</i>	6	<b>P</b> ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921.	Semester 1
<b>ENTO4003</b> Integrated Pest Management	6	<b>P</b> ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921.	Semester 2
<b>Environmetrics</b>			
Select two of the following units:			
<b>BIOM4003</b> Matrix Algebra and Linear Models	6	<b>P</b> ENVX3002 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>BIOM4004</b> Advanced Statistical Methods	6	<b>P</b> BIOM4003 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>BIOM4005</b> Biometrical Methods	6	<b>P</b> ENVX3002 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>ENVX4001</b> GIS, Remote Sensing and Land Management	6	<b>P</b> ENVX3001 or GEOS2111 or GEOS2911 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>Food Science</b>			
<b>AGCH3026</b> Food Biotechnology	6	<b>A</b> Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry <b>N</b> AGCH3005, AGCH3003, AGCH4006, AFNR5103	Semester 1
<b>HORT4005</b> Research and Practice in Hort Science	6	<b>P</b> HORT3005	Semester 2
<b>Forest Science</b>			
<b>ENSY3002</b> Fire in Australian Ecosystems	6	<b>P</b> AGEN2005 or BIOL2023 or BIOL2923	Semester 1
<b>ENSY3003</b> Forest Ecosystem Science	6	<b>P</b> Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage.	Semester 2
<b>Horticulture</b>			
<b>HORT3005</b> Production Horticulture	6	<b>A</b> AGEN1001 and AGEN1004 <b>P</b> (AGEN2001 and AGEN2005) or BIOL2023 or BIOL2923	Semester 1
<b>HORT4005</b> Research and Practice in Hort Science	6	<b>P</b> HORT3005	Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Hydrology</b>			
<b>LWSC3007 Advanced Hydrology and Modelling</b>	6	<b>P</b> LWSC2002	Semester 1
<b>ENVX3001 Environmental GIS</b>	6	<b>P</b> AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology	Semester 2
<b>Soil Science</b>			
<b>SOIL3009 Contemporary Field and Lab Soil Science</b>	6	<b>P</b> SOIL2003	Semester 1
<b>SOIL3010 The Soil at Work</b>	6	<b>P</b> SOIL2003 or SOIL2004	Semester 2
<b>Table F - Other Year 4 electives</b>			
<b>AVBS4009 Aquaculture</b>	6	<b>P</b> Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3	Semester 1
<b>AVBS4012 Extensive Animal Industries</b>	6	<b>P</b> Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3	Semester 1
<b>VIRO3001 Virology</b>	6	<b>A</b> Intermediate Microbiology <b>P</b> 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: 18 credit points of BMED units including (BMED2401 and BMED2404) or (BMED2801 and BMED2802 and BMED2807). <b>N</b> VIRO3901 <i>Students are very strongly advised to complete VIRO3001/3901 before enrolling in VIRO3002/3902 Medical and Applied Virology in Session 2.</i>	Semester 1
<b>AGEN5001 Agricultural and Environmental Extension</b>	6	<b>A</b> AGEN1001 and AGE1006 <b>P</b> Assumed knowledge: AGEN1001 and AGE1006 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>ANSC3107 Animal Genetics 3</b>	6	<b>P</b> GENE2001 or MBLG2072 or MBLG2972	Semester 2
<b>AREC3003 Econ of Minerals and Energy Industries</b>	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>AVBS4002 Dairy Production and Technology</b>	6	<b>P</b> Assumed Knowledge: Enrolled students are expected to have some understanding of key components of the dairy production system, including basic knowledge of animal physiology and nutrition.	Semester 2
<b>AVBS4008 Intensive Animal Industries</b>	6	<b>P</b> (Animal and Veterinary Bioscience years 1-3) OR (Bachelor of Science in Agriculture years 1-3)	Semester 2

# Bachelor of Science in Agriculture

## Units of study

### Year 1

Year 1 will have the following 48 credit point structure:

#### AGEN1001

##### Shaping our Landscapes

**Credit points:** 6 **Teacher/Coordinator:** Dr Peter Ampt **Session:** Semester 1 **Classes:** 2x1hr lect, 1x2hr tut, 4x1 day (6.5hr) field (ave 2hrs/week) **Prohibitions:** AFNR1001 **Assessment:** 1x2hr exam (40%), Field class reports (10%), Group work participation (10%), Journal (10%), Problem based learning project (30%) **Practical field work:** Preparation, revision and private study 3hrs/week **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to help students develop understanding of our non-urban landscapes and the physical, biological, economic and cultural factors that have shaped them, with particular emphasis on the interaction between production and environment. It is a core first year unit for students in BScAgr, BEnvSys, BAgEc, BResEc and BAnVetBioSc. The unit begins with a review of the current global issues around population, food, agriculture and environment and the place of Australia in this global context. Australia's current production (plant and animal based) and environmental systems and landscapes are described with an emphasis on the physical, biological, economic and cultural factors that have shaped them, concluding with an account of future production and environment scenarios. At the end of this unit, students should be able to describe global production and environment issues and key Australian landscapes and production systems, explain the factors that have shaped them and apply this understanding to a specific location and production system. They should analyse the situation of natural resource managers and evaluate the options available to them to maintain or improve profitable production and achieve sustainability. The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

##### Textbooks

To be advised during semester.

#### BIOL1001

##### Concepts in Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1, Summer Main **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prohibitions:** BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments tests and lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Concepts in Biology is an introduction to the major themes of modern biology. The unit covers fundamental cell biology, with a particular emphasis on cell structure and function; the foundations of molecular biology from the role of DNA in protein synthesis to the genetics of organisms; and the theory of evolution and principles of phylogenetic analysis, including how these are used to interpret the origins of the diversity of extant organisms. Practical classes focus on students designing experiments, making and recording their observations and communicating their findings. The unit emphasises how biologists carry out scientific investigations, from the molecular and cellular level to the level of ecosystems. This unit of study provides a good foundation for intermediate biology units of study.

##### Textbooks

Knox R B et al. Biology, An Australian Focus. 4th ed. McGraw-Hill. 2010

or

#### BIOL1911

##### Concepts in Biology (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** 80+ in HSC 2-unit Biology (or equivalent) or Distinction or better in a University level Biology unit **Prohibitions:** BIOL1991, BIOL1901, BIOL1101, BIOL1500, BIOL1001 **Assessment:** One 2-hour exam, assignments, tests, lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

Concepts in Biology (Advanced) has the same overall structure as BIOL1001 but material is discussed in greater detail and at a more advanced level. Students enrolled in BIOL1901 participate in alternative components, which include a separate lecture and practical stream from BIOL1001. The content and nature of these components may vary from year to year.

##### Textbooks

As for BIOL1001.

#### 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 9 weeks. **Prohibitions:** CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903 **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 (60%), laboratory work (15%), online assignments (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or

#### 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 9 weeks. **Prohibitions:** CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901 **Assumed knowledge:** HSC Chemistry and Mathematics **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

##### Textbooks

A booklist is available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

or



## CHEM1901

### Chemistry 1A (Advanced)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1-hour lectures and one 1-hour tutorial per week; one 3-hour practical per week for 9 weeks. **Prerequisites:** HSC Chemistry result of 80 or more **Prohibitions:** CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

## ENVX1002

### Introduction to Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop **Session:** Semester 1 **Classes:** 2x1 hr lectures/wk, 1x1 hr tutorial/wk, 1x2 hr computer practical/wk **Corequisites:** Prohibitions: ENVX1001 **Assessment:** 1 Ā Exam during the Exam period (50%), 2 Ā Practical Tests (10% each), 2 Ā Assessment Tasks (10% each) and 8 Online Quizzes (1.25% each). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a core first year unit for the BEnvSys, BScAgr, BFoodAgr, BVetBiol and BAnVetBioSc degrees. It provides the foundation quantitative and statistical skills that are needed in other units in the degrees and for further study in applied statistics. In the first portion of the unit the emphasis is on the role of statistics in scientific research, describing data and its variability, and probability. In the second part the focus is on sample designs and framing scientific 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 final part of the unit is on the use of calculus for modelling biological and environmental data, for example the use of linear and non-linear functions. In the practicals the emphasis is on applying theory to analysing real datasets using the spreadsheet package Excel and the statistical package Genstat.

#### Textbooks

Recommended readings: -Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton). -Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

## AGEN1002

### Sustaining our Landscapes

**Credit points:** 6 **Teacher/Coordinator:** Professor Mark Adams (Coordinator), Professor Alex McBratney, Dr Tarryn Turnbull, A/Prof Tihomir Ancev **Session:** Semester 2 **Classes:** 3 x lectures + 1 x tutorial per week for weeks 1-6 & 11-13, 1x tutorial per week only for weeks 7-10, 1 x compulsory 2.5 day weekend field trip between weeks 6 & 7 **Assumed knowledge:** School Year 12 level knowledge of mathematics, some biology and chemistry. **Assessment:** 1 x 2hr exam (50%), 4 x tutorial exercises (24%), 1 x field trip report (26%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The quest for sustainability is integral to all land management. The earth's natural systems - especially cycles of water, carbon and nutrients - are critical to economic, social and many other aspects of the world in which we live. As a country dependent on export of commodities, Australia must contend with very significant external forces that shape how we manage land.

This unit of study provides students with critical knowledge and understanding of the economic, biophysical, and chemical principles that must be considered in assessing sustainability, and applies that

knowledge to assessing how current Australian landscapes might be managed in the future. Beginning with an exploration of the meaning of sustainability and how scientific and economic methodology is applied to its study, students will progressively engage with more complex and challenging content. By the end of the unit, students will have explored major elements of sustainability and be able to apply their understanding to articulate critical questions that need to be asked when presented with simplistic approaches or ideas. A major field trip will focus on introducing students to quantitative measurement of key processes and developing a greater depth of knowledge of sustainability "in the field". A range of typical Australian landscapes will be considered, ranging from the high country and forests to intensive irrigated agriculture. The field trip and tutorial exercises are intended to help students gain skills in rigorous analysis of the relevant literature and in preparing short pieces of writing. Students direct experience of and exposure to the science and economics of ecological sustainability. Students will work in small groups during field and tutorial sessions.

#### Textbooks

A Critique for Ecology R.H. Peters, 1991, Cambridge University Press  
Biogeochemistry : An Analysis of Global Change W.H. Schlesinger 1997, Academic Press

## AGEC1006

### Economic Environment of Agriculture

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prohibitions:** AGECE1004, AGECE1003 **Assumed knowledge:** HSC Mathematics **Assessment:** 1x2hr exam (55%) and 1x50 min mid-semester exam (25%) and workshop papers (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

To give students an overview of the structure, viability and importance of the agricultural sector in the Australian economy. It is a core unit of study in the BScAgr, BHortSc and BAnVetBioSc degrees. It is designed to give an understanding of the basic economic principles and how they relate to Australian agriculture. Students will look at basic economic theory and concepts and then apply these concepts to solve simplified versions of real problems faced by the agriculture and resource sectors. Students will look at the relationship between these concepts and the concepts learnt within their science related courses. Students will be able to analyse economic concepts and apply these concepts to real world scenarios. They will be able to synthesis and comprehend the relationship between the economic and science disciplines. The students will gain skills through workshop based tasks, information literacy and communication skills through the presentation of the workshop reports and discussion throughout the workshop.

#### Textbooks

HE Drummond and JW Godwin, Agricultural Economics, 3rd edn (Prentice-Hall, 2011)

## AGEN1004

### Applied Biology for Ag and Environment

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Prof. Michael D'Azocchio, Prof. David Guest, A/Prof. Luciano Gonzalez, A/Prof. Michael Kertesz, Prof. Rosanne Taylor, Dr Catherine Herbert **Session:** Semester 2 **Classes:** 1x2 hr lecture/workshop per week, 1x3.5 hr Practical per week **Prohibitions:** BIOL1002 **Assessment:** Practical Participation and Quizzes (10%), Plant ID Portfolio (20%), Group video and presentation (30%), Individual viva-voce exam (10%), End of semester exam (30%) **Practical field work:** Practical and field report preparation. Class preparation, material revision/private study **Mode of delivery:** Normal (lecture/lab/tutorial) day

Building on the fundamentals of biology introduced in 1st semester biology (BIOL1001 or equivalent), this unit runs alongside 2nd semester chemistry where students learn the fundamentals of organic chemistry and the major biomolecules. In this unit, students will gain an understanding of how biological processes and systems function. Students will be introduced to the major plant, animal and microbial systems, how they interact, and how an understanding of environment influences is key to effective and sustainable management of the biosphere. Topics will be introduced that will emphasise the specific importance of the major biological processes and through lectures, practicals and field trips, students will gain an in-depth understanding

of basic plant, animal and microbial physiology, biochemistry, energy flows and biological interactions, and the importance of these in determining the resilience of organisms, communities, ecosystems and the biosphere. Students will be able to contextualize this knowledge so that they can determine appropriate management strategies for productivity and the conservation and rehabilitation of natural systems.

#### Textbooks

Recommended reference books (purchase of text book is not essential & reference materials will be provided): - Sadava D, Hillis D, Heller C, Berenbaum M 2012, Life: the science of biology, 10th edition, WH Freeman and Co, Gordonville VA.

### AGEN1006

#### Biological Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr Claudia Keitel (Coordinator), Dr Thomas Roberts, Dr. Feike Dijkstra, A/Prof. Balwant Singh, A/Prof. Adam Bridgeman **Session:** Semester 2 **Classes:** 3x1-hr lectures/wk, 1x1-hr tutorial/wk 1 x 3-hr practical/wk **Prerequisites:** CHEM1001 or CHEM1101 or CHEM1901 **Prohibitions:** CHEM1002 **Assessment:** Three quizzes (3x5%), 1 x Problem solving exercise (10%), Final exam (60%), Laboratory-based assessment (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study expands on the basic chemical concepts taught in first semester (CHEM1001). The unit will cover the structure and behaviour of organic and inorganic compounds relevant to chemical reactions in biological systems. The unit will introduce students to organic molecules (hydrocarbons, alcohols, aldehydes and ketones, aromatic compounds, organic acids) and inorganic chemistry (e.g. acid-base and redox reactions, solubility, metal complexes) as well as the structures and reactions of major biological macromolecules (e.g. carbohydrates, lipids, proteins and nucleic acids). In weeks 1-7, lectures, tutorials and laboratory work are conducted in co-operation with the School of Chemistry, Faculty of Science. In weeks 8-13, lectures, tutorials and laboratory work will be undertaken in the Faculty of Agriculture and Environment. Lectures, tutorials and laboratory work are integrated, providing students with a theoretical and practical basis for further studies in the management of biological systems. This 6 credit point unit consists of approximately 80 hours directed learning.

#### Textbooks

Reference books; Blackman, Bottle, Schmid, Mocerino and Wille Chemistry and SI Chemical Data (package), 2nd Edition, 2012 (John Wiley) ISBN: 9781118234228

### Year 2

Please note in Year 2 AGEN2006 replaces AVBS1002 Year 2 will have the following 48 credit point structure:

### ENVX2001

#### Applied Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), A/Prof Willem Vervoort, A/Prof Peter Thomson **Session:** Semester 1 **Classes:** 2x1 hr lectures/wk, 1x1 hr tutorial/wk, 1x2 hr computer practical/wk **Prerequisites:** ENVX1001 or ENVX1002 or BIOM1003 or MATH1011 or MATH1015 **Assessment:** 1 Exam during the Exam period (50%), 2 Practical Tests (2x10%), 2 Assessment Tasks (2x10%) and 8 Online Quizzes (8x1.25%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is a core 2nd year unit for students in the BEnvSys, BScAgr and BAVBSc degrees. It consists of two parts. In the first part students will learn the basics of experimental design and investigate how to use an ANOVA to analyse experiments with more than 2 treatment levels, multiple factors and different blocking designs. In the second part an introduction to a branch of mathematics called linear algebra is given with an emphasis on the applications to statistics and modelling. In this part the students will learn to model relationships between response and predictor variables using regression, and find patterns in datasets with many variables using principal components. During the practicals two software packages; Genstat and Excel, will be used to analyse real datasets. At the end of this unit, students will have learnt how to design and experiment and how to analyse data using ANOVA, regression and principal components, the basic methods needed for their future studies and careers.

#### Textbooks

No textbooks are recommended but useful reference books are:

-Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton).

-Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

### GENE2002

#### Veterinary and Agricultural Genetics 2

**Credit points:** 6 **Teacher/Coordinator:** Prof Peter Sharp **Session:** Semester 1 **Classes:** 3 lec/wk, 3 prac/fortnightly and 1 tut/fortnightly **Prerequisites:** At least one of (BIOL1001, BIOL1002, BIOL1101, BIOL1901, BIOL1911, VETS1018) **Prohibitions:** GENE2001 **Assumed knowledge:** Knowledge of biology, chemistry and statistics from, or equivalent to that in, the 1st year Units of Study in the degrees in which this Unit is available. **Assessment:** 1x 2hr final exam (60%), 4x on-line quizzes (10%), assignment(s) (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides an introduction to the genetics and breeding of plants and animals, especially domesticated or managed "wild" species and populations. It provides an understanding for parallel and following courses. Lectures cover the basics of gene transmission and interaction, cytogenetics, molecular genetics, genomics, population and quantitative genetics, as well as the more applied aspects of plant and animal breeding and biotechnology. Practicals and tutorials emphasize, with agricultural (plant and animal), and veterinary examples, the procedures of genetic and cytogenetic analysis. Computer simulation is used to illustrate the principles of population genetics, quantitative inheritance and selection programs. The unit of study also provides exposure to current plant and animal breeding and biotechnology practices and creates awareness of ethical issues relating to these developments.

#### Textbooks

Essential Cell Biology - Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter, Edition: 4th Garland Science, Introduction to Veterinary Genetics, 3rd Edition, Frank W. Nicholas, ©2010, Wiley-Blackwell

### AGEN2001

#### Plant Function

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell (Coordinator), Dr Thomas Roberts **Session:** Semester 1 **Classes:** 2x1-hr lectures, 1x 3-hr practical per week **Prerequisites:** (BIOL1001 or BIOL1911) and 12cp of Junior Chemistry **Assessment:** 1x 1hr mid-semester exam (20%), 1x 2hr final exam (40%), 1000w essay (10%), Five practical reports (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings, tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

#### Textbooks

Taiz L, Zeiger E (2010) Plant Physiology 5th ed.

### SOIL2003

#### Soil Properties and Processes

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Prof Alex McBratney, A/Prof. Stephen Cattle **Session:** Semester 1 **Classes:** 3x1hr lectures and 1x3hr practical/week, commencing week 1, and a compulsory field excursion to be held on the Thursday and Friday in the week preceding the first semester. **Assessment:** Soil description report (10%), Quizzes (or Essay) (15%), Practical exercise book (20%), Practical exam (15%) and Written exam (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the fundamental concepts within pedology, soil physics and soil chemistry. These concepts are part of the grounding principles that underpin crop and animal production, nutrient and water cycling, and environmental sustainability taught by other units of study in the Faculty. Students will participate in a two-day field excursion in the first week of semester to examine some common soils of the Sydney Basin, they will also learn to describe soil, and measure soil chemical and physical properties in the field. Referring to common soil profiles of the Sydney Basin, students will concentrate on factors affecting soil formation, the rudiments of soil description, and analysis of soil properties that are used in soil classification. Students will also develop knowledge of the physics of water and gas movement, soil strength, soil chemical



properties, inorganic and organic components, nutrient cycles and soil acidity in an agricultural context. At the end of this unit students will become familiar with the factors that determine a soil's composition and behaviour, and will have an understanding of the most important soil physical and chemical properties. Students will develop communication skills through essay, report and practical exercises. The final report and laboratory exercise questions are designed to develop team work and collaborative efforts.

*Textbooks*

Campbell, K.O. & Bowyer, J.W. (eds) (1988). *The Scientific Basis of Modern Agriculture*. Sydney University Press.  
 White, R.E. (2006). *Principles and Practice of Soil Science: the Soil as a Natural Resource*. 4th ed., Blackwell Science, Oxford.  
 Charman, P.E.V. & Murphy, B.W. (2000). *Soils: Their properties and management*. 2nd ed. Oxford University Press, Melbourne.

**AGEN2006**

**Animal Production and Management**

**Credit points:** 6 **Teacher/Coordinator:** Professor Michael D'Occhio, Associate Professor Luciano Gonzalez **Session:** Semester 2 **Classes:** 2 x 1 hr lectures per week **Prerequisites:** 12 credit points of junior Biology and 12 credit points of junior Chemistry **Assumed knowledge:** HSC Maths (2 unit) and Biology **Assessment:** 1 x mid-term exam (20%), 1 x 2 hr final exam (30%), 2 x Assignments (2 x 25% each) **Practical field work:** 10 x excursions/ practical sessions per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to develop the student's ability to critically examine and evaluate the production and management of animals used for food and fibre in Australia and internationally. The unit will focus on new and emerging issues in animal production, including productivity, welfare, remote monitoring and management, animals in the environment, and meeting specifications in an ever-evolving marketplace. The identification, selection and breeding of animals that are optimally suited to production systems is a focus. New thinking and innovations that are being used to address scientific, industry and social expectation challenges will be a feature of the unit and case studies will be used throughout to examine interactions between these factors and their impact on management practices. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through online discussion postings, laboratory reports and presentations, and personal and intellectual autonomy through working in groups. At the successful completion of the unit, students will have the core knowledge and skills to enable them to lead developments in production animal industries in Australia and overseas.

*Textbooks*

No prescribed textbooks

**ENTO2001**

**Introductory Entomology**

**Credit points:** 6 **Teacher/Coordinator:** Dr Tanya Latty **Session:** Semester 2 **Classes:** (2x1hour lecture, 1x3hour practical, 1x1hour insect collection)/week, commencing week 1. **Prerequisites:** 12 cp of first year biology **Prohibitions:** BIOL2917, BIOL2017 **Assessment:** 1 x 2hr exam (50%), lab quizzes and manual (20%), 1 x insect collection (30%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

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: 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.

**MICR2024**

**Microbes in the Environment**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** 2 lec, 3h prac/wk **Prerequisites:** 12 cp of first year Biology **Prohibitions:** MICR2021, MICR2022, MICR2921, MICR2922 **Assessment:** 1 x 2hr exam (60%), 4 x quizzes (15%), lab skills assessment (5%) and 1 x lab project report (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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*

Willey et al. 2011. *Prescott/Harley/Klein's Microbiology* 8th ed. McGraw-Hill

**AGEN2005**

**Plant Systems Biology**

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant (Coordinator), Dr Thomas Buckley **Session:** Semester 2 **Classes:** 3x1-hr lectures/tutorials per week plus 1 x 2 day field trip **Prerequisites:** AGEN2001 or BIOL2023 or BIOL2923 **Assessment:** 1x 2hr final exam (50%), 1000w essay (30%), 1x practical report (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study will provide students with an understanding of the plant metabolic network, its regulation and how metabolic control is integral to an ability to adapt to environmental change. It is a core unit for students enrolled in the Bachelor of Science in Agriculture and Bachelor of Environmental Systems. From the perspective of energy flows, this unit will outline a framework for the plant metabolic network at the physiological, chemical and molecular levels. Students will become familiar with network complexity and its regulation through the use of the latest bioinformatics and analytical tools. Students will gain first-hand experience in the assessment of plant health and management of resource availability in both cropping and natural systems by participating in a 2-day field trip in week 11 of semester to institutes and facilities in major Australian research hubs. Information will be interpreted at a range of scales from the cellular to the whole plant, demonstrating the importance of metabolism to plants and to broader biospheric processes. At the completion of this unit, students will be able to articulate the major components of the plant metabolic network, its regulation in response to changes in resource availability and to make informed management decisions for the optimization of the productivity and resilience of Australian ecosystems.

**Year 3\***

Year 3 will have the following structure: a core (24 credit points) of

**AGCH3025**

**Chemistry and Biochemistry of Foods**

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Roberts (Coordinator), Prof Les Copeland, **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x4-hr practical fortnightly **Prohibitions:** AFNR5102, AGCH3017, AGCH3024 **Assumed knowledge:** Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry **Assessment:** 1x2hr exam (40%) and 6 x lab reports (6x10%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study aims to give students an understanding of the properties of food constituents, and the interactions between these constituents during food processing, storage and digestion. The unit will develop an understanding of the relationship between form and functionality of constituents and the concept of fitness-for-purpose (i.e., quality) in converting agricultural products into foods. Students will gain an appreciation of the relationship between chemical composition and properties of macroconstituents (carbohydrates, proteins, lipids) and microconstituents (vitamins, minerals, antioxidants, flavour and anti-nutritional chemicals) and their functions in plant- and

animal-based foods. The material presented in lectures and practical classes will enable students to develop research and inquiry skills and an analytical approach in understanding the biochemistry of foods, food processing and storage. On completing this unit, students will be able to describe the chemical and biochemical properties of major food constituents, and demonstrate an understanding of the functionality of these constituents in food processing and nutrition. Students will have gained experience in laboratory techniques used in industry for the analysis of some food products, and information literacy and communication skills from the preparation of practical reports.

#### Textbooks

Lecture and laboratory notes will be made available through Blackboard. There is no recommended textbook.

### PPAT3003 Plant Disease

**Credit points:** 6 **Teacher/Coordinator:** Prof David Guest **Session:** Semester 1 **Classes:** (2x 1hr lec, 3h prac)/wk **Prerequisites:** MICR2024 or MICR2021 or MICR2921 or MICR2022 or MICR2922 **Assessment:** 1x 2hr end of semester exam (60%), 1x prac exam (25%), six take-home quizzes (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces plant disease and the pathogens that limit agricultural and horticultural production. The unit is core to the BScAgr and BHortSc degrees and is available as an elective to BLWS and BSc students. It builds on the material introduced in MICR2024. The lecture component of the unit discusses the aetiology of plant disease and symptom development; diagnosis of plant disease; the biology, epidemiology and management of fungi and other microbes that cause plant disease; breeding for disease resistance; plant-parasite relationships; and disease resistance in plants. The practical component introduces techniques used in handling and identifying fungi and in studying plant disease, and develops skills in experimental design, execution and interpretation of experimental data. At the completion of this unit, students will be able to exercise problem-solving skills (developed through practical experiments and lecture discussions), think critically, and organise knowledge (from consideration of the lecture material and preparation of practical reports), expand from theoretical principles to practical explanations (through observing and reporting on practical work), use certain computer software for analysing data and reporting on laboratory projects. Students learn to work in a research team, plan effective work schedules (to meet deadlines for submission of assessable work), use statistical analysis in research, keep appropriate records of laboratory research, work safely in a research laboratory and operate a range of scientific equipment. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through assessment tasks and personal and intellectual autonomy through working in groups.

#### Textbooks

Schumann GL & Darcy CJ 2006. Essential Plant Pathology. APS Press, St Paul, Minn., USA.

### AGRO3004 Managing Agro-Ecosystems

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Brett Whelan (Coordinator), Dr Daniel Tan, Dr Lachlan Ingram, Prof. Michael D'Acchio. **Session:** Semester 2 **Classes:** 1x 2hr lecture/wk; 1x 2hr tutorial/practical each week. Half-day field trips during weeks 3, 9, 10, 11 (no lecture or tutorial those weeks). **Prerequisites:** (BIOL2023 or BIOL2923 or PLNT2003 or AGEN 2001) and SOIL2003. **Assessment:** 3x quizzes (30%), 1 x Viva Voce (30%), 1x 2hr exam (40%). **Practical field work:** Half-day field trips during weeks 3, 9, 10, 11 **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide a solid introductory understanding of the biology and management of cropping systems, with a focus on major Australian broad acre crops. The course examines a typical crop cycle, with an emphasis on cereals, especially wheat. An overview of the main crops grown in Australia is presented. The relationship between crop growth and soil and aerial environments is discussed, and the importance of water and water-use efficiency is highlighted. The physiology of crops--including germination, photosynthesis, vegetative and reproductive growth and development,

transpiration, photosynthate partitioning, and mineral nutrient acquisition and use--is studied as the basis of crop yield and production. Biological processes associated with seed (grain) development are described. Weed management, pasture management, and precision agriculture are discussed in theoretical and practical terms, and an introduction to crop adaptation and breeding is presented. Successful students will attain the ability to appreciate and analyse some of the most important limitations to crop yield and production in Australia and how those limitations can be minimized or overcome through science-based planning and management practices.

#### Textbooks

Reference Books;

Pratley, J. (ed) (2003) Principles of Field Crop Production. 4th Edition, Oxford Univ. Press, Melbourne.

Connor DJ, Loomis RS, Cassman KG (2011) Crop Ecology: Productivity and Management in Agricultural Systems, 2nd Ed. Cambridge Univ Press, Cambridge.

Marschner, P. (ed) (2012) Mineral Nutrition of Higher Plants. 3rd Edition, Academic Press, London.

### SOIL2004 The Soil Resource

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Stephen Cattle (Coordinator), Prof Alex McBratney, A/Prof Balwant Singh **Session:** Semester 2 **Classes:** (2x1 hr lec, 1x2 hr pracs)/wk, 25 hr (5 days) fieldtrip in the week immediately preceding the start of Semester 2 **Assessment:** Fieldtrip participation (5%), soil survey mapping report (30%), laboratory report and poster presentation (25%), three group tutorials (20%), viva voce exam (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will familiarise students with the description and mapping of soil types in the Australian landscape, with common analytical methods for soil and with the various forms of degradation that may alter the quality and function of soil. It is an applied soil science unit that builds on the fundamental soil science concepts learned in the SOIL2003 unit. The first practical component of the unit, a five-day soil survey, will give students experience in soil description and classification in the field, and soil samples collected during this survey will be subsequently analysed for a variety of attributes by the students in laboratory practicals. In the lecture series, topics including soil type distribution, soil quality, soil function, soil fertility and soil degradation will be discussed and linked to practical sessions. By the end of this unit, students will be able to construct maps of soil properties and soil type distribution, describe primary soil functions, soil attributes and types of soil degradation in an agricultural context, and be able to recognize and communicate the ability of a soil profile to sustain plant growth. Students will gain research and inquiry skills by collecting, analysing and interpreting soil survey data, and will gain communication skills by having to prepare and present a poster.

And 24 credit points from Table D.

## Table D - Year 3 Electives

### AFNR3001 Agro-ecosystems in Developing Countries

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 1x18 days fieldtrip before start of semester 1 **Assessment:** Project Proposal (10%), Project Report (60%), Project Presentation (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit provides students with a direct contact with the agricultural reality of a developing country through a fieldtrip. Active learning in the field through contacts with farmers, public servants, cooperatives, private firms and NGOs should then motivate a critical reflection on the constraints to agricultural development in these environments.

The fieldtrip will be organized around central themes (for example, technology adoption, sustainable use of resources, access to credit, land use change) that will be introduced in a short series of seminars (held on main campus ahead of the departure and intended to provide a first introduction to some of the questions that are expected to be addressed in the field) and will constitute the focus of group work once back to main campus.

Although there are no formal prerequisites, the unit is directed to students that have completed most of the second year units in their degrees.

N.B. Department permission required for enrolment. Please note that, in practice, this unit will run prior to the start of semester 1 with all classes and the fieldtrip being scheduled during that period.

### AGEC2102

#### Agribusiness Marketing

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/fortnight **Prerequisites:** AGE1006 or AGE1102 or RSEC1031 **Assessment:** Group presentation (15%), 1x2000wd case study (25%), and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an introductory understanding of agribusiness marketing in a modern context. The unit will provide students in the Sciences degrees with an understanding of how the economic theory taught in first year in AGE1006 can be treated in an applied context. For BAgEc students, it is an intermediate level unit in the Agribusiness major.

Students will study the theory relating to the firm-level marketing mix and marketing strategy. The emphasis will be on 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 to demonstrate how marketing decisions are made along the marketing chain. At the end of this unit students will be able to use marketing theory to analyse the steps in the marketing chain and be aware of the forces for change within that chain.

By completing this unit, students should have improved their ability to master key theories, identify and frame problems, organise knowledge, carry out individual and group research, and synthesise information. They should also have improved their information literacy skills, and communication skills through group presentations and individual research.

### ANSC3102

#### Animal Reproduction

**Credit points:** 6 **Teacher/Coordinator:** Dr Simon de Graaf **Session:** Semester 1 **Classes:** lectures 2 hrs/week, tutorials 1 hr/week, practicals 3 hrs/week **Assumed knowledge:** ANSC3104 **Assessment:** written and oral assignments (30%), mid-semester written exam (10%), end of semester written exam (60%) **Practical field work:** There will be several half day practical classes held at the Camden Campus **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides a comprehensive programme on basic and applied aspects of male and female reproductive biology, with particular emphasis on livestock and domestic animals. The fundamental topics include reproductive cycles, sexual differentiation, gametogenesis, fertilization, embryo development, gestation and parturition. An understanding of the applications of advanced reproductive technologies is developed through lectures, tutorials and the assignments. In addition, practical instruction is given on semen collection and processing, manipulation of the reproductive cycle, artificial insemination, and pregnancy diagnosis in sheep and pigs. Classes are held at the Camperdown Campus in Sydney and at the Camden Campus Animal Reproduction Unit and Mayfarm piggery.

#### Textbooks

Senger, PL 2013, Pathways to pregnancy & parturition 3rd ed., Current Conceptions Inc

### ANSC3103

#### Animal Structure and Function A

**Credit points:** 6 **Teacher/Coordinator:** Dr Peter White **Session:** Semester 1 **Classes:** lectures 3hrs/wk, laboratories/tutorials 3hrs/wk (note these will vary depending upon the week) **Prerequisites:** 12 credit points of junior Biology **Assumed knowledge:** AVBS1002 **Assessment:** assignments/presentations/online quiz (50%) and examinations (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Animal Structure and Function A will develop an understanding of the role of the body systems in maintaining homeostasis in an animal's

internal environment. In ASFA the structure and function of the musculoskeletal, cardiovascular, respiratory, central nervous and integumentary systems of the body are explored in depth particularly with reference to the maintenance of homeostasis and an animal's perception of, and response to, its environment. The developed understanding of the normal functioning of these systems allows identification of the impact on the animal of abnormal function of these systems. A study of the structure and function of muscle will include its role in movement and as meat in a production setting. The overall goals of the Unit are (i) to enable students to develop a rich understanding of the relationships between body systems and structures (to be continued in ASFB). (ii) to develop generic skills particularly in group work and oral presentation, (iii) to develop an appreciation of the links between structure and function and their relevance to animal disease and production that will be further developed in Veterinary Pathogenesis as well as in advanced, applied studies in Behaviour in third year and in 4th year Animal Production.

### AREC2001

#### Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

### AREC2003

#### Concepts in Enviro and Resource Economics

**Credit points:** 6 **Session:** Semester 1 **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 1x50min Mid-semester Test (20%), 2x1000wd Assignments (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the concepts in microeconomics to provide insights into efficient and sustainable resource management. The primary focus of this unit 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 introductory material on economic valuation of environmental assets and benefit cost analysis is included.

### BIOL3018

#### Gene Technology and Genomics

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Neville Firth **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** (MBLG2072 or MBLG2972) and 6cp from either (MBLG2071 or MBLG2971) or Intermediate BIOL. **Prohibitions:** BIOL3918 **Assessment:** One 2-hour exam (60%), assignments (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

A unit of study with lectures, practicals and tutorials on the application of recombinant DNA technology and the genetic manipulation of prokaryotic and eukaryotic organisms. Lectures cover the applications of molecular genetics in biotechnology and consider the regulation, impact and implications of genetic engineering and genomics. Topics include biological sequence data and databases, comparative genomics, the cloning and expression of foreign genes in bacteria, yeast, animal and plant cells, novel human and animal therapeutics and vaccines, new diagnostic techniques for human and veterinary disease, and the genetic engineering of animals and plants. Practical work may include nucleic acid isolation and manipulation, gene cloning and PCR amplification, DNA sequencing and bioinformatics, immunological detection of proteins, and the genetic transformation and assay of plants.

Department Permission required for enrolment

**BIOL3918****Gene Technology and Genomics Advanced**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Neville Firth **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prerequisites:** Distinction average across (MBLG2072 or MBLG2972) and 6cp from either (MBLG2071 or MBLG2971) or Intermediate BIOL. **Prohibitions:** BIOL3018 **Assessment:** One 2-hour exam (60%), assignments (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Qualified students will participate in alternative components of BIOL3018 Gene Technology & Genomics. The content and nature of these components may vary from year to year.

Department Permission required for enrolment

**ECMT2150****Cross Section Econometrics**

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

**ENVX3002****Statistics in the Natural Sciences**

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), Dr Floris Van Ogtrop (Coordinator). A/Prof Peter Thompson **Session:** Semester 1 **Classes:** 2x2 hr workshop/wk, 1x3 hr computer practical/wk **Prerequisites:** ENVX2001 or BIOM2001 or STAT2012 or STAT2912 or BIOL2022 or BIOL2922 **Assessment:** 1 A Exam during the Exam period (50%), 5 A Assessment Tasks (5x10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the analysis of data they may face in their future careers, in particular data that are not well behaved, they may be non-normal, there may be missing observations or they may be correlated in space and time. In the first part, students will learn how to analyse and design experiments based on the general linear model. In the second part, they will learn about the generalisation of the general linear model to accommodate non-normal data with a particular emphasis on the binomial and poisson distributions, in addition to modelling non-linear relationships. In the third part linear mixed models will be introduced which provide the means to analyse datasets that do not meet the assumptions of independent and equal errors, for example data that is correlated in space and time. At the end of this unit, students will have learnt a range of advanced statistical methods and be equipped to apply this knowledge to analyse data that they may encounter in their future studies and careers.

**Textbooks**

Recommended readings:

-Mead R, Curnow RN, Hasted AM (2002) 'Statistical methods in agriculture and experimental biology.' (Chapman & Hall: Boca Raton).  
-Quinn GP, Keough MJ (2002) 'Experimental design and data analysis for biologists.' (Cambridge University Press: Cambridge, UK).

**HORT3005****Production Horticulture**

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Robyn McConchie **Session:** Semester 1 **Classes:** 2x1hr lec; 1x3hr prac/workshop/wk **Prerequisites:** (AGEN2001 and AGEN2005) or BIOL2023 or BIOL2923 **Assumed knowledge:** AGEN1001 and AGEN1004 **Assessment:** 1x 3 hr exam (55%), three assignments (45%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study covers topics on the production of perennial fruit crops, wine grapes, the sustainable production of vegetables and it also covers the key aspects of the postharvest handling and quality assurance of fresh produce. At the end of this unit students are expected to have a detailed understanding of these areas of

horticulture and be able to discuss related literature and the physiological principles underlying the commercial success of these horticultural enterprises. Students will also gain research and enquiry skills through research based practical sessions and assignments.

**Textbooks**

Recommended reading: Louis Glowinski (2008) The complete book of fruit growing in Australia. Lothian Books, Westwood, M.N. (1993) Temperate-zone pomology. Timber Press Inc., Jackson, J.E (2003) Biology of apples and pears. Cambridge University Press, Gopinadhan Paliyath et al. (Ed.) (2008) Postharvest biology and technology of fruits, vegetables, and flowers. Oxford : Wiley-Blackwell, Decoteau, D/. R (2000). Vegetable Crops. Upper Saddle River, NJ: Prentice Hall

**AGEC3102****Agricultural and Resource Policy**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 1 **Classes:** 1x2-hr lecture + 1x1-hr lectures/week, 1x1-hr tutorial/fortnightly **Prerequisites:** (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) **Prohibitions:** AGECE3002 **Assessment:** 1x2.5hr exam (70%) and 3x600 wd problem sets (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit covers the theoretical framework for economic analysis of policy interventions (welfare economics and public choice theory). Emphasis is put on building the skills needed to analyze the incidence of economic policy and on the design of policies under asymmetric information. An understanding of the institutional structure of agricultural and resource policy in Australia is promoted through the direct contact with policy makers, public agencies and lobbying groups. N.B. Available to 3rd year students in the Faculty of Economics and Business

**Textbooks**

To be advised

**AGCH3033****Environmental Chemistry**

**Credit points:** 6 **Teacher/Coordinator:** Dr. Feike Dijkstra (Coordinator); Dr. Claudia Keitel; Dr. Malcolm Possella/A/Prof. Balwant Singh **Session:** Semester 2 **Classes:** 2 lec & 3hr prac/wk **Prerequisites:** 12 cp of Junior Chemistry **Prohibitions:** CHEM2404 **Assumed knowledge:** SOIL2003, LWSC2002 **Assessment:** Research Proposal (40%), Prac Report (40%), Presentation (15%), Class Participation (5%) **Practical field work:** Practical reports and essay writing. Preparation reading for practical or field trips, preparation for group presentation, exam preparation. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This course provides basic concepts in environmental chemistry underpinning many of the environmental problems humans are faced with, with a focus on agricultural and natural ecosystems.

AGCH3033 is a core unit for the BEnvSys degree and an elective unit suitable for the BScAgr, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry and biology.

Sources, reactions and fate of chemical species will be investigated in air, water, soil and biota. Case studies about human impacts on the environment will be integrated in the lectures, laboratory classes and field trip.

At the end students have an understanding of chemical concepts that are at the root of many environmental problems in agricultural and natural ecosystems. This unit will provide students with tools to identify and assess the chemistry behind environmental problems and will guide students in developing methods to manage these problems.

Students will enhance their skills in problem definition, assessing sources of information, team-work and effectively communicating environmental issues from a chemical perspective through laboratory reports and oral presentation.

**Textbooks**

Reference Books: Andrews et al. 2004. An Introduction to Environmental Chemistry.  
Van Loon and Duffy. 2010. Environmental Chemistry: A Global Perspective.  
Hanrahan. 2011. Key Concepts in Environmental Chemistry.

**ANSC3101****Animal Nutrition 3**

**Credit points:** 6 **Teacher/Coordinator:** Dr Alex V. Chaves **Session:** Semester 2 **Classes:** lectures 2 h/week, lecture recording 1h/week and in situ and/or

online laboratories 2-3 h/week **Prerequisites:** AVBS1002, (VETS1032 or PLNT2001 or PLNT2901) **Corequisites:** AVBS2001 or MICR2024 **Assessment:** Assignments, including 5 individual reports from problem based learning (30%), 1 online middle term exam (35%), 1 oral or video presentation (25%), and 1 online end of term exam (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This Unit of Study builds upon principles discussed in AVBS1002 Concepts of Animal Management. The Unit is broadly divided into four sections, namely: estimating the nutritive characteristics of feeds; defining 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 and wildlife. 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 nutrient requirements of the animal; interactions between nutrients that influence health and production. And following from this, students will have the 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

Students are encouraged to have an individual tablet PC or laptop with wireless connectivity (e.g.: ipad; Galaxy Note, etc.) during all classes. There is no required text for the course. A number of textbooks are available on reserve at the library. These include: 1 - Animal Nutrition by McDonald, P., Edwards, R.A., Greenhalgh, J.F.D. and Morgan, C.A. (2002) 6th ed. Pearson Education Limited, Harlow UK. Badham Library Call # 636.0852 3 E 2 - Feeds and Feeding (5th Edition) (Hardcover) by Tilden Wayne Perry, Arthur E. Cullison, Robert S. Lowrey (Authors). Publisher: Prentice Hall; 5 edition (November 19, 1998). Badham Library Call # 636.084 9 B 3 - Animal Feeds, Feeding and Nutrition, and Ration Evaluation CD-ROM (Hardcover) by David Tisch (Author). Publisher: Delmar Cengage Learning; 1 edition (October 5, 2005). Badham Library Call # 636.08557 5 4 - Animal Nutrition Science (Paperback) by G. Dryden (Author) Publisher: CAB; 1 edition (October 5, 2008). Badham Library Call # 636.0852 66 5 - Tables of Composition and Nutritional Value of Feed Materials Pigs, Poultry, Cattle, Sheep, Goats, Rabbits, Horses, Fish By Daniel Sauvant, Jean-Marc Perez, Gilles Tran Publisher: INRA (January, 2004). Badham Library Call # 636.0852 60 National Research Council (NRC) publications describing nutrient requirements of various species may also provide useful information; these publications can all be accessed online and are available on reserve at the library: - Nutrient Requirements of Poultry (NRC, 1994). Badham or Camden 636.50852 4 F - Nutrient Requirements of Swine (NRC, 1998). Badham or Camden 636.40852 7 G - Nutrient Requirements of Dairy Cattle (NRC, 2001). Badham or Camden 636.214 17D - Nutrient Requirements of Beef Cattle (NRC, 2000). Badham 636.213 27 G - Nutrient Requirements of Horses (NRC, 2007). Badham or Camden 636.10852 5 F There will be copies of this text on reserve and for purchase in the bookstore. Again, it is not essential to buy these text books. All the material required for the course will be presented in lecture and in the lecture notes, but the text may prove useful in understanding the lecture material.

### ANSC3104

#### Animal Structure and Function B

**Credit points:** 6 **Teacher/Coordinator:** Dr Cathy Herbert **Session:** Semester 2 **Classes:** lectures 3 hrs/wk, laboratories/tutorials 3 hrs/wk, activities will vary on a weekly basis **Prerequisites:** ANSC3103 **Assumed knowledge:** AVBS1002 **Assessment:** anatomy dissection project (20%), topic test (10%), assignment (20%), final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

In this Unit students will complete the study of the structure and function of organ systems in animals started in ANSC3103. The role of hormones and the immune systems will be investigated in relation to maintenance of internal homeostasis. An introduction to digestion and male and female reproductive anatomy and physiology will form the basis for further applied studies in these areas in third year Units of Study in Animal Nutrition and Animal Reproduction. There will be development of the generic skills of critically reading and writing.

#### Textbooks

For Animal Structure:  
Dyce, KM, Sack, WO & Wensing, CJG 2002, Textbook of Veterinary Anatomy, 3rd edn, W.B.Saunders, Philadelphia  
For Animal Function:

Sherwood, L, Klandorf, H and Yancey, PH 2005. Animal Physiology. From Genes to Organisms. Thomson Brook Cole

A handbook containing details of lecture outlines, objectives, reference lists, details of practical classes, staffing as well as other relevant class material will be available for students to purchase

### AREC2002

#### Commodity Market and Price Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 1x50min Mid-semester Test (20%), 1xGroup Assignment (1000wd equiv) (20%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AREC2004

#### Benefit-Cost Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGE1006 or AGE1102 **Assessment:** 1x200wd Oral Presentation (5%), 1xGroup-work Essay (1000wd equiv) (20%), 1x50min Mid-semester Test (25%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Foundational concepts in welfare economics, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures, are analysed in detail and applied to project evaluation and policy assessment. Procedures of conducting a benefit-cost analysis are presented, and tools of non-market valuation for public goods and 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.

### AREC3001

#### Production Modelling and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

### ENVX3001

#### Environmental GIS

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** Three-day field trip, (2 lec & 2 prac/wk). **Prerequisites:** AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology **Assessment:** One 15 min presentation (10%), 3500w prac report (35%), 1500w report on trip excursion (15%), 2 hr exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to impart knowledge and skills in spatial analysis and geographical information science (GISc) for decision-making in an environmental context. The lecture material will present several themes: principles of GISc, geospatial data sources and acquisition methods, processing of geospatial data and spatial statistics. Practical exercises will focus on learning geographical information systems (GIS) and how to apply them to land resource assessment, including digital terrain modelling, land-cover assessment, sub-catchment modelling, ecological applications, and soil quality assessment for

decisions regarding sustainable land use and management. A 3 day field excursion during the mid-semester break will involve a day of GPS fieldwork at Arthursleigh University farm and two days in Canberra visiting various government agencies which research and maintain GIS coverages for Australia. By the end of this UoS, students should be able to: differentiate between spatial data and spatial information; source geospatial data from government and private agencies; apply conceptual models of spatial phenomena for practical decision-making in an environmental context; apply critical analysis of situations to apply the concepts of spatial analysis to solving environmental and land resource problems; communicate effectively results of GIS investigations through various means- oral, written and essay formats; and use a major GIS software package such as ArcGIS.

#### Textbooks

Burrough, P.A. and McDonnell, R.A. 1998. Principles of Geographic Information Systems. Oxford University Press: Oxford.

Clarke, K. C. 2003. Getting Started With Geographic Information Systems. 4th Edition. Prentice Hall: Upper Saddle River, New Jersey.

### LWSC2002

#### Introductory Hydrology

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 2 **Classes:** Lec 2hr/wk; practical: 3hr/wk; field work: 25hr/wk (for 3 days only) **Prerequisites:** 6cp of Junior Geoscience or AGEN1002 **Assessment:** 1x 2 hr exam (50%), laboratory and practical reports (3x10%), field trip report (20%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces students to hydrology and water management in the context of Australian integrated catchment management. It particularly focuses on the water balances, rainfall runoff modeling, analysis and prediction of streamflow and environmental flows, water quality and sustainable practices in water management. Through theoretical work and case studies, the students will engage with problems related water quantity and quality in Australia and the world. The unit builds on knowledge gained in AGEN 1001 and AGEN 1002, and establishes the foundation for later units in the hydrology and water area. The unit provides one of the essential building blocks for a career related to water management and hydrology. The unit consists of two parts; the first part will involve a series of lectures, tutorials, practical exercises and case studies. The second part of the unit consists of a field excursion to regional NSW. During the field excursions, which are aligned with the ENVX3001 unit in the AVCC week, students will engage with current water problems and engage in basic hydrometric and water quality data collection. The data will be used later to analyse catchment condition and water quantity issues.

After completion of this unit, you should be able to:

Explain the different processes in the hydrological cycle

Measure and interpret hydrometric and basic water quality data

Elucidate the processes involved in generation of streamflow from rainfall.

Distinguish the link between water quantity and water quality and its implications for water management.

Demonstrate a deeper understanding of the unique nature of Australian Hydrology

#### Textbooks

Ladson (2007) Hydrology an Australian Introduction. Oxford University press. Chapters 1 & 6, Gordon, N. D., McMahon, T. A., Finlayson, B. L., Gippel, C. J., and Nathan, R. J. (2004) Stream hydrology: an introduction for ecologists, John Wiley & Sons Inc.

### PLNT3001

#### Plant, Cell and Environment

**This unit of study is not available in 2015**

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones **Session:** Semester 2 **Classes:** Workshops and discussions 2 hr/wk; laboratories: alternate weeks 30 hr total (6 pracs; 5 hr each) **Prerequisites:** 12 cp of Intermediate Biology, Plant Science, Molecular Biology and Genetics **Prohibitions:** PLNT3901 **Assessment:** 1x 2hr exam (40%), 2x reports (30%), 1x essay (15%), 1x group presentation (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study of comprises lectures/workshops and practical sessions that will explore how plants function and interact with their environment. Classes will examine the mechanisms plants have evolved to adapt and acclimate to varied and variable environments. We will address how plants adapt to their light environment and how they respond to common abiotic stresses (e.g. drought, salinity) and biotic stresses (herbivory) and how they interact with other organisms. Emphasis will be placed on integration of plant responses from molecular through to whole plant scales. You will need to draw on knowledge from intermediate units of study and explore the published literature to successfully integrate information from areas unfamiliar to yourself. The purpose of this Unit of Study is to develop an understanding of current directions in Plant Science at an advanced level. When you have successfully completed this unit of study, you should be able to: be familiar with modern approaches of physiology, biophysics and molecular biology in the study of plant function; understand how domains of knowledge interact to describe plant function; understand how plants function in stressful environments; carry out a small research project; draft a manuscript for publication in a peer-reviewed journal.

#### Textbooks

Students will be drawing on the current research literature for content. A Study Guide for the unit will be available for purchase during the first week of semester from the Copy Centre at a cost to be advised.

### Year 4<sup>^</sup>

Year 4 students will complete:

### AFNR4101

#### Research Project A

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 1 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** 144 credit points of level 1000-3000 units of study **Assessment:** Research proposal, literature review. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit aims to develop a student's ability to undertake a major research project in an area of specialization. The unit builds on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. This unit is a corequisite with AFNR4102 and each student will work with an academic supervisor in an area of specialization and develop a well defined research project to be executed. The research project is undertaken to advance the students ability to build well-developed research skills, a strong analytical capacity, and the ability to provide high quality research results demonstrating a sound grasp of the research question. Working with an academic supervisor students will develop their ability to define a research project including the producing of testable hypotheses, identifying existing knowledge from reviewing the literature and the design and execution of a research strategy towards solving the research question. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the development of experimental programs. Students will improve their written and planning skills by composing a research project proposal and the writing of a comprehensive literature review.

### AFNR4001

#### Professional Development

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 2 **Classes:** Workshops over four years **Prohibitions:** AGRF4000 **Assessment:** 1x blog posting (10%), 1x on-line (multi-media) (30%) and 1x portfolio (60%) **Practical field work:** 40 days of professional experience, 1 week long excursion **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study is designed to allow students to critically reflect on the relationship between the rural enterprise and environment and how they can contribute to the future decisions and management affecting the rural community. It is a core unit of study in 4th year for the BAgEc, BScAgr, BLWSc, BResEc, BHortSc which requires students to complete 40 days of professional experience with the expectation that students will examine the nature of facts from their

degree in this environment. A minimum of 15 days must be completed on-farm/field. The remaining days may be at the student's discretion. The unit will be counted towards 4th year, but professional experience placements will normally be undertaken throughout the degree. In the early stages of the Professional Development program students participate in Faculty excursions that have been developed so they can experience a range of activities, such as research, extension, on-farm and industry both in the rural and urban environment to complement their learning within their individual degree programs. Building on this various workshops have been developed to assist students to identify a rural environment theme or issue of their interest with the specific emphasis being placed on them reflecting on how their new understandings of their theme of interest affects their personal and professional development. To complete this unit students will present a portfolio of their theme including critical reflection on the pivotal relationships between the academic degree, rural environment, professional experience, and beliefs and values of the rural community. Through developing these pivotal relationships, students will be able to use their new understandings to support and guide the future developments in the rural enterprise and environment. By developing and presenting the portfolio and engaging in other online activities the students will enhance their skills in inquiry, information literacy and communication. In particular the autonomous development of case studies reflecting the contemporary issues in agriculture and their professional placements the students will have to consider their understandings of ethical, social and professional issues and further develop the personal and intellectual autonomy.

Note: Department permission required for enrolment

#### AFNR4102

##### Research Project B

**Credit points:** 12 **Teacher/Coordinator:** A/Prof Stephen Cattle **Session:** Semester 2 **Classes:** No formal classes, approx. 18h per week **Prerequisites:** AFNR4101 **Assessment:** Oral presentation, research paper, poster. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is a continuation of the major research project initiated in AFNR4101 and continues to build on theoretical and applied knowledge gained across most of the units of study undertaken throughout their degree program. Working with their academic supervisor in the area of specialization the student will continue to pursue the defined research project towards presenting final results and conclusions. The research results are presented in a format of a research paper as submitted to a research journal. The research paper and corrected literature review is combined and presented together as a thesis. Students will continue to build their research skills, develop strong analytical capacity, demonstrate a sound grasp of the topic, and an ability to interpret results in a broad framework. Working with an academic supervisor students will develop their ability to produce results of high quality, draw reliable conclusions and identify future areas avenues of research. Students will build on their previous research and inquiry skills through sourcing a wide range of knowledge to solve the research problem and enhance their intellectual and personal autonomy by means of the managing the research program. Students will improve their communication skills through oral presentation of their research findings, the production of a poster detailing their research findings and the writing of a research paper.

Year 4 students will complete one specialisation comprising two 6cp units of study and up to one elective unit from Table D, E or F. A student may apply to the degree coordinator for permission to enrol in up to one (6 cp) elective University of Sydney unit of study in year 3 and up to one (6 cp) University of Sydney unit of study in year 4 which is not listed in Tables D or E. The application must (1) be made prior to enrolment in the unit (2) be submitted with a written academic justification for enrolment by the student and (3) be submitted with written approval of the relevant unit of study coordinator.

## Table E - Year 4 Specialisations

### Agricultural Chemistry

#### AFNR5107

##### Principles of Biochemical Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Rosalind Deaker (Coordinator), Prof Les Copeland, Dr Thomas Roberts, A/Prof Michael Kertesz, Dr Feike Dijkstra, Dr Claudia Keitel, Dr Neil Wilson **Session:** Semester 1 **Classes:** 18 hrs of lectures and 36 hrs of laboratory during the semester **Prohibitions:** AGCH4007 **Assessment:** Assessment includes attendance and participation in lectures and practical classes. Each module will comprise 25% of the final assessment mark and satisfactory progress in all modules is required for the successful completion of this unit. (4x25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to expose students to the principles and practice of a diverse range of analytical methods used in agricultural and environmental science. The unit of study will be presented in four modules including: materials and sampling techniques; separation techniques (chromatographic and electrophoretic); instrumentation and measurement techniques (spectral analyses); and microbiological and molecular biology techniques. Each module will be a combination of lectures and practical classes that will analyse common agricultural or biochemical samples to illustrate the practical aspects of the theory. Students will also gain skills in data analysis relevant to the respective techniques.

At the completion of these modules, students will be familiar with the operation of a number of laboratory instruments, the theory that underpins their operation, be confident in the analysis of data, and be able to choose the most appropriate sampling strategy and analytical technique to perform high quality research.

#### AGCH3033

##### Environmental Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr. Feike Dijkstra (Coordinator); Dr. Claudia Keitel; Dr. Malcolm Possella/Prof. Balwant Singh **Session:** Semester 2 **Classes:** 2 lec & 3hr prac/wk **Prerequisites:** 12 cp of Junior Chemistry **Prohibitions:** CHEM2404 **Assumed knowledge:** SOIL2003, LWSC2002 **Assessment:** Research Proposal (40%), Prac Report (40%), Presentation (15%), Class Participation (5%) **Practical field work:** Practical reports and essay writing. Preparation reading for practical or field trips, preparation for group presentation, exam preparation. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This course provides basic concepts in environmental chemistry underpinning many of the environmental problems humans are faced with, with a focus on agricultural and natural ecosystems.

AGCH3033 is a core unit for the BEnvSys degree and an elective unit suitable for the BScAgr, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry and biology.

Sources, reactions and fate of chemical species will be investigated in air, water, soil and biota. Case studies about human impacts on the environment will be integrated in the lectures, laboratory classes and field trip.

At the end students have an understanding of chemical concepts that are at the root of many environmental problems in agricultural and natural ecosystems. This unit will provide students with tools to identify and assess the chemistry behind environmental problems and will guide students in developing methods to manage these problems.

Students will enhance their skills in problem definition, assessing sources of information, team-work and effectively communicating environmental issues from a chemical perspective through laboratory reports and oral presentation.

##### Textbooks

Reference Books: Andrews et al. 2004. An Introduction to Environmental Chemistry.  
Van Loon and Duffy. 2010. Environmental Chemistry: A Global Perspective.  
Hanrahan. 2011. Key Concepts in Environmental Chemistry.

## Agricultural Economics

### AREC3001

#### Production Modelling and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

### AREC3002

#### Agricultural Markets

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. It addresses price analysis and efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. Building on the application of microeconomic theory to both production and consumption in agricultural markets, its content is analytical.

## Agricultural Genetics

### GENE4012

#### Plant Breeding

**Credit points:** 6 **Teacher/Coordinator:** Professor Richard Trethowan **Session:** Semester 2 **Classes:** 20x lectures plus group presentations plus 10hrs practicals/demonstrations (26 July - 30 August) **Prerequisites:** GENE2001, GENE4013 **Assessment:** 1x2hr exam (75%) and 1 x group project (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Lectures and practical work are devoted to the theory, philosophy and practice of plant breeding. The unit addresses screening techniques, conservation of genetic variability, breeding for disease resistance and integration of molecular technology in applied plant breeding, with examples from both field and horticultural crops. The unit is taught in the context [of] climate change, food security and the evolving global intellectual property environment.

### GENE4015

#### Cytogenetics

**Credit points:** 6 **Teacher/Coordinator:** Professor Peter Sharp; animal component coordinator, Dr Jaime Gongora **Session:** Semester 2 **Classes:** Equivalent of 2 lecture/tutorials & 3 practicals/week **Prerequisites:** (BIOM2001 or ENVX2001) and GENE2001 **Assessment:** 1x1500wd Essay (25%), 1x750wd Practical report (10%) and 1x1000wd Fact Sheet (15%) 1x1200wd Laboratory report (20%), 1x2000wd Assignment (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a final year elective in the two degrees, BScAgr, and BAnVetBiosci. Approximately a half of the face-to-face contact hours will be given as an intensive, and this section of the unit will be held during the mid-year break before semester 2. Lecture and practical work in cytogenetics, especially of plant and animal species of applied interest in plant agriculture, animal agriculture and other applied interest in animal genetics, such as companion, native and endangered species. The lecture component covers the molecular nature of chromosomes and their transmission, variation in chromosome behaviour, both normal and disease related. In addition, the uses of chromosome engineering to produce variation in plants and animals will also be covered. The practical component covers the technologies

used to study chromosomes or both plants and animals, both mitotic and meiotic chromosomes, and molecular techniques such as in situ hybridisation, gene activity and chromosomal protein localisation. On completion, students will be able to apply cytogenetic knowledge and technologies to species of eukaryotes of economic significance, and know how cytogenetic processes have affected the development of these species.

## Agronomy

### AGRO4003

#### Crop and Pasture Agronomy

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan(Coordinator), A/Prof Brett Whelan, Dr Rosalind Deaker, Dr Lachlan Ingram **Session:** Semester 1 **Classes:** 12x2 h lectures/weeks 1-13; 4x2 h practicals/weeks 8, 11-13; Field excursions: week preceding start of semester and 6 (subject to weather) **Prerequisites:** AGRO3004 **Assessment:** 2 Data Analysis Projects (2x50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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. The unit also covers precision agriculture, legume science, rangeland science and crop protection. This unit includes a one-week excursion to cotton growing areas in northern NSW and Qld, specialist intensive instruction provided by the Cotton RDC, a three day excursion to the Cooma rangelands and a series of workshops, tutorials that provides analysis and synthesis of the major farming systems in this industry. Pasture production is also considered in the context of farming systems.

### AGRO4004

#### Sustainable Farming Systems

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** Negotiated practicals and workshops (63h) **Prerequisites:** AGRO3004 **Assessment:** Final Exam (50%), 3 Assignments (3x10%), Data Analysis Project (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to provide students with training in the professional skills required to practice agronomy. The unit principally builds on theoretical and applied knowledge gained in third year agronomy (AGRO3004). In this unit students will integrate their knowledge of plant physiology, soil science, experimental design, and biometry to address applied problems in agronomy, namely the issue of sustainability. Students will develop their ability to establish conclusions towards making recommendations for long term sustainability of crop and pasture systems. By implementing and managing a major field and/or glasshouse experiment(s) students will develop their research and inquiry skills. Team work is strongly encouraged in this unit and the integration and reporting of research findings will facilitate critical thinking and development of written communication skills. After completing this unit, students should be able to confidently design and manage a glasshouse/field experiment, and interpret and communicate their findings, by integrating knowledge from across disciplinary boundaries.

## Animal Production

### AGRO4005

#### Livestock Production Systems

**Credit points:** 6 **Teacher/Coordinator:** A/Professor Luciano A. Gonzalez **Session:** Semester 2 **Classes:** Lectures 2 x 1 hr/week and practicals/tutorials 3 hr/week **Prerequisites:** 6 credit points of Junior Biology or equivalent **Assumed knowledge:** Junior plant and animal biology (or equivalent), junior chemistry biology, intermediate crop and animal production, nutrition and physiology (or equivalent). **Assessment:** Mid-term exam (15%), final exam (30%), practical reports (10%), case study assignment (40%), seminar presentation (5%). **Practical field work:** At least 4 visits to livestock enterprises and the supply chain **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*



This unit examines livestock production following a whole system approach by integrating animals, vegetation, environment (soil, water, air and climate) and management, and analysing the interactions between them. The unit builds on principles delivered in core (AGEN1001, AGEN1004 and AGEN2006) and elective (ANSC3101, AVBS4012) units of study for those students interested in pursuing a career in Animal Science. The focus of this unit is on beef cattle and sheep. Particularities and commonalities of these livestock systems will be presented.

The pasture/grassland section examines the relationship between livestock production, forage quality and quantity in both native and sown pastures, impact of weeds, and grazing management. Interactions between climate, forage and animal production are also addressed. The animal component of this unit integrates concepts in grazing ecology, nutrition, reproduction, animal behaviour and welfare, and economics to develop skills in managing the production process for improved productivity, production efficiency and environmental stewardship. A special characteristic of this unit is the strong focus on simulation models decision support systems, and new technologies. Computer-based and field classes will provide direct experience in business management of livestock production systems and skills in record keeping and data handling. Students completing this unit will acquire skills to examine and manage livestock enterprises following a whole-system approach required in roles as consultants, advisors or managers of sustainable livestock enterprises.

Teaching Staff: A/Professor Luciano Gonzalez (Coordinator), Dr Lachlan Ingram.

#### AGRO4006

##### New and Emerging Tech in Animal Science

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Luciano Gonzalez **Session:** Semester 2 **Classes:** 2 x 1 hr lecture per week, 6 x excursions/practical sessions per semester, - Excursions (x3) to livestock enterprises, Practicals (x3) at Camden that will include: Demonstration and hands-on with remote sensing, recording and ICT technologies **Prerequisites:** 6 credit points Junior Biology or equivalent **Assessment:** 1x mid-semester exam (15%), 1x 2 hr final exam (30%), 2x Assignments (2 x 15% each), Practical reports (computer labs and field classes; 25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide students with an advanced understanding of new and emerging livestock technologies in Australia and overseas. Examples of these technologies include (1) next-generation infrared and laser scanning to determine physiological status and whole body composition, (2) diet formulation to enhance the nutritional and eating quality of livestock food products, (3) new vaccines and other therapeutics to regulate fertility, growth and behaviour whilst enhancing welfare and wellbeing, (4) microRNA technology to influence cellular, endocrine and physiological processes, (5) new genomics and laboratory-based reproductive technologies for advanced livestock breeding, (6) technologies to monitor and control animal behaviour, (7) unmanned ground and aerial vehicles to monitor livestock and the environment, (8) sensors and advanced image-capture technology to record the attributes of soil, air and the feedbase, (9) data-fusion science to integrate, analyse and interpret collected data, and (10) modelling of livestock systems. Students will gain research and inquiry skills through research based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and presentations, and personal and intellectual autonomy through working in groups. At successful completion of the unit students will have a sound knowledge of new and emerging technologies that will shape the livestock industries in Australia and overseas. This will provide valuable grounding for students preparing for postgraduate study and other learning and career paths.

##### Textbooks

No prescribed text but referral to references listed from library

## Entomology

#### ENTO4004

##### Insect Taxonomy and Systematics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tanya Latty **Session:** Semester 1 **Classes:** (1 x 2hr lecture, 1 x 3hr practical)/week, commencing week 1. **Prerequisites:** ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921. **Assessment:** 1 x 2hr exam (40%), 1 x museum project (25%), 1 x insect collection (25%), 1 x class participation (10%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Knowledge of the evolutionary relationships between insect groups contributes to our understanding of insect biology and correct taxonomic identification of insects is essential for all areas of entomological research, including pest management. This unit builds on the knowledge gained in second year entomology (BScAgr and BHortSc) and is a core unit for the entomology specialty (BScAgr). 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. Students will demonstrate their knowledge of insect taxonomy through individual projects and assess the impact of evolutionary relationships among insect groups on modern agriculture. Research, inquiry and information literacy skills will be improved through a museum project and a self-directed insect collection. Students will practice their communication skills and develop personal and intellectual autonomy through in-class discussion of current literature.

##### Textbooks

Upton MS and Mantle BL, 2010. Methods for collecting, preserving and studying insects and other terrestrial arthropods, 5th edition. The Australian Entomological Society, Miscellaneous Publication No. 3.  
Recommended: Naumann, I 1993. CSIRO Handbook of Australian Insect Names. 6th edition, CSIRO Entomology, Melbourne, VIC. 200 pp.  
Triplehorn, CA & Johnson, NF 2005. Borror and DeLong's introduction to the study of insects. 7th edition, Thomson Brooks/Cole, Belmont, CA, 864 pp.

#### ENTO4003

##### Integrated Pest Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Tanya Latty **Session:** Semester 2 **Classes:** 1x2hr lecture, 1x3hr practical/week, commencing week 1. **Prerequisites:** ENTO2001 or ENTO2002 or BIOL2017 or BIOL2917 or BIOL2021 or BIOL2921. **Assessment:** 1x2hr exam (40%), 1 x case study (20%), 1 x group assignment (20%), 1 x insect collection (20%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The focus of this unit is the development and adoption of integrated pest management (IPM) within Australian agriculture. It builds on the knowledge gained in second year entomology (BScAgr and BHortSc) and is a core unit for the entomology specialty (BScAgr). Applied entomology deals with the control of insect pests and the use of beneficial insects. The biology of major pest (herbivores and disease vectors) and beneficial (predators, parasitoids, pollinators) insect groups is covered in depth. Students will compare the advantages and disadvantages of different pest control strategies and evaluate the importance of insect ecology, control methods and socio-economic factors to successful adoption of integrated pest management. Field trips will demonstrate the practical application of IPM concepts presented in lectures. Research, inquiry and information literacy skills will be improved through critical review of current literature and compilation of a case study. Students will practice their communication skills and develop personal and intellectual autonomy through a group project, in-class discussion and a self-directed insect collection.

##### Textbooks

Required: Bailey, PT (Ed.) 2007. Pests of field crops and pastures. CSIRO Publishing, Collingwood, Vic. 520 pp.  
Recommended: Llewellyn, R. (Ed.) 2002. The Good Bug Book. 2nd edition, Australasian Biological Control, Richmond, NSW. 110 pp.  
Pedigo, LP and Rice, ME. 2009. Entomology and Pest Management, 6th edn. Pearson Prentice Hall, 784 pp.

## Environmetrics

Select two of the following units:

#### BIOM4003

##### Matrix Algebra and Linear Models

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop (Coordinator), A/Prof Peter Thomson **Session:** Semester 1 **Classes:** 1x3 hr workshop/wk, 3x1 day workshops (exam period) **Prerequisites:** ENVX3002 **Assessment:** 2 Ã Data Analysis Projects (50% each) **Mode of delivery:** Block mode

*Note: Department permission required for enrolment.*

In order to obtain a deeper understanding of statistics it is necessary to learn more about matrices as used to develop and explain statistical and mathematical concepts. 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 three aims to this unit. Firstly, we will revise matrices learnt in earlier units and then introduce new concepts such as special matrices (symmetric, orthogonal, idempotent), rank, eigenvalues and eigenvectors, as well as some matrix and vector calculus. The second aim is to apply these techniques to the formulation of linear models and linear mixed models which have been introduced in earlier units. The underlying theory will be developed along with more advanced applications. The third aim is to provide an introduction to key application areas for the future; (i) the analysis of big datasets, ones with many predictor variables, and (ii) the analysis of spatial data. Furthermore, the students will be introduced to R, an open source statistical software package.

#### 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

#### Advanced Statistical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop **Session:** Semester 2 **Classes:** 3x1 hr lecture/wk, 1x1 hr tutorial/wk, 1x1 hr computer practical/wk **Prerequisites:** BIOM4003 **Assessment:** 1 Å Final Exam (50%), 3 Assignments (10% each), Data Analysis Project (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit consists of 3 components; multivariate statistics, sample designs and generalized linear models. In the first part principal component analysis and multivariate analysis of variance (MANOVA) will be covered. In the second part basic sample designs such as simple random, stratified random, ratio estimation and cluster sampling will be covered. Finally generalized linear models will be introduced with more theoretical detail than is taught in earlier units. Research skills will developed by project work involving the analysis of a real world dataset from a relevant discipline.

### BIOM4005

#### Biometrical Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Thomas Bishop **Session:** Semester 1 **Classes:** 3x1 hr lecture/wk, 1x1 hr tutorial/wk, 1x1 hr computer practical/wk **Prerequisites:** ENVX3002 **Assessment:** 1 Å Final Exam (50%), 3 Assignments (10% each), Data Analysis Project (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit 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; including the binomial, Poisson, geometric, normal and exponential distributions. In addition techniques such as method of moments and maximum likelihood estimation will be introduced for fitting the distributions to the data will be explored. Research skills will developed by project work involving the analysis of a real world dataset.

#### Textbooks

Many reference books exist in various Libraries.

### ENVX4001

#### GIS, Remote Sensing and Land Management

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** 2x1-hr lectures/week weeks 1-6, 1x1 project weeks 7-11, 1xÅ hour presentation scheduled for weeks 12 and 13, 1x3-hr practical/week weeks 1-6. **Prerequisites:** ENVX3001 or GEOS2111 or GEOS2911 **Assessment:** 1x Å hour presentation (5%) weeks 12 and 13, Practical work reports (50%) weekly weeks 1-6, 1x2500w project report (45%) due by week 13. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

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 actualize it using integrated GIS and RS techniques.

#### Textbooks

Reference Textbook: Jesen J. R. 2006. Remote sensing of the environment: an earth resource perspective. 2nd ed. Pearson Prentice Hall Upper Saddle, New Jersey.  
 Rees W.G. 2001. Physical principles of remote sensing. 2nd ed. Cambridge University Press, Cambridge, United Kingdom.

### Food Science

### AGCH3026

#### Food Biotechnology

**Credit points:** 6 **Teacher/Coordinator:** Prof Les Copeland (Coordinator) Associate Prof Robyn McConchie, Dr Thomas Roberts **Session:** Semester 1 **Classes:** One 4-hr class/wk, which includes a combination of lectures, tutorials and practical work **Prohibitions:** AGCH3005, AGCH3003, AGCH4006, AFNR5103 **Assumed knowledge:** Equivalent to 6 credit points of Intermediate Biochemistry or Chemistry **Assessment:** The unit is taught in four separate modules, (4x25%); the assessment tasks vary for each module, but may include lab reports, short essays, opinion pieces, poster/oral presentations, or an exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study aims to give students an understanding of the role of biotechnology in food production, and an appreciation of the underpinning science. The content is delivered in four discrete modules that address specific aspects of food biotechnology - enzyme technologies, GM foods, quality and safety of perishable products, and malting and fermentation. Illustrative case studies are included. The assessment tasks are designed to develop graduate attributes such as research and inquiry; information literacy, and an ability to critically evaluate information sources about food biotechnology; construct views and opinions on the science of food biotechnology, and propose informed solutions to food biotechnology problems; communicate aspects of food biotechnology to both the scientific and broader community

#### Textbooks

Lecture notes, laboratory notes and set readings will be made available for each module through Blackboard. There is no recommended textbook.

### HORT4005

#### Research and Practice in Hort Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Dr Kim-Yen Phan-Thein **Session:** Semester 2 **Classes:** 1x2h tut/wk; one 1-week excursion **Prerequisites:** HORT3005 **Assessment:** Pre-Field trip industry report (10%); Field trip industry report (15%); 2 x Practical reports (2 x 25%) 50%; End of semester exam 25%. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This Unit of Study provides students with a scientific grounding in the sustainable production of safe and nutritious fruit, vegetables and nuts. The unit encompasses the fundamentals of produce and nursery production, including an analysis of production system options, agro-ecosystem/resource management, and industry best production

and management practices. The unit will use case studies exemplifying important developments in horticultural production, supply and marketing chains. Students will examine multiple real world examples of horticulture, and use a supply chain framework to develop skills in integrative system evaluation, problem identification, data analysis and interpretation, and systematic problem-solving. Combining relevant industry knowledge, critical analytical skills, and a systems perspective will enable students to make valid, scientifically-informed decisions in horticulture and beyond. The unit is comprised of the key learning activities: lecture/tutorials, practicals in production and post-harvest horticulture techniques, and site visits to horticultural producers, research sites and peak industry bodies. The site visit program includes a week-long field trip to major horticultural production regions to view operations and Q&A with owner/operators.

## Forest Science

### ENSY3002

#### Fire in Australian Ecosystems

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell **Session:** Semester 1 **Classes:** 2x1hr lectures, 1x3hr practical/wk **Prerequisites:** AGEN2005 or BIOL2023 or BIOL2923 **Assessment:** 1x 2h exam (40%), 1x 2000-2500w essay (20%), 3x practical reports (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is intended to describe fundamental scientific knowledge relating to fire behaviour and ecological and social effects of bushfire in Australian ecosystems. The student will gain a greater understanding of how fire has shaped the landscape and the people. It is an elective unit that builds on basic knowledge gained in junior-level biology and chemistry and intermediate-level plant biology and soil science subjects. Firstly, fire behaviour including the elements of weather, fuel and landscape will be explained and examined in relation to predictive modelling and climate change. Secondly, the fire response of flora, fauna, fungi and microorganisms will be described at a range of different scales and analysed against a background of current land management practices in Australia. Social aspects of bushfire will be discussed and analysed according to contemporary policies and practices. At the end of this unit, students will be able to apply fire behaviour and ecological principles for planning purposes and to integrate scientific information from a range of sources to assess fire impacts on the environment and human communities. The students will gain research, literacy and communication skills through field-based data collection, essay and report writing and oral presentations.

#### Textbooks

A reading list will be provided consisting of selected book chapters, journal articles and other publications

### ENSY3003

#### Forest Ecosystem Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant **Session:** Semester 2 **Classes:** 2 lectures/week, 1 tut/fortnight, 1 field excursion (2 days) in week 6 of semester **Prerequisites:** Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage. **Assessment:** One 2hr exam (50%), one 2000w essay (40%), one oral presentation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study enables students to understand the management and conservation of trees and forests in a changing climate. It is an elective unit for students enrolled in advanced topics for the Bachelor of Environmental Systems course program. Beginning with an introduction to the unique chemical, physical and ecological characteristics of trees, this unit then focuses on policy development and management prescriptions driven by fundamental processes of ecosystem function. At the end of this unit students will be able to articulate critical evaluations of scientific and policy based documents in relation to research and management of trees in the Australian landscape. Students will be given the opportunity to gain firsthand knowledge of Australian forest management by participating in a 2 day field excursion (in week 6 of semester) combined with industry, government, research and conservation groups. At the end of this unit, students will be able to articulate strengths, weaknesses and

improvements to the management of Australian forests for the purposes of production, conservation and climate change adaptation. Students will gain an intricate knowledge of tree function and be able to relate this understanding to the management of trees and forests in a changing environment. Students will develop skills to enable effective communication with industry, conservation and governmental groups.

## Horticulture

### HORT3005

#### Production Horticulture

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Robyn McConchic **Session:** Semester 1 **Classes:** 2x1hr lec; 1x3hr prac/workshop/wk **Prerequisites:** (AGEN2001 and AGEN2005) or BIOL2023 or BIOL2923 **Assumed knowledge:** AGEN1001 and AGEN1004 **Assessment:** 1x 3 hr exam (55%), three assignments (45%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study covers topics on the production of perennial fruit crops, wine grapes, the sustainable production of vegetables and it also covers the key aspects of the postharvest handling and quality assurance of fresh produce. At the end of this unit students are expected to have a detailed understanding of these areas of horticulture and be able to discuss related literature and the physiological principles underlying the commercial success of these horticultural enterprises. Students will also gain research and enquiry skills through research based practical sessions and assignments.

#### Textbooks

Recommended reading: Louis Glowinski (2008) The complete book of fruit growing in Australia. Lothian Books, Westwood, M.N. (1993) Temperate-zone pomology. Timber Press Inc., Jackson, J.E (2003) Biology of apples and pears. Cambridge University Press, Gopinadhan Paliyath et al. (Ed.) (2008) Postharvest biology and technology of fruits, vegetables, and flowers. Oxford : Wiley-Blackwell, Decoteau, D/ R (2000). Vegetable Crops. Upper Saddle River, NJ: Prentice Hall

### HORT4005

#### Research and Practice in Hort Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Dr Kim-Yen Phan-Thein **Session:** Semester 2 **Classes:** 1x2h tut/wk; one 1-week excursion **Prerequisites:** HORT3005 **Assessment:** Pre-Field trip industry report (10%); Field trip industry report (15%); 2 x Practical reports (2 x 25%) 50%; End of semester exam 25%. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This Unit of Study provides students with a scientific grounding in the sustainable production of safe and nutritious fruit, vegetables and nuts. The unit encompasses the fundamentals of produce and nursery production, including an analysis of production system options, agro-ecosystem/resource management, and industry best production and management practices. The unit will use case studies exemplifying important developments in horticultural production, supply and marketing chains. Students will examine multiple real world examples of horticulture, and use a supply chain framework to develop skills in integrative system evaluation, problem identification, data analysis and interpretation, and systematic problem-solving. Combining relevant industry knowledge, critical analytical skills, and a systems perspective will enable students to make valid, scientifically-informed decisions in horticulture and beyond. The unit is comprised of the key learning activities: lecture/tutorials, practicals in production and post-harvest horticulture techniques, and site visits to horticultural producers, research sites and peak industry bodies. The site visit program includes a week-long field trip to major horticultural production regions to view operations and Q&A with owner/operators.

## Hydrology

### LWSC3007

#### Advanced Hydrology and Modelling

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 1 **Classes:** 2 hr lectures/wk, 3 hr practical/wk **Prerequisites:** LWSC2002 **Assessment:** 4 x Practical assessments and reports (50%), take-home exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to allow students to examine advanced hydrological modeling and sampling designs focusing on catchment level responses and uncertainty. This unit builds on the theoretical knowledge gained in LWSC2002. Students will learn how to develop their own simulation model of catchment hydrological processes in R and using SWAT and review the possibilities and impossibilities of using simulation models for catchment management. Students will further investigate optimal sampling techniques for water quality data based on understanding the variability in hydrological responses. At the end of this unit, students will be calibrate and evaluate a catchment model, articulate advantages and disadvantages of using simulation models for catchment management, justify the choice of a simulation model for a particular catchment management problem, identify issues in relation to uncertainty in water quality and quantity, develop an optimal water quality sampling scheme. The students will gain research and inquiry skills through research based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation and personal and intellectual autonomy through working in groups.

#### Textbooks

Textbooks (Recommended reading)

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

### ENVX3001

#### Environmental GIS

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** Three-day field trip, (2 lec & 2 prac/wk). **Prerequisites:** AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology **Assessment:** One 15 min presentation (10%), 3500w prac report (35%), 1500w report on trip excursion (15%), 2 hr exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to impart knowledge and skills in spatial analysis and geographical information science (GISc) for decision-making in an environmental context. The lecture material will present several themes: principles of GISc, geospatial data sources and acquisition methods, processing of geospatial data and spatial statistics. Practical exercises will focus on learning geographical information systems (GIS) and how to apply them to land resource assessment, including digital terrain modelling, land-cover assessment, sub-catchment modelling, ecological applications, and soil quality assessment for decisions regarding sustainable land use and management. A 3 day field excursion during the mid-semester break will involve a day of GPS fieldwork at Arthursleigh University farm and two days in Canberra visiting various government agencies which research and maintain GIS coverages for Australia. By the end of this UoS, students should be able to: differentiate between spatial data and spatial information; source geospatial data from government and private agencies; apply conceptual models of spatial phenomena for practical decision-making in an environmental context; apply critical analysis of situations to apply the concepts of spatial analysis to solving environmental and land resource problems; communicate effectively results of GIS investigations through various means- oral, written and essay formats; and use a major GIS software package such as ArcGIS.

#### Textbooks

Burrough, P.A. and McDonnell, R.A. 1998. Principles of Geographic Information Systems. Oxford University Press: Oxford.

Clarke, K. C. 2003. Getting Started With Geographic Information Systems. 4th Edition. Prentice Hall: Upper Saddle River, New Jersey.

## Soil Science

### SOIL3009

#### Contemporary Field and Lab Soil Science

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (Coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, A/Prof Budiman Minasny, Dr Damien Field **Session:** Semester 1 **Classes:** (2 lec, 2 prac or 1 lec, 3 prac )/wk, 6-day field excursion north-western NSW commencing 15 days prior to beginning of Semester 1 **Prerequisites:** SOIL2003 **Assessment:** 1 x viva voce exam (40%), soil physics written assessments (20%), soil chemistry written assessments (20%), soil judging (12%), pedology written assessments (8%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a theoretical and empirical unit providing specialised training in three important areas of contemporary soil science, namely pedology, soil chemistry and soil physics. The key concepts of these sub-disciplines will be outlined and strengthened by hands-on training in essential field and laboratory techniques. All of this is synthesized by placing it in the context of soil distribution and use in North-Western New South Wales. The unit is motivated by the teaching team's research in this locale. It builds on students' existing soil science knowledge gained in SOIL2003. After completion of the unit, students should be able to articulate the advantages and disadvantages of current field & laboratory techniques for gathering necessary soil information, and simultaneously recognise key concepts and principles that guide contemporary thought in soil science. Students will be able to synthesise soil information from a multiplicity of sources and have an appreciation of the cutting edge areas of soil management and research. By investigating the contemporary nature of key concepts, students will develop their skills in research and inquiry. Students will develop their communication skills through report writing and will also articulate an openness to new ways of thinking which augments intellectual autonomy. Teamwork and collaborative efforts are encouraged in this unit.

#### Textbooks

Textbooks: D. Hillel. 2004. Introduction to Environmental Soil Physics. Elsevier Science, San Diego, CA, USA, R. Schaetzl and S. Anderson 2005. Soils: Genesis and Geomorphology. Cambridge University Press, New York, NY, USA, D.L. Sparks 2003 Environmental Soil Chemistry (2nd edn). Academic Press, San Diego, CA, USA

### SOIL3010

#### The Soil at Work

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, Dr Damien Field, Prof David Guest, A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** Problem-based unit: each student completes 1 problem as part of a team, involving multiple team meetings; 4 x 4 hr soil biology workshops **Prerequisites:** SOIL2003 or SOIL2004 **Assessment:** Introduction to the problem group presentation (10%); Status of the problem group report (10%); How to tackle the problem seminar (20%) - team seminars, before fieldwork, analyses done; Results seminar (20%) - team seminars; Final group report (25%); Activities diary for group (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a problem-based applied soil science unit addressing the physical, chemical and biological components of soil function. It is designed to allow students to identify soil-related problems in the real-world and by working in a group and with an end-user, to suggest short and long-term solutions to problems such as fertility, resilience, carbon management, structural decline, acidification, salinisation and contamination. The soil biology workshops will allow student groups to incorporate relevant measurements of soil biota in their experiments. Students will gain some understanding of the concept of sustainability, and will be able to identify the causes of problems by reference to the literature, discussion with landusers and by the design and execution of key experiments and surveys. Students will gain a focused knowledge of the key soil drivers to environmental problems and will have some understanding on the constraints surrounding potential solutions. By designing and administering strategies to tackle real-world soil issues, students will develop their research and inquiry skills and enhance their intellectual autonomy. By producing reports and seminars that enables understanding by an end-user, students will improve the breadth of their communication skills. This is a core unit for students majoring or specialising in soil science and an elective unit for those wishing to gain an understanding of environmental problem-solving. It utilises and reinforces soil-science knowledge gained in SOIL2003 and SOIL2004, as well as generic problem-solving skills gained during the degree program.

#### Textbooks

Reference book: I.W.Heathcote 1997. Environmental Problem Solving: A Case Study Approach. McGraw-Hill, New York, NY, USA.

## Table F - Other Year 4 electives

**AVBS4009****Aquaculture**

**Credit points:** 6 **Teacher/Coordinator:** Dr Joy Becker **Session:** Semester 1 **Classes:** Lectures 2hrs/wk, tutorials 1hr/wk, practicals 3hrs/wk **Prerequisites:** Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3 **Assessment:** written and/or oral assignments (40%), written practical report (20%), exam 2 hrs (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Unit of Study explores in detail aspects of commercial aquaculture, including global trends in aquaculture development. Other topics include water quality, feeding, management, health and disease, genetics and reproduction, environmental impact and economic constraints to production. The unit of study emphasises methods to improve aquacultural productivity. It builds on basic principles of anatomy, physiology, nutrition, genetics and health and disease presented in other units of study in BAnVetBioSc. At the end of this Unit of Study, students will demonstrate an understanding of the principles of: the context of aquaculture in global food production; husbandry, management and welfare of aquaculture species; comparative aspects of husbandry in aquaria, domestic, commercial; health and disease relevant to aquaculture; nutrition of aquaculture species; reproduction and genetics of species in aquaculture; water quality and environmental impact of aquaculture; economics and marketing of aquaculture products.

**AVBS4012****Extensive Animal Industries**

**Credit points:** 6 **Teacher/Coordinator:** Dr Russell Bush **Session:** Semester 1 **Classes:** lectures 3hrs/wk, practicals 3hrs/wk **Prerequisites:** Animal and Veterinary Bioscience years 1-3 OR Bachelor of Science in Agriculture years 1-3 **Assessment:** case study (10%), practical report (15%), meat grading (15%), excursion report (20%) and written exam (40%) **Practical field work:** 5 day study tour to the Riverina **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces the concepts of sheep (wool and meat) and beef cattle production in the Australian environment within the context of world food and fibre consumption and production. The key products as well as domestic and export markets for these are presented. The course provides an historical perspective of the basis for each of these industries and describes each of the production systems designed to meet the demand for these products.

Production in both the tropical and temperate regions of Australia will be covered and include the key elements of extensive grazing and intensive feedlot systems. Major issues will include breeds and breeding systems, basic nutrition and production practices and animal welfare issues as they affect the quality and quantity of product marketed.

The concepts of first stage processing of both meat and fibre products in abattoirs and top-making plants respectively will be presented. The major factors that influence the quality of product and therefore grading and market demand will be presented.

Lecture material will be supported with appropriate practical classes and a 5 day study tour to the Riverina to evaluate different commercial production systems. Students will also have an opportunity to compete in the annual Inter Collegiate Meat Judging (ICMJ) competition as a member of the University of Sydney team. This competition involves teams from numerous universities throughout Australia as well as Japan and the USA.

**VIRO3001****Virology**

**Credit points:** 6 **Teacher/Coordinator:** Dr Tim Newsome **Session:** Semester 1 **Classes:** 26 x 1-hour lectures, 7 x 4-hour practical classes, 1 x 2-hour tutorial **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: 18 credit points of BMED units including (BMED2401 and BMED2404) or (BMED2801 and BMED2802 and BMED2807). **Prohibitions:** VIRO3901 **Assumed knowledge:** Intermediate Microbiology **Assessment:** Pre-class assessment for practical classes: (5 x 1%), continuous assessment for practical classes: (3 x 2%), project assessment for practical classes: (7%), presentation on virology-themed research literature: (7%), theory of practical

exam: (15%) (30 minutes), theory exam (60%) (120 minutes). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Students are very strongly advised to complete VIRO3001/3901 before enrolling in VIRO3002/3902 Medical and Applied Virology in Session 2.*

Viruses are some of the simplest biological machinery known yet they are also the etiological agents for some of the most important human diseases. New technologies that have revolutionised the discovery of viruses are also revealing a hitherto unappreciated abundance and diversity in the ecosphere, and a wider role in human health and disease. Developing new gene technologies have enabled the use of viruses as therapeutic agents, in novel vaccine approaches, gene delivery and in the treatment of cancer. This unit of study is designed to introduce students who have a basic understanding of molecular biology to the rapidly evolving field of virology. Viral infection in plant and animal cells and bacteria is covered by an examination of virus structure, genomes, gene expression and replication. Building upon these foundations, this unit progresses to examine host-virus interactions, pathogenesis, cell injury, the immune response and the prevention and control of infection and outbreaks. The structure and replication of sub-viral agents: viroids and prions, and their role in disease are also covered. The practical component provides hands-on experience in current diagnostic and research techniques such as molecular biology, cell culture, serological techniques, immunofluorescence and immunoblot and is designed to enhance the students' practical skills and complement the lecture series. In these practical sessions experience will be gained handling live, potentially pathogenic microbes. Tutorials cover a range of topical issues and provide a forum for students to develop their communication and critical thinking skills. The unit will be taught by the Discipline of Microbiology within the School of Molecular Bioscience with the involvement of the Discipline of Infectious Diseases and Immunology within the Sydney Medical School.

**Textbooks**

Kripe and Howley. *Fields Virology*. 6th edition 2013. Available freely as an electronic resource from the University of Sydney library.

**AGEN5001****Agricultural and Environmental Extension**

**Credit points:** 6 **Teacher/Coordinator:** Dr Peter Ampt **Session:** Semester 2 **Classes:** 1 lec/wk (2hr), 1 tut/wk (3 hr), 1 field (3 day) **Prerequisites:** Assumed knowledge: AGEN1001 and AGEC1006 **Assumed knowledge:** AGEN1001 and AGEC1006 **Assessment:** 1500w essay 20%, Tutorial/workshop participation 30%, 3000w problem based learning project 30%, Field trip report 20%. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study is designed to develop knowledge, skills and understanding for engaging effectively with the people whose decisions shape innovation in agricultural production and environmental management. These people include land managers, consultants, agribusiness, extension agents, scientists, bureaucrats and politicians.

This unit of study is designed to develop key graduate competencies in communication and soft systems thinking for those with an interest in careers including consulting, agribusiness, agricultural extension, environmental management, policy, participatory research and natural resource management. It is relevant to all FAE degrees, to BAnVetBioSc and to environmentally focussed students in other faculties. Students will find this unit very helpful if they are undertaking a research project that involves working with people using interviews, focus groups or surveys. It is suitable for both undergraduate and postgraduate students.

This unit of study covers integrative aspects of extension theory and practice, social learning, sustainable agriculture, knowledge domains, participatory action research, human geography, soft systems thinking and adaptive natural resource management. The role of extension in agricultural and environmental management is a crucial aspect of sustainability, as extension agents provide the main conduit between scientists, economists and policymakers and the people who live and work in the landscape.

By the end of this course students will have the knowledge, skills and understanding to: describe and discuss the theoretical and practical underpinnings of extension; describe and analyse factors influencing

the behaviours, attitudes and beliefs of natural resource managers; discuss and design effective extension programs/projects; conduct, analyse and evaluate simple surveys, focus groups and semi-structured interviews; and to critically evaluate the integration of conservation and production in the landscape and the ever-changing role extension plays in facilitating sustainable change.

#### Textbooks

Recommended reading, Jennings, J., Packham R. and Woodside, D.(eds) (2001) *Shaping Change APEN*; Hay, I (2012) *Communicating in Geography and the Environmental Sciences*, Oxford; Leeuwis, C. and Van den Ban, A.W. (2004) *Communication for Rural Innovation: Rethinking Agricultural Extension*, Blackwells Publishing; Roling, N.G. and Wagemakers, A.E. (eds) (2000) *Facilitating Sustainable Agriculture: Participatory Learning and Adaptive management in Times of Environmental Uncertainty*, Cambridge University Press

### ANSC3107

#### Animal Genetics 3

**Credit points:** 6 **Teacher/Coordinator:** Prof Claire Wade **Session:** Semester 2 **Classes:** lectures 3 hrs/wk, practicals 3 hrs/wk **Prerequisites:** GENE2001 or MBLG2072 or MBLG2972 **Assessment:** Practicals with associated reports and on-line quizzes (25%), Mid Semester on-line examination (25%), Final Examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit of Study explores in detail genetic aspects of commercial animal populations and investigates options for the practical application of genetics to improve animal productivity. It is designed to provide the background material, fundamental concepts and data analysis methods for breeding strategies in the animal industries. The unit of study develops basic principles of population and quantitative genetics from Agricultural Genetics. It provides essential background and context to the molecular principles expanded in Animal Biotechnology. Animal Genetics provides the justification for the application for advanced reproductive technologies presented in Animal Reproduction.

At the end of this Unit of Study, students will demonstrate an understanding of: the principles of population genetics and the concepts of relationship and inbreeding, and adverse effects of this inbreeding; the principles of quantitative genetics including the concepts of genetic variance, heritability and repeatability, and methods for the identification and selection of superior livestock; the use of multi-trait selection procedures to increase the overall economic value of populations of animals; the constraints to production gains using genetic selection programmes and advantages obtained through crossbreeding; the practical application of selection and crossing in animals; the application of genomic and reproductive technologies in Animal breeding. Introductory bioinformatics, genomics, cytogenetics and conservation biology will be covered.

#### Textbooks

Nicholas, FW (2010) *Introduction to Veterinary Genetics* (3rd Ed) October 2009, 2010, Wiley-Blackwell, Iowa, USA ISBN: 978-1-4051-6832-8

### AREC3003

#### Econ of Minerals and Energy Industries

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit builds on previously acquired economics training and develops advanced understanding of the economics of minerals exploration, extraction and marketing and the economics of energy generation, distribution and use. The implications of mineral extraction and energy generation activities for natural resources and the environment are explored. The unit will foster in-depth knowledge of the markets for minerals and energy, their industry structure and business environment, including the role of markets for derivatives on minerals and energy commodities.

### AVBS4002

#### Dairy Production and Technology

**Credit points:** 6 **Teacher/Coordinator:** Assoc. Professor Sergio (Yani) Garcia. Participating staff: Assoc. Prof. Kendra Kerrisk, Dr Pietro Celi, Dr Cameron Clark, Assoc. Prof. John House, Nicolas Lyons, Victoria Scott **Session:**

Semester 2 **Classes:** Lectures up to 3 hrs/wk, practicals 3 hrs/wk **Prerequisites:** Assumed Knowledge: Enrolled students are expected to have some understanding of key components of the dairy production system, including basic knowledge of animal physiology and nutrition. **Assessment:** Whole farm professional report (30%), Pracs assessments, (30%), 1 hr exam (40%) **Practical field work:** Visit to commercial dairy farms and different systems of production in 3 or 4 regions of NSW (a minimum of 8 commercial farms will be visited during the semester) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will explore the various aspects of dairy farming and the dairy industry from a scientific point of view. The lectures are a mix of the principles on which sound dairy farming is based and practical examples of how this operates in practice. Focus is placed on integrating knowledge to gain understanding on the system of production as a whole.

At the end of this unit of study, students will demonstrate a solid understanding of: the characteristics of the dairy industry in Australia and in a world wide context; the key components of pasture-based dairy systems; principles and practices of pasture and feeding management; the application of new technologies to improve efficiency and productivity (particularly automatic milking).

In addition, students will demonstrate an appreciation of key aspects of reproduction and lactation physiology; the integration of knowledge of genetics and reproduction into the type of herd improvement structure set up in the dairy industry; the application of ruminant physiology knowledge to developing feeding programs for dairy cows; the extension of basic reproductive physiology onto the dairy farm using case studies as examples; the economics of the dairy farm business. Practical classes include milking cows; grazing and feeding management of dairy cows; calf rearing; and visits to commercial farms ranging from small pasture-based dairy farms to a feed-lot operation milking over 2,000 cows.

Note 1: Pracs assessments marks will be a combination of assistance (0.4) and completion of short questionnaires about the prac or the farm visit (0.6)

Note 2: the professional report is basically a dairy system planning exercise reported in a professional (non academic) style. Students will be given budgeting tools and full explanations to assist with this task at the beginning of the course. The report is individual although this may depend on number of students enrolled.

### AVBS4008

#### Intensive Animal Industries

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Downing **Session:** Semester 2 **Classes:** 6 hrs/wk **Prerequisites:** (Animal and Veterinary Bioscience years 1-3) OR (Bachelor of Science in Agriculture years 1-3) **Assessment:** Written exam (50%) (Poultry and Pigs 50:50), in course evaluations and case study - Pigs (25%), Broiler growth study report and in course evaluations - Poultry (25%) **Practical field work:** Visits to an intensive pig/poultry farm, feed mill and poultry production and processing units when biosecurity restrictions allow **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is composed of two parts, a Poultry Production component and a Pig Production component. The course will provide students with a comprehensive overview of the production of eggs and poultry meat and pork. The individual components examine various aspects of the poultry and pig production systems important in maintaining efficiency and profitability. It investigates aspects of breeding, nutrition, housing, growth performance, health, welfare, reproductive capability, waste management, marketing and current industry issues. This unit will expand on some aspects of previous year 3 units of study in animal structure and function, nutrition and reproduction. There is a broiler growth study which comprises a significant part of the practical work in the Poultry component. There is a strong emphasis on assessment being built into the course work as this is considered to be more relevant to learning in the final year.

#### Textbooks

There is no single text that adequately covers the Australian pig industry and for this reason no formal text is required. There are many sites (industry, academic institutions and government departments) on the Web which provide excellent information. Links to these will be provided. Where appropriate, relevant reference material will be identified for specific areas of the course. Often poultry specific text books are obsolete very quickly, it would be important to use trade

information. The library subscribes to breeder management guides and general poultry production journals as well as specific poultry scientific journals.

# Bachelor of Agricultural Economics

## Course rules

No new admissions from 2015.

## Bachelor of Agricultural Economics

### Bachelor of Agricultural Economics (Honours)

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

## Course resolutions

### 1 Course codes

Code	Course title
BUAGRECO-01	Bachelor of Agricultural Economics (no new admissions from 2015)

### 2 Attendance pattern

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

### 3 Admission to candidature

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

### 4 Requirements for award

- (1) The units of study that may be taken for the course/s are set out in the table of units of study for Bachelor of Agricultural Economics. The Dean may approve some variation in units of study required for the degree for exceptionally talented students.
- (2) To qualify for the degree of Bachelor of Agricultural Economics a candidate must successfully complete 192 credit points, comprising:
  - (a) 72 credit points of core units of study; and
  - (b) two majors including an Agricultural Economics major and an additional major; and
  - (c) elective credit points;

### 5 Majors

- (1) A major requires a minimum of 36 credit points above junior level. The majors available are:
  - (a) Accounting
  - (b) Agribusiness
  - (c) Agricultural Economics
  - (d) Agriculture Finance
  - (e) Agricultural Marketing
  - (f) Agricultural Science
  - (g) Commercial Law
  - (h) Econometrics
  - (i) Economics
  - (j) Finance

- (k) Geography
- (l) Government and International Relations
- (m) Management
- (n) Marketing
- (o) Psychology
- (2) Core units of study that are common to the requirements of a major may count to that major, however, any unit of study may only count towards one major. Where a unit of study is common to 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.

### 6 Award of the degree

- (1) The Bachelor of Agricultural Economics is awarded as either Pass or with Honours. Honours are awarded in classes ranging from First Class to Second Class.

### 7 Weighted average mark (WAM)

- (1) For the Bachelor of Agricultural Economics, the Faculty of Agriculture and Environment uses a Year 2/3 WAM that includes all 2000 level and 3000 level units of study. Year 4 WAM will be calculated based on the units chosen from Year 4 of the Units of Study Table.
- (2) The WAM calculations use the following formula:

WAM =	$\frac{\text{sum}(Wc \times Mc)}{\text{sum}(Wc)}$
-------	---

where Wc is the unit of study credit points x the unit weighting and Mc is the mark achieved for the unit. The mark used for units with a grade AF is zero. Pass/fail units and credited units from other institutions are not counted. All units carry a weighting of one, except the individual research components of undergraduatedegrees, which carry a weighting of two.

### 8 Award of the degree of Bachelor with Honours

- (1) For the degree of Bachelor of Agricultural Economics
  - 1.1 To qualify for the award of Honours a student must normally:
    - (a) have a Year 2/3 WAM of at least 65; and
    - (b) complete an independent research component as part of the final year of the program with an overall honours mark of at least 65.
  - 1.2 The overall honours mark shall be the average of the Year 2/3 WAM and the Year 4 WAM.
  - 1.3 Honours is awarded in the following classes:

Level of honours	Overall honours mark	Minimum WAM Years 2/3
First Class	mark >= 75	65
Second Class, Division 1	70 <= mark < 75	65
Second Class, Division 2	65 <= mark < 70	65
Honours not awarded	mark < 65	n/a

### 9 Transitional provisions

These resolutions apply to persons who commenced their candidature after 1 January, 2014 and persons who commenced their candidature prior to 1 January, 2014 who elect to proceed under these resolutions.







# Bachelor of Agricultural Economics

## Units of study table

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
All students complete an Agricultural Economics major and one non-Agricultural Economics major. Details of majors can be found in Table 3.			
<b>Year 2</b>			
<b>AGEC2103</b> <b>Production Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> ECON1001 or AGECE1006 or (AGECE1003 and AGECE1004) or RESEC1031 <b>N</b> AGECE2003	Semester 1
or			
<b>AREC2001</b> <b>Econ of Biological Production Systems</b>	6	<b>P</b> ECON1001 or AGECE1006 or AGECE1102	Semester 1
<b>AGEC2105</b> <b>Applied Econometric Modelling 1</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (ECMT1010 or MATH1905 or MATH1005 or MATH1015) and ECMT1020 <b>N</b> AGECE2005, ECMT2110	Semester 1
or			
<b>ECMT2150</b> <b>Cross Section Econometrics</b>	6	<b>P</b> (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 <b>N</b> ECMT2110	Semester 1 Semester 2
<b>ECOS2001</b> <b>Intermediate Microeconomics</b>	6	<b>P</b> ECON1001 or BUSS1040 <b>C</b> ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECON2001, ECOS2901, ECON2901 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
And 1 elective unit from Tables 1 and 2, with a view to completing a Table 4 non-AGECE major			
<b>AGEC2101</b> <b>Market and Price Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGECE1006 or (AGECE1003 and AGECE1004) or AGECE1002 or AGECE1102 or RESEC1031 or AGECE1031 <b>N</b> AGECE2001	Semester 2
or			
<b>AREC2002</b> <b>Commodity Market and Price Analysis</b>	6	<b>P</b> ECON1001 or AGECE1006 or AGECE1102	Semester 2
<b>ECOS2002</b> <b>Intermediate Macroeconomics</b>	6	<b>P</b> ECON1002 <b>C</b> ECMT1020 <b>N</b> ECON2002, ECOS2902, ECON2902 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
And 3 elective units from Tables 1 and 2, with a view to completing a Table 4 non-AGECE major			
<b>Year 3</b>			
<b>AGEC3102</b> <b>Agricultural and Resource Policy</b>	6	<b>P</b> (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) <b>N</b> AGECE3002	Semester 1
<b>AGEC3103</b> <b>Applied Optimisation</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) <b>N</b> AGECE3101, AGECE3001	Semester 1
or			
<b>AGEC3101</b> <b>Agribusiness Management</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGECE2103 or AGECE2003 or AGECE1006 <b>N</b> AGECE3001, AGECE1102, AGECE3103	Semester 2
or			
<b>AREC3001</b> <b>Production Modelling and Management</b>	6	<b>P</b> AREC2001 or AGECE2103 or ECOS2001 or ECOS2901	Semester 2
<b>AGECE3104</b> <b>Research Methods</b>	6	<b>P</b> AGECE2105 <b>N</b> AGECE3004	Semester 2
And 5 elective units from Table 2 across semester 1 and 2, with a view to completing a Table 4 non-AGECE major			
<b>Year 4</b>			
Year 4 WAM will be calculated based on the units chosen from the Year 4 Units of Study Table.			
<b>AFNR4001</b> <b>Professional Development</b>	6	<b>N</b> AGRF4000 <i>Note: Department permission required for enrolment</i>	Semester 2
and			
<b>AGECE4112</b> <b>Research Project A</b>	9	<b>P</b> 2 units out of AGECE3102, AGECE3103, AGECE3104 or AGECE3004 <b>N</b> AGECE4012 <i>Note: Department permission required for enrolment Department permission required for enrolment.</i>	Semester 1
and			



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AGEC4113</b> <b>Research Project B</b>	9	<b>P</b> 2 units out of AGEC3102, AGEC3103, AGEC3104 or AGEC3004 <b>N</b> AGEC4013 <i>Note: Department permission required for enrolment</i> <i>Department permission required for enrolment.</i>	Semester 2
or			
<b>AGEC4121</b> <b>Research Exercises A</b>	9	<b>P</b> 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC 3104 or AGEC3004 <b>N</b> AGEC4112, AGEC4012	Semester 1
and			
<b>AGEC4122</b> <b>Research Exercises B</b>	9	<b>P</b> 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC3104, or AGEC3004 <b>N</b> AGEC4113, AGEC4013	Semester 2
And 4 AGEC or RSEC or AREC elective units of study from the list below across semesters 1 and 2. Two units would normally be chosen for semester 1 and 2 units for semester 2. A maximum of 2 level 4000 RSEC or 2 of AREC3003 and AREC3004 units for the entire year can be completed.			
Note, you cannot double count units in your degree, for example if you have completed ECOS3006, you can only count this unit of study as either a year 3 or year 4 unit, likewise units of study can only count towards one major.			
Semester 1 elective units below:			
<b>AGEC4103</b> <b>International Agricultural Trade</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC4003	Semester 1
or			
<b>ECOS3006</b> <b>International Trade</b>	6	<b>P</b> (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) <b>N</b> ECON3006	Semester 1
<b>AGEC4107</b> <b>Special Topics</b>	6	<b>N</b> AGEC4007 <i>Note: Department permission required for enrolment</i>	Semester 1 Semester 2
<b>RSEC4131</b> <b>Benefit-Cost Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) <b>N</b> AGEC4037	Semester 1
or			
<b>AREC2004</b> <b>Benefit-Cost Analysis</b>	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 2
<b>AGEC4108</b> <b>Quantitative Planning Methods</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 <b>N</b> AGEC4008 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>RSEC4133</b> <b>Economics of Mineral &amp; Energy Industries</b> <i>This unit of study is not available in 2015</i>	6	<b>A</b> (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 <b>P</b> (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) <b>N</b> ECON3013	Semester 2
or			
<b>AREC3003</b> <b>Econ of Minerals and Energy Industries</b>	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>AGEC4102</b> <b>Agricultural Development Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 2
or			
<b>ECOS3002</b> <b>Development Economics</b>	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
<b>AGEC4104</b> <b>Industrial Organization of Agribusiness</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
or			
<b>ECOS3005</b> <b>Industrial Organisation</b>	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
<b>RSEC4132</b> <b>Environmental Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>A</b> (ECON2001 or ECOS2001), (ECON2002 or ECOS2002), (AGEC3001 or AGEC3101), AGEC2101, AGEC2105 <b>P</b> ECON2001 or ECOS2001 or AGEC2103 or AGEC2003 or RSEC2031 <b>N</b> ECON3013, AGEC4035	Semester 2
or			
<b>ECOS3013</b> <b>Environmental Economics</b>	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>AGEC4101</b> <b>Agricultural Marketing Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC4004	Semester 2
or			
<b>AREC3002</b> <b>Agricultural Markets</b>	6	<b>P</b> AREC2001 or AGEC2103 or ECOS2001 or ECOS2901	Semester 2
<b>AGEC4109</b> <b>Agricultural Finance and Risk</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> ((AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)) OR (AGEC1102 and AGEC3103) <b>N</b> AGEC4009	Semester 2
or			
<b>AREC3005</b> <b>Agricultural Finance and Risk</b>	6	<b>P</b> AREC2001 or AGEC2103 or AREC2002 or AGEC2101 or ECOS2001 or ECOS2901	Semester 2
<b>RSEC4134</b> <b>Economics of Water &amp; Bio-resources</b> <i>This unit of study is not available in 2015</i>	6	<b>A</b> (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 <b>P</b> (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) <b>N</b> ECON3013	Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
or			
<b>AREC3004</b> Economics of Water and Bio-Resources	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1

**Table 1 BAgEc Years 1 and 2 elective units**

- Students may count no more than 24 credit points of the units specified towards meeting the requirements of their degree, and no more than 12 credit points from the listed MATH and Modern Language units.
- Prerequisites apply for many second semester units.

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>ACCT1006</b> Accounting and Financial Management	6	P ACCT1005 or BUSS1030 N ACCT1003, ACCT1004, ACCT1001, ACCT1002	Semester 1 Semester 2
<b>BUSS1030</b> Accounting, Business and Society	6	N ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 <i>This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.</i>	Semester 1 Semester 2
<b>BIOL1001</b> Concepts in Biology	6	A HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). N BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911	Semester 1 Summer Main
<b>BIOL1002</b> Living Systems	6	A HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). N BIOL1500, BIOL1902; BIOL1992	Semester 2
<b>CLAW1001</b> Foundations of Business Law	6		Semester 1 Semester 2
<b>GEOS1001</b> Earth, Environment and Society	6	N ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902	Semester 1
<b>GEOS1002</b> Introductory Geography	6	N GEOG1001, GEOS1902, GEOG1002	Semester 2
<b>GOVT1101</b> Australian Politics	6		Semester 1
<b>GOVT1104</b> Introduction to Political Science	6		Semester 2
<b>GOVT1105</b> Geopolitics	6		Semester 1 Semester 2
<b>GOVT1202</b> World Politics	6	<i>In Summer School this unit is available to current HSC students only.</i>	Semester 1 Semester 2 Summer Main
<b>INFS1000</b> Digital Business Innovation	6	N INFO1000, ISYS1003	Semester 1 Semester 2 Summer Main
<b>MATH1011</b> Applications of Calculus	3	A HSC Mathematics N MATH1001, ENVX1001, MATH1901, MATH1906, MATH1111, BIOM1003	Semester 1 Summer Main
<b>MATH1013</b> Mathematical Modelling	3	A HSC Mathematics or a credit or higher in MATH1111 N MATH1003, MATH1903, MATH1907	Semester 2 Summer Main
<b>MKTG1001</b> Marketing Principles	6	N MKTG2001	Semester 1 Semester 2
<b>PSYC1001</b> Psychology 1001	6		Semester 1 Summer Main
<b>PSYC1002</b> Psychology 1002	6		Semester 2 Summer Main
<b>WORK1003</b> Foundations of Work and Employment	6	<i>This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.</i>	Semester 1 Semester 2
Modern Language (Level 1 or higher) units, with the approval of the Dean of Agriculture and Environment			

**Table 2 BAgEc Years 2 and 3 elective units**

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AGEC2102</b> Agribusiness Marketing	6	P AGECE1006 or AGECE1102 or RSEC1031	Semester 1
<b>LWSC2002</b> Introductory Hydrology	6	P 6cp of Junior Geoscience or AGEN1002	Semester 2
<b>SOIL2003</b> Soil Properties and Processes	6		Semester 1
<b>ENVX3001</b> Environmental GIS	6	P AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology	Semester 2
Any level 2 or 3 semester units in Accounting (ACCT), Agricultural and Resource Economics (AREC), 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 FAE.			
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 degree, with approval of the Dean FAE and the Degree Coordinator.			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
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.			

### Table 3 Majors in the BAgREc Degree

The definitions of majors in the following tables apply for students commencing in 2012 or later. These students are required to complete 36 credit points of senior units of study 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 University of Sydney Business School 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 and other majors available in the BAgREc degree are defined in Table 3. Up to three majors will be noted on a student's transcript.

- 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.

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Agricultural Economics major</b>			
<b>Junior (Level 1) units</b>			
<b>AGEC1102 Agricultural and Resource Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>A</b> HSC Mathematics or HSC Mathematics Extension 1 <b>N</b> AGEC1002	Semester 2
<b>AGEN1001 Shaping our Landscapes</b>	6	<b>N</b> AFNR1001	Semester 1
<b>Level 2 and 3 units</b>			
<b>AGEC2101 Market and Price Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031 <b>N</b> AGEC2001	Semester 2
or			
<b>AREC2002 Commodity Market and Price Analysis</b>	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 2
<b>AGEC2103 Production Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) or RESEC1031 <b>N</b> AGEC2003	Semester 1
or			
<b>AREC2001 Econ of Biological Production Systems</b>	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 1
<b>AGEC3102 Agricultural and Resource Policy</b>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC3002	Semester 1
<b>AGEC3101 Agribusiness Management</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGEC2103 or AGEC2003 or AGEC1006 <b>N</b> AGEC3001, AGEC1102, AGEC3103	Semester 2
or			
<b>AREC3001 Production Modelling and Management</b>	6	<b>P</b> AREC2001 or AGEC2103 or ECOS2001 or ECOS2901	Semester 2
or			
<b>AGEC3103 Applied Optimisation</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC3101, AGEC3001	Semester 1
Plus two designated Year 4 AGEC, AREC or ECOS elective units			
<b>Non-Agricultural Economics majors</b>			
<b>Accounting</b>			
<b>Junior (Level 1) units</b>			
<b>ACCT1006 Accounting and Financial Management</b>	6	<b>P</b> ACCT1005 or BUSS1030 <b>N</b> ACCT1003, ACCT1004, ACCT1001, ACCT1002	Semester 1 Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>BUSS1030</b> Accounting, Business and Society	6	<b>N</b> ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 <i>This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.</i>	Semester 1 Semester 2
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>Level 2 and 3 units</b>			
<b>ACCT2011</b> Financial Accounting A	6	<b>P</b> (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) and (ECMT1010 or BUSS1020) <b>N</b> ACCT2001	Semester 1 Semester 2
<b>ACCT2012</b> Management Accounting A	6	<b>P</b> (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) <b>N</b> ACCT2002	Semester 1 Semester 2
Any four of the following:			
<b>ACCT3011</b> Financial Accounting B	6	<b>P</b> ACCT2011 or ACCT2001 <b>N</b> ACCT3001	Semester 1 Semester 2
<b>ACCT3012</b> Management Accounting B	6	<b>P</b> ACCT2012 or ACCT2002 <b>N</b> ACCT3002 <i>Discipline Permission required for students who have not passed ACCT2012 (or ACCT2002)</i>	Semester 1 Semester 2
<b>ACCT3013</b> Financial Statement Analysis	6	<b>P</b> (ACCT2011 or ACCT2001) and (FINC2011 or FINC2001) <b>N</b> ACCT3003	Semester 1
<b>ACCT3014</b> Auditing and Assurance	6	<b>P</b> ACCT3011 or ACCT3001 <b>N</b> ACCT3004	Semester 1 Semester 2
<b>ACCT3031</b> International Corporate Governance	6	<b>A</b> CLAW2201 <b>P</b> ACCT2011 or ACCT2001	Semester 2
<b>ACCT3032</b> Current Issues in Management Accounting	6	<b>P</b> ACCT2012 or ACCT2002 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>CLAW2201</b> Corporations Law	6	<b>P</b> Any 4 full semester junior units of study including CLAW1001 <b>N</b> CLAW2001	Semester 1 Semester 2
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Agribusiness</b>			
<b>Junior (Level 1) units</b>			
Some junior elective units of WORK, IBUS or INFS may be required to meet the prerequisites of Level 2/3 units listed for this major.			
<b>Level 2 and 3 units</b>			
<b>AGEC2102</b> Agribusiness Marketing	6	<b>P</b> AGECE1006 or AGECE1102 or RSEC1031	Semester 1
<b>AGEC4104</b> Industrial Organization of Agribusiness <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103)	Semester 1
or			
<b>ECOS3005</b> Industrial Organisation	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
<b>AGEC4101</b> Agricultural Marketing Analysis <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) <b>N</b> AGECE4004	Semester 2
or			
<b>AREC3002</b> Agricultural Markets	6	<b>P</b> AREC2001 or AGECE2103 or ECOS2001 or ECOS2901	Semester 2
<b>AGEC4109</b> Agricultural Finance and Risk <i>This unit of study is not available in 2015</i>	6	<b>P</b> {(AGEC3001 or AGECE3101) and (AGEC2003 or AGECE2103)} OR (AGECE1102 and AGECE3103) <b>N</b> AGECE4009	Semester 2
or			
<b>AREC3005</b> Agricultural Finance and Risk	6	<b>P</b> AREC2001 or AGECE2103 or AREC2002 or AGECE2101 or ECOS2001 or ECOS2901	Semester 2
Either 12 credit points INFS level 2/3 units or 12 credit points WORK level 2/3 units or 12 credit points of IBUS level 2/3 units			
<b>Agricultural Finance</b>			
<b>Junior (Level 1) units</b>			
Some junior elective units may be required to meet the prerequisites of Level 2/3 units listed for this major			
<b>Level 2 and Level 3</b>			
<b>FINC2011</b> Corporate Finance I	6	<b>A</b> ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) <b>N</b> FINC2001 <i>Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.</i>	Semester 1 Semester 2 Summer Early Winter Main
<b>FINC2012</b> Corporate Finance II	6	<b>P</b> FINC2011 or FINC2001 <b>N</b> FINC2002	Semester 1 Semester 2 Summer Main

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AGEC4104</b> <b>Industrial Organization of Agribusiness</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
or			
<b>ECOS3005</b> <b>Industrial Organisation</b>	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
<b>AGEC4108</b> <b>Quantitative Planning Methods</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 <b>N</b> AGEC4008 <i>Note: Department permission required for enrolment</i>	Semester 2
or			
<b>AGEC4107</b> <b>Special Topics</b>	6	<b>N</b> AGEC4007 <i>Note: Department permission required for enrolment</i>	Semester 1 Semester 2
<b>AGEC4109</b> <b>Agricultural Finance and Risk</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> {(AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)} OR (AGEC1102 and AGEC3103) <b>N</b> AGEC4009	Semester 2
or			
<b>AREC3005</b> <b>Agricultural Finance and Risk</b>	6	<b>P</b> AREC2001 or AGEC2103 or AREC2002 or AGEC2101 or ECOS2001 or ECOS2901	Semester 2
Plus three FINC3000 units			
<b>Agricultural Marketing</b>			
<b>Junior (Level 1) units</b>			
<b>MKTG1001</b> <b>Marketing Principles</b>	6	<b>N</b> MKTG2001	Semester 1 Semester 2
<b>Level 2 and 3 units</b>			
<b>AGEC2102</b> <b>Agribusiness Marketing</b>	6	<b>P</b> AGEC1006 or AGEC1102 or RSEC1031	Semester 1
<b>AGEC4104</b> <b>Industrial Organization of Agribusiness</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
or			
<b>ECOS3005</b> <b>Industrial Organisation</b>	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
<b>MKTG2112</b> <b>Consumer Behaviour</b>	6	<b>P</b> MKTG1001 (or MKTG2001) <b>N</b> MKTG2002	Semester 1 Semester 2
<b>MKTG3118</b> <b>Marketing Strategy and Planning</b>	6	<b>P</b> MKTG1001 (or MKTG2001), MKTG2112 (or MKTG2002), and (MKTG2113 or MKTG1002 or MKTG2003) <b>N</b> MKTG3201	Semester 2
Plus two other MKTG3000 units			
<b>AGEC4101</b> <b>Agricultural Marketing Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC4004	Semester 2
or			
<b>AREC3002</b> <b>Agricultural Markets</b>	6	<b>P</b> AREC2001 or AGEC2103 or ECOS2001 or ECOS2901	Semester 2
<b>Commercial Law</b>			
<b>Junior (Level 1) units</b>			
<b>CLAW1001</b> <b>Foundations of Business Law</b>	6		Semester 1 Semester 2
<b>Level 2 and 3 units</b>			
A minimum of six CLAW2000 and 3000 units			
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Econometrics</b>			
<b>Junior (Level 1) units</b>			
<b>ECMT1010</b> <b>Introduction to Economic Statistics</b>	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECMT1020</b> <b>Introduction to Econometrics</b>	6	<b>P</b> ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 <i>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.</i>	Semester 1 Semester 2
<b>Compulsory senior units</b>			
<b>ECMT2150</b> <b>Cross Section Econometrics</b>	6	<b>P</b> (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 <b>N</b> ECMT2110	Semester 1 Semester 2
<b>ECMT2160</b> <b>Time Series Econometrics</b>	6	<b>P</b> ECMT2150 or ECMT2110	Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Level 2 and 3 units</b>			
At least four senior elective units of study (24 credit points) selected from the following options with a minimum of three at the 3000 level:			
<b>ECMT2130</b> Financial Econometrics	6	<b>P</b> ECMT2110 or ECMT2010 or ECMT1020 <b>N</b> ECMT2030	Semester 2
<b>ECMT2160</b> Time Series Econometrics	6	<b>P</b> ECMT2150 or ECMT2110	Semester 2
<b>ECMT3120</b> Applied Econometrics	6	<b>P</b> ECMT3110 or ECMT3010 or (ECMT2150 and ECMT2160) <b>N</b> ECMT3020	Semester 2
<b>ECMT3130</b> Forecasting for Economics and Business	6	<b>P</b> ECMT2110 or ECMT2010 or (ECMT2150 and ECMT2160) <b>N</b> ECMT3030	Semester 2
<b>ECMT3150</b> The Econometrics of Financial Markets	6	<b>P</b> ((ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) and (ECMT2110 or ECMT2010) and (ECMT2130 or ECMT2030)) or (ECMT2130 and ECMT2150 and ECMT2160) <b>N</b> ECMT3050	Semester 1
<b>ECMT3170</b> Computational Econometrics	6	<b>P</b> ECMT2160 or ECMT2110	Semester 2
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Economics</b>			
<b>Junior (Level 1) units</b>			
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECMT1020</b> Introduction to Econometrics	6	<b>P</b> ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 <i>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.</i>	Semester 1 Semester 2
<b>ECON1001</b> Introductory Microeconomics	6	<b>N</b> BUSS1040	Semester 1 Semester 2 Summer Main
<b>ECON1002</b> Introductory Macroeconomics	6		Semester 1 Semester 2 Summer Main
<b>Level 2 and 3 units</b>			
<b>ECOS2001</b> Intermediate Microeconomics	6	<b>P</b> ECON1001 or BUSS1040 <b>C</b> ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECON2001, ECOS2901, ECON2901 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
<b>ECOS2002</b> Intermediate Macroeconomics	6	<b>P</b> ECON1002 <b>C</b> ECMT1020 <b>N</b> ECON2002, ECOS2902, ECON2902 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
Any four further ECOS2000 or ECOS3000 units, of which at least three must be at the 3000 level			
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Finance</b>			
<b>Junior (Level 1) units</b>			
Any one junior unit of study (six credit points) from the University of Sydney Business School.			
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECON1001</b> Introductory Microeconomics	6	<b>N</b> BUSS1040	Semester 1 Semester 2 Summer Main
<b>ECON1002</b> Introductory Macroeconomics	6		Semester 1 Semester 2 Summer Main
<b>Level 2 and 3 units</b>			
<b>FINC2011</b> Corporate Finance I	6	<b>A</b> ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) <b>N</b> FINC2001 <i>Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.</i>	Semester 1 Semester 2 Summer Early Winter Main
<b>FINC2012</b> Corporate Finance II	6	<b>P</b> FINC2011 or FINC2001 <b>N</b> FINC2002	Semester 1 Semester 2 Summer Main
<b>FINC3017</b> Investments and Portfolio Management	6	<b>P</b> FINC2011 <b>N</b> FINC3007 <i>Students who achieved less than a credit in FINC2011 are advised not to attempt FINC3017 until they have completed FINC2012.</i>	Semester 1 Semester 2 Summer Early
A minimum of three (18 credit points) further FINC3000 level units			
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Geography</b>			
<b>Junior (Level 1) units and Level 2 units</b>			
Some junior elective and intermediate GEOG/GEOS units may be required to meet the prerequisites of Level 3 units for this major.			
<b>Level 3 units</b>			
24 CP made up of:			
<b>GEOS3333 Geographical Concepts, Skills &amp; Methods</b>	6	<b>P</b> Assumed Knowledge: Basic knowledge of ARC GIS software. <b>N</b> GEOS3933	Semester 2
or			
<b>GEOS3933 Geog. Concepts, Skills &amp; Methods (Adv)</b>	6	<b>P</b> Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002. <b>N</b> GEOS3333	Semester 2
<b>GEOS3053 Southeast Asia Field School</b>	6	<b>P</b> 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. <b>N</b> GEOS3953, GEOG3201 <i>Note: Department permission required for enrolment Students must contact the unit coordinator no later than September in the year before taking this unit.</i>	Intensive July
or			
<b>GEOS3953 Southeast Asia Field School (Adv)</b>	6	<b>P</b> 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment. <b>N</b> GEOS3053 <i>Note: Department permission required for enrolment Students must contact the unit coordinator no later than September in the year before taking this unit.</i>	Intensive July
Plus any of the following units:			
<b>ENVI3111 Environmental Law and Ethics</b>	6	<b>P</b> 12 credit points of intermediate units of study <b>N</b> ENVI3911	Semester 1
or			
<b>ENVI3911 Environmental Law and Ethics (Advanced)</b>	6	<b>P</b> Distinction average across 12 credit points of intermediate units of study <b>N</b> ENVI3111	Semester 1
<b>ENVI3112 Environmental Assessment</b>	6	<b>P</b> (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units <b>N</b> ENVI3912, ENVI3004, ENVI3002	Semester 2
or			
<b>ENVI3912 Environmental Assessment (Advanced)</b>	6	<b>P</b> Distinction average in ((GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units) <b>N</b> ENVI3112, ENVI3004, ENVI3002	Semester 2
<b>GEOS3520 Urban Citizenship &amp; Sustainability</b>	6	<b>P</b> 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOILS2002, LWSC2002 <b>N</b> GEOS3920	Semester 1
or			
<b>GEOS3920 Urban Citizenship &amp; Sustainability (Adv)</b>	6	<b>P</b> Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002 <b>N</b> GEOS3520	Semester 1
<b>GEOS3524 Global Development and Livelihoods</b>	6	<b>P</b> 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience <b>N</b> GEOS2112, GEOS3924, GEOS2912	Semester 1
or			
<b>GEOS3924 Global Development and Livelihoods (Adv)</b>	6	<b>P</b> 24 credit points of Intermediate units of study including a distinction in 6 credit points of Intermediate Geoscience <b>N</b> GEOS2912, GEOS2112, GEOS3524	Semester 1
<b>GEOS3009 Coastal Environments and Processes</b>	6	<b>P</b> (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906)) <b>N</b> MARS3003, MARS3105, GEOS3909	Semester 1
or			
<b>GEOS3909 Coastal Environments and Processes (Adv)</b>	6	<b>P</b> Distinction average in ((6 credit points of Intermediate Geoscience* units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))) <b>N</b> MARS3105, GEOS3009, MARS3003 <i>A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</i>	Semester 1
<b>GEOS3014 GIS in Coastal Management</b>	6	<b>P</b> Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. <b>N</b> MARS3104, GEOS3914	Semester 2
or			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>GEOS3914</b> <b>GIS in Coastal Management (Advanced)</b>	6	<b>P</b> Distinction average in either 12 credit points of Intermediate Geoscience units or [(GEOS2115 or GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]; <b>N</b> GEOS3014, MARS3104 <i>Note: Department permission required for enrolment</i> <i>A distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</i>	Semester 2
<b>GEOS3101</b> <b>Earth's Structure and Evolution</b>	6	<b>A</b> GEOS2114, GEOS2124 <b>P</b> (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School <b>N</b> GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003	Semester 1
or			
Different pathways are available for this major. See the Faculty of Science handbook at <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			
<b>Government and International Relations</b>			
<b>Junior (Level 1) units</b>			
Two level 1000 Government (GOVT) units			
<b>Level 2 and 3 units</b>			
At least 36 senior credit points of Level 2000 and Level 3000 GOVT units, including at least 6 credit points from Level 3000 units of units of study. Note. Students may also complete a maximum of 12 credit points in cross-listed non-'GOVT' senior units of study as electives for this major. For details of all non-'GOVT' units of study that may be cross listed with this major, see the Faculty of Arts and Social Sciences website			
<b>Management</b>			
<b>Level 1</b>			
One junior prerequisite unit of study (six credit points) from the Business School.			
<b>Level 2 and 3 units</b>			
<b>WORK2201</b> <b>Foundations of Management</b>	6	<b>P</b> 24 credit points of junior units of study <b>N</b> WORK2001, IREL2001 <i>This a compulsory unit of study for the Management major.</i>	Semester 1
<b>WORK2210</b> <b>Strategic Management</b>	6	<b>P</b> 40 credit points worth of units of study <b>N</b> WORK2010 <i>This is the compulsory unit of study for the Management major.</i>	Semester 2
<b>WORK2218</b> <b>Managing Organisational Behaviour</b>	6	<b>P</b> 24 junior credit points <i>This is the compulsory unit of study for the Management major.</i>	Semester 1
A minimum of three units from:			
<b>IBUS2102</b> <b>Cross-Cultural Management</b>	6	<b>P</b> 36 junior credit points <b>N</b> IBUS2002	Semester 1 Semester 2
<b>IBUS3107</b> <b>Business Negotiations</b>	6	<b>P</b> 48 credit points <i>Note: Department permission required for enrolment</i> <i>This unit will require student's participation in a number of negotiations. Preparation for these negotiations, which are a large part of your grade, will require time-pressured reading of material in class.</i>	Semester 1
<b>QBUS2350</b> <b>Project Planning and Management</b>	6	<b>P</b> BUSS1020 or ECMT1010 or equivalent <b>N</b> CIVL3805, ECMT3640	Semester 2
<b>WORK2209</b> <b>Managing Organisational Change</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> 40 credit points worth of units of study <b>N</b> WORK2009	Semester 2
<b>WORK2211</b> <b>Human Resource Strategies</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> 40 credit points of units of study including (WORK1003 or WORK1002) <b>N</b> WORK2011, IREL2011	Semester 2
<b>WORK2217</b> <b>International Human Resource Management</b>	6	<b>P</b> 40 credit points worth of units of study including either (WORK1003 or WORK1001) OR (IBUS2101 or IBUS2001) <b>N</b> WORK2017	Semester 2
<b>WORK2219</b> <b>Managing Organisational Sustainability</b>	6	<b>P</b> 40 credit points worth of units of study	Semester 2
<b>WORK2221</b> <b>Organisational Communication</b>	6	<b>P</b> 40 credit points worth of units of study	Semester 1
<b>WORK2222</b> <b>Leadership in Organisations</b>	6	<b>A</b> WORK2201 or WORK2218 <b>P</b> 40 credit points worth of units of study	Semester 2
<b>WORK2227</b> <b>Regulation at Work</b>	6	<b>P</b> 24 credit points of junior units of study including WORK1003 <b>N</b> WORK2208, WORK2207	Semester 2
<b>WORK3922</b> <b>Organisational Research Methods</b>	6	<b>P</b> 40 credit points worth of units of study <b>N</b> IREL3902, WORK3902	Semester 2
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Marketing</b>			
<b>Junior (Level 1) units</b>			
<b>MKTG1001</b> <b>Marketing Principles</b>	6	<b>N</b> MKTG2001	Semester 1 Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Level 2 and 3 units</b>			
<b>MKTG2112</b> Consumer Behaviour	6	<b>P</b> MKTG1001 (or MKTG2001) <b>N</b> MKTG2002	Semester 1 Semester 2
<b>MKTG2113</b> Marketing Research	6	<b>P</b> MKTG1001 <b>N</b> MKTG1002	Semester 1
<b>MKTG3118</b> Marketing Strategy and Planning	6	<b>P</b> MKTG1001 (or MKTG2001), MKTG2112 (or MKTG2002), and (MKTG2113 or MKTG1002 or MKTG2003) <b>N</b> MKTG3201	Semester 2
Plus three other MKTG2000 or 3000 units			
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Psychology</b>			
Note: A Psychology major requires the completion of 60 credit points of PSYC units			
<b>Junior (Level 1) units</b>			
<b>PSYC1001</b> Psychology 1001	6		Semester 1 Summer Main
<b>PSYC1002</b> Psychology 1002	6		Semester 2 Summer Main
<b>Level 2 and 3 units</b>			
<b>PSYC2011</b> Brain and Behaviour	6	<b>P</b> PSYC1001 and PSYC1002. <b>N</b> PSYC2911, PSYC2111	Semester 1
<b>PSYC2012</b> Statistics & Research Methods for Psych	6	<b>A</b> Recommended: HSC Mathematics, any level <b>P</b> PSYC1001 and PSYC1002 <b>N</b> PSYC2112	Semester 1
<b>PSYC2013</b> Cognitive and Social Psychology	6	<b>P</b> PSYC1001 and PSYC1002. <b>N</b> PSYC2113	Semester 2
<b>PSYC2014</b> Personality and Intelligence 1	6	<b>P</b> PSYC1001 and PSYC1002 <b>N</b> PSYC2114	Semester 2
<b>PSYC3018</b> Abnormal Psychology	6	<b>A</b> (PSYC2012 or PSYC2112) and (PSYC2014 or PSYC2114) <b>P</b> At least two intermediate Psychology units of study from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014 and PSYC2114 <b>N</b> PSYC3203	Semester 1
At least three Senior units of study, which must include:			
<b>PSYC3015</b> Personality and Intelligence 2	6	<b>A</b> (PSYC2012 or PSYC2112); (PSYC2013 or PSYC2113) <b>P</b> (PSYC2014 or PSYC2114) and (PSYC2011 or PSYC2911 or PSYC2111 or PSYC2012 or PSYC2112 or PSYC2013 or PSYC2113)	Semester 1
<b>PSYC3016</b> Developmental Psychology	6	<b>P</b> PSYC2013 or PSYC2113 and at least one other Intermediate Psychology unit from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 and PSYC2114. <b>N</b> PSYC3206	Semester 2
<b>PSYC3017</b> Social Psychology	6	<b>A</b> PSYC2012 or PSYC2112. <b>P</b> PSYC2013 or PSYC2113 and at least one other Intermediate Psychology Unit of Study from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 and PSYC2114. <b>N</b> PSYC3212	Semester 1
<b>PSYC3020</b> Applications of Psychological Science	6	<b>P</b> 12 credit points of junior psychology and 12 credit points in Intermediate Psychology <b>N</b> PSYC3019	Semester 2
and at least one of:			
<b>PSYC3011</b> Learning and Behaviour	6	<b>A</b> PSYC2012 or PSYC2112 <b>P</b> (PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014 or PSYC2114. <b>N</b> PSYC3209	Semester 1
<b>PSYC3012</b> Cognition, Language and Thought	6	<b>A</b> PSYC2012 or PSYC2112 <b>P</b> (PSYC2013 or PSYC2113) and at least one other Intermediate Psychology unit from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 or PSYC2114. <b>N</b> PSYC3205	Semester 1
<b>PSYC3013</b> Perceptual Systems	6	<b>A</b> PSYC2012 <b>P</b> (PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014, PSYC2114 or ANAT2010 <b>N</b> PSYC3210	Semester 2
<b>PSYC3014</b> Behavioural and Cognitive Neuroscience	6	<b>A</b> PSYC2113 or PSYC2013 <b>P</b> Either ((PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from (PSYC2012 or PSYC2112), (PSYC2013 or PSYC2113), (PSYC2014 or PSYC2114)) OR ((PSYC2011 or PSYC2911 or PSYC2111 or PSYC2013) and ANAT2010 and PCOL2011) <b>N</b> PSYC3215, PSYC3204, PSYC3914	Semester 2
See the Faculty of Science handbook at <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			

# Bachelor of Agricultural Economics

## Units of study

All students complete an Agricultural Economics major and one non-Agricultural Economics major. Details of majors can be found in Table 3.

### Year 2

#### AGEC2103

##### Production Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** ECON1001 or AGECE1006 or (AGECE1003 and AGECE1004) or RESECE1031 **Prohibitions:** AGECE2003 **Assessment:** 2 x assignments (40%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on microeconomic principles studied in first year and applies them to the analysis of firms' decisions. Emphasis is put on the formalization of the firm's problem and in the use of duality. The topics include: production functions (single and multi-output); distance functions and their use in the measurement of productivity; the decomposition of productivity and productivity changes; production under risk; cost and profit functions.

N.B. Available to 2nd year students in the Faculty of Economics and Business

*Textbooks*

Collection of readings

or

#### AREC2001

##### Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

#### AGEC2105

##### Applied Econometric Modelling 1

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECMT1010 or MATH1905 or MATH1005 or MATH1015) and ECMT1020 **Prohibitions:** AGECE2005, ECMT2110 **Assessment:** 1x1hr exam (25%), 1 x assignment (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Applied Econometric Modelling is designed to provide students with a sound understanding of the application of applied econometric methods to the agricultural and resource sectors. Topics covered will include: single and multiple regression, forecasting, dummy variables, violations of OLS assumptions, dynamics, binary choice models, and an introduction to cointegration. 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.

This unit of study is designed to develop student understanding and capability in applied regression analysis.

It is a core unit for students in BAgREc and BResEc, students and a non core unit for BScAgr students.

Students will become familiar with exploring data sets and estimating, interpreting, and assessing regressions that represent economic relationships.

At the end of this unit, students will be able to understand the major concepts and principles of applied regression analysis, estimate simple regressions in EVIEWS and interpret the output, and be able to read, understand, and possibly replicate recent literature in agricultural and resource economics journals that apply econometric methods.

The students will gain research and computing skills.

*Textbooks*

D.N. Gujarati & D.C. Porter, Basic Econometrics, 5th Ed. (McGraw-Hill Irwin), New York.

or

#### ECMT2150

##### Cross Section Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

#### ECOS2001

##### Intermediate Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or BUSS1040 **Corequisites:** ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECON2001, ECOS2901, ECON2901 **Assessment:** Tutorial participation (10%), 2x in-class tests (40%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

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.

And 1 elective unit from Tables 1 and 2, with a view to completing a Table 4 non-AGEC major

#### AGEC2101

##### Market and Price Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 2 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** AGECE1006 or (AGECE1003 and AGECE1004) or



AGEC1002 or AGECE1102 or RSEC1031 or AGECE1031 **Prohibitions:** AGECE2001 **Assessment:** 1x1hr in-class mid-term exam (20%), 1x3000wd assignment (20%), 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

N.B. Available to 2nd year students in Faculty of Economics and Business.

Advised prerequisite: AGECE2105 or ECMT2110

or

### AREC2002

#### Commodity Market and Price Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 1x50min Mid-semester Test (20%), 1xGroup Assignment (1000wd equiv) (20%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### ECOS2002

#### Intermediate Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1002 **Corequisites:** ECMT1020 **Prohibitions:** ECON2002, ECOS2902, ECON2902 **Assessment:** Mid-semester test (30%), assignments (20%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

This unit of study develops models of the goods, money and labour markets, and 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.

And 3 elective units from Tables 1 and 2, with a view to completing a Table 4 non-AGECE major

## Year 3

### AGECE3102

#### Agricultural and Resource Policy

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 1 **Classes:** 1x2-hr lecture + 1x1-hr lectures/week, 1x1-hr tutorial/fortnightly **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE3002 **Assessment:** 1x2.5hr exam (70%) and 3x600 wd problem sets (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit covers the theoretical framework for economic analysis of policy interventions (welfare economics and public choice theory). Emphasis is put on building the skills needed to analyze the incidence

of economic policy and on the design of policies under asymmetric information. An understanding of the institutional structure of agricultural and resource policy in Australia is promoted through the direct contact with policy makers, public agencies and lobbying groups.

N.B. Available to 3rd year students in the Faculty of Economics and Business

*Textbooks*

To be advised

### AGECE3103

#### Applied Optimisation

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE3101, AGECE3001 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study deals with constrained optimization problems in which one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The main focus of the unit is on linear programming (LP) problems, viz. problems in which the objective function and the constraint functions are all linear, and the application of LP in agricultural and other planning contexts. Topics include graphical and mathematical representation of LP problems, solution methods, solution information, stability of optimal solutions, primal and dual formulations and parametric programming. After covering the essentials of LP and its extension to integer LP, the focus shifts to modelling real world scenarios as optimization problems. Students are streamed: one group deals with specialized LP formulations (e.g. transportation model, stochastic programming). The other examines dynamic optimization for problems that involve inter-temporal resource allocation. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (e.g. LINDO).

or

### AGECE3101

#### Agribusiness Management

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** AGECE2103 or AGECE2003 or AGECE1006 **Prohibitions:** AGECE3001, AGECE1102, AGECE3103 **Assessment:** 1x2hr exam (50%) and 1x50 min mid-semester exam (15%) and 1 assignment (25%) and workshop reports (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce decision making problems encountered by firms and agribusiness firms and general methods of solving microeconomic decision making problems. It is unit of study that builds on knowledge gained in junior units of study in particular AGECE1006, AGECE2103 and AGECE2102. Students will review production economics and activity analysis and show how budgeting methods can be used to relate them. They will extend these budgeting techniques to problems of time and risk, using capital and parametric budgeting. Students will also be introduced to linear programming and show how this tool is a practical method of solving decision making problems. Students will learn to consider methods for solving decision making problems where the outcomes are not known with certainty. The students will gain skills through workshop based tasks, an assignment, information literacy and communication skills through the presentation of the workshop reports and discussion throughout the workshop.

or

### AREC3001

#### Production Modelling and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

#### AGEC3104

##### Research Methods

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 2 **Classes:** 2x1-hr lectures/week & 1x1-hr tutorial/fortnight **Prerequisites:** AGEC2105 **Prohibitions:** AGEC3004 **Assessment:** 1x2500wd assignment(40%) and 1x2 hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data; and methods of analysis of data. Topics are illustrated with examples of research in theoretical economics and empirical research. Students are expected to read widely. Development of practical research skills, including the ability to critically and statistically synthesise and interpret data will be fostered by the completion of applied computer-based workshop exercises. Information literacy skills and the ability to summarise and synthesise information and use it to inform an argument will be improved through the preparation of a literature review and a research proposal.

And 5 elective units from Table 2 across semester 1 and 2, with a view to completing a Table 4 non-AGEC major

#### Year 4

Year 4 WAM will be calculated based on the units chosen from the Year 4 Units of Study Table.

#### AFNR4001

##### Professional Development

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 2 **Classes:** Workshops over four years **Prohibitions:** AGRF4000 **Assessment:** 1x blog posting (10%), 1x on-line (multi-media) (30%) and 1x portfolio (60%) **Practical field work:** 40 days of professional experience, 1 week long excursion **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study is designed to allow students to critically reflect on the relationship between the rural enterprise and environment and how they can contribute to the future decisions and management affecting the rural community. It is a core unit of study in 4th year for the BAgEc, BScAgr, BLWSc, BResEc, BHortSc which requires students to complete 40 days of professional experience with the expectation that students will examine the nature of facts from their degree in this environment. A minimum of 15 days must be completed on-farm/field. The remaining days may be at the student's discretion. The unit will be counted towards 4th year, but professional experience placements will normally be undertaken throughout the degree. In the early stages of the Professional Development program students participate in Faculty excursions that have been developed so they can experience a range of activities, such as research, extension, on-farm and industry both in the rural and urban environment to complement their learning within their individual degree programs. Building on this various workshops have been developed to assist students to identify a rural environment theme or issue of their interest with the specific emphasis being placed on them reflecting on how their new understandings of their theme of interest affects their personal and professional development. To complete this unit students will present a portfolio of their theme including critical reflection on the pivotal relationships between the academic degree, rural environment, professional experience, and beliefs and values if the rural community. Through developing these pivotal relationships, students will be able to use their new understandings to support and guide the future

developments in the rural enterprise and environment. By developing and presenting the portfolio and engaging in other online activities the students will enhance their skills in inquiry, information literacy and communication. In particular the autonomous development of case studies reflecting the contemporary issues in agriculture and their professional placements the students will have to consider their understandings of ethical, social and professional issues and further develop the personal and intellectual autonomy.

*Note: Department permission required for enrolment and*

#### AGEC4112

##### Research Project A

**Credit points:** 9 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGEC3102, AGEC3103, AGEC3104 or AGEC3004 **Prohibitions:** AGEC4012 **Assessment:** Individual report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note:*

In this unit of study, students develop their ability to undertake a research project in economics. The unit builds on theoretical and applied knowledge gained throughout the degree. Each student will develop a well defined research project in close collaboration with an academic supervisor. In addition to improving their research skills through the design and report on a single research study, students will improve their communication skills through oral presentation of their work.

and

#### AGEC4113

##### Research Project B

**Credit points:** 9 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGEC3102, AGEC3103, AGEC3104 or AGEC3004 **Prohibitions:** AGEC4013 **Assessment:** Individual report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note:*

This unit of study is taken in conjunction with the companion unit, AGEC4112 Research Project A. See AGEC4112 for details.

or

#### AGEC4121

##### Research Exercises A

**Credit points:** 9 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 1 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC 3104 or AGEC3004 **Prohibitions:** AGEC4112, AGEC4012 **Assessment:** Group report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study should be 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 work 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 prepare individual and/or group written reports and/or oral presentations concerning data acquisition, analysis and interpretation of results. Students who undertake this unit will not be eligible for honours.

and

#### AGEC4122

##### Research Exercises B

**Credit points:** 9 **Teacher/Coordinator:** A/Prof Dilip Dutta **Session:** Semester 2 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC3104, or AGEC3004 **Prohibitions:** AGEC4113, AGEC4013 **Assessment:** Group report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

And 4 AGEC or RSEC or AREC elective units of study from the list below across semesters 1 and 2. Two units would normally be chosen

for semester 1 and 2 units for semester 2. A maximum of 2 level 4000 RSEC or 2 of AREC3003 and AREC3004 units for the entire year can be completed. Note, you cannot double count units in your degree, for example if you have completed ECOS3006, you can only count this unit of study as either a year 3 or year 4 unit, likewise units of study can only count towards one major. Semester 1 elective units below:

### AGEC4103

#### International Agricultural Trade

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC4003 **Assessment:** 1x1hr exam (25%), 1 x essay (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

Krugman and Obstfeld. International Economics: Theory and Policy, 9th Ed. (Pearson Addison Wesley), New York.

or

### ECOS3006

#### International Trade

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3006 **Assessment:** problem sets (5%), Mid-semester test (35%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AGEC4107

#### Special Topics

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1, Semester 2 **Classes:** Individual research and consultation **Prohibitions:** AGEC4007 **Assessment:** Research paper (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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.

### RSEC4131

#### Benefit-Cost Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 1x2 hr lecture/wk commencing week 1 & 1x1 hr tut/wk, commencing week 2. **Prerequisites:** (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) **Prohibitions:** AGEC4037 **Assessment:** 1 x oral presentation (5%), 1 x written group-work essay (20%), 1 x 1hr mid-semester exam (25%),

1 x 2hr final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

### AREC2004

#### Benefit-Cost Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGEC1006 or AGEC1102 **Assessment:** 1x200wd Oral Presentation (5%), 1xGroup-work Essay (1000wd equiv) (20%), 1x50min Mid-semester Test (25%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Foundational concepts in welfare economics, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures, are analysed in detail and applied to project evaluation and policy assessment. Procedures of conducting a benefit-cost analysis are presented, and tools of non-market valuation for public goods and 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.

### AGEC4108

#### Quantitative Planning Methods

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2 tut/lab session)/wk, commencing week 1 **Prerequisites:** AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 **Prohibitions:** AGEC4008 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sector level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are also discussed. Topics include non-linear programming, stochastic programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (e.g. 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 may include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization.

### RSEC4133

#### Economics of Mineral & Energy Industries

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 2 **Classes:** 2x1-hr lectures/week commencing week 1, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 **Assessment:** Excursion attendance and report (25%); 1x1hr mid-term exam (30%) and 1x2 hr final exam (45%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit provides theoretical and empirical background on the economics of minerals exploration, extraction and marketing and on the economics of energy generation, distribution and use. The economics of minerals and energy commodity markets will be discussed and analysed. 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 analysed. 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

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.

or

### AREC3003

#### Econ of Minerals and Energy Industries

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit builds on previously acquired economics training and develops advanced understanding of the economics of minerals exploration, extraction and marketing and the economics of energy generation, distribution and use. The implications of mineral extraction and energy generation activities for natural resources and the environment are explored. The unit will foster in-depth knowledge of the markets for minerals and energy, their industry structure and business environment, including the role of markets for derivatives on minerals and energy commodities.

### AGEC4102

#### Agricultural Development Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 2 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) **Assessment:** 1x2000 wd problem set (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on the microeconomic analysis of development, with a special emphasis on the importance of market failures in financial markets as origin of persistent poverty. The unit also addresses policy interventions to overcome such failures and the challenges in their evaluation. A special emphasis is put in the discussion of the role of agriculture in development, and the evidence supporting its importance in poverty reduction.

#### Textbooks

Debraj Ray, *Development Economics*, Princeton University Press.

Abhijit Banerjee, Roland Bénabou and Dilip Mookherjee, *Understanding Poverty*, Oxford University Press.

World Bank, *Agriculture for Development - World Development Report 2008*, World Bank and Oxford University Press

N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

or

### ECOS3002

#### Development Economics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** One of (ECOS2001 or ECON2001) or

(ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3002 **Assessment:** 2x in-class tests (30%) and 2.5hr Final exam (70%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AGEC4104

#### Industrial Organization of Agribusiness

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) **Assessment:** 1x2000 wd assignment (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

### ECOS3005

#### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

### RSEC4132

#### Environmental Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tihomir Ancew **Session:** Semester 2 **Classes:** 2x1-hr lectures/week commencing week 1, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** ECON2001 or ECOS2001 or AGECE2103 or AGECE2003 or RSEC2031 **Prohibitions:** ECON3013, AGECE4035 **Assumed knowledge:** (ECON2001 or ECOS2001), (ECON2002 or ECOS2002), (AGECE3001 or AGECE3101), AGECE2101, AGECE2105 **Assessment:** 1 x report and presentation from the practical experience in environmental economics (20%), 1x1hr mid-term exam (30%), and 1x2hr final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit provides theoretical and empirical background necessary for a resource economist to be able to successfully function when faced with various environmental problems. The unit investigates economic aspects of a range of environmental issues. The studied concepts are exemplified 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: competing uses of the environment / externalities, market failure, the importance of property rights, optimal allocation of pollution abatement, and the processes for making choices relating to non-market goods. Some social issues with environmental impacts are studied through



exploration of the problems of population size and distribution, economic growth, and environmental regulation.

*Textbooks*

Perman, R., Y. Ma, J. McGilvray and M. Common. Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003  
Tom Tietenberg.,2008. Environmental and Natural Resource Economics  
Endres. 2011. Environmental Economics: Theory and Policy

or

**ECOS3013**

**Environmental Economics**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x1500wd Essay (25%), 1hr Mid-semester test (25%), 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The natural environment is invariably affected by production and consumption in our modern economy. In particular, environmental outcomes are important in the presence of market failures (externalities and public goods). This unit focuses on developing a student's detailed understanding of the economic techniques used by policymakers to address environmental issues. These techniques include: Pigovian taxes and subsidies; regulation with asymmetric information; marketable permits; pricing contributions for public goods; optimal damages; and the allocation of property-rights and market failures.

**AGEC4101**

**Agricultural Marketing Analysis**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Elizabeth Nolan **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, commencing week 1 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC4004 **Assessment:** Problem sets (30%) 1x2hr exam (40%) 1x3000wd essay (30%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. Its content is analytical, and draws heavily on applied microeconomics. The unit addresses price analysis and pricing efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. The main learning aims of the unit are development of student skills in understanding the fundamental concepts in marketing theory and applying them to the agribusiness industry, and further development of students' analytical abilities in the context of agricultural marketing. Extensive reading will be required.

*Textbooks*

To be advised

or

**AREC3002**

**Agricultural Markets**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. It addresses price analysis and efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. Building on the application of microeconomic theory to both production and consumption in agricultural markets, its content is analytical.

**AGEC4109**

**Agricultural Finance and Risk**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1. **Prerequisites:** ((AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103))

OR (AGEC1102 and AGEC3103) **Prohibitions:** AGEC4009 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

**AREC3005**

**Agricultural Finance and Risk**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or AREC2002 or AGEC2101 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (70%), 2x1500wd Assignments (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Agricultural production is typically risky, adding complexity to decision analysis and increasing need of risk consideration in agricultural policy design. This unit explores this theme, and has two related components: risk and risk management in agriculture, and issues of agricultural producer finance. These two components cover a broad range of topics that incorporate production risk and other sources of risk in agriculture.

**RSEC4134**

**Economics of Water & Bio-resources**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tihomir Ancew **Session:** Semester 2 **Classes:** 2x1-hr lectures/week commencing week 1, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 **Assessment:** 1xessay (35%); 1x1hr mid-term exam (25%); 1x2hr final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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. There will be particular emphasis on 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 forestry.

*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.

or

### AREC3004

#### Economics of Water and Bio-Resources

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester Test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit develops knowledge and skills in natural resource economics built on previously gained economics training. The economics of dynamic natural systems is studied through application of advanced modelling approaches. Particular emphasis is given to the economic mechanisms for managing water and biological resources including property rights, water allocation and water markets. Key policy instruments (taxes, quotas, standards) are analysed. Institutional and policy aspects will also be considered via analysis of water policy reform in Australia and elsewhere.

### Table 1 BAgrEc Years 1 and 2 elective units

#### ACCT1006

##### Accounting and Financial Management

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Janine Coupe; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** ACCT1005 or BUSS1030 **Prohibitions:** ACCT1003, ACCT1004, ACCT1001, ACCT1002 **Assessment:** Tutorial work (10%), practice set (15%), mid-semester exam (25%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Accounting and Financial Management is an introduction to financial reporting, and the gateway to further study in accounting leading to a major in accounting. This unit builds upon the accounting context, presented in BUSS1030 Accounting, Business and Society, with the aim of developing the technical skills of recording basic business transactions through accounting systems. In addition to this technical focus, specific attention will be given to the way in which the accounting information can be used to undertake financial management and analysis, to give students the ability to produce and interpret financial reports.

#### BUSS1030

##### Accounting, Business and Society

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Paul Blayney; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prohibitions:** ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 **Assessment:** Tutorial contribution (15%), written assessment (10%), mid-semester examination (25%) and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.*

This unit investigates the fundamentals of accounting and aims to provide a broad understanding of the role of accounting in the context of business and society. The format of the unit is designed to show that there are many uses of accounting data. The focus moves from accountability to decision making; both functions are explained through examples such as the 'double entry equation', and from an output (financial statements) perspective. Some more technical aspects of accounting are outlined, including the elements of assets, liabilities, revenues and expenses within simple, familiar scenarios. Besides developing an understanding of the role of accounting via conventional financial reports, recent developments including the discharge of accountability by companies through the release of corporate social

and environmental reports and the global financial crisis, are explored through an accounting lens.

#### BIOL1001

##### Concepts in Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1, Summer Main **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prohibitions:** BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments tests and lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Concepts in Biology is an introduction to the major themes of modern biology. The unit covers fundamental cell biology, with a particular emphasis on cell structure and function; the foundations of molecular biology from the role of DNA in protein synthesis to the genetics of organisms; and the theory of evolution and principles of phylogenetic analysis, including how these are used to interpret the origins of the diversity of extant organisms. Practical classes focus on students designing experiments, making and recording their observations and communicating their findings. The unit emphasises how biologists carry out scientific investigations, from the molecular and cellular level to the level of ecosystems. This unit of study provides a good foundation for intermediate biology units of study.

##### Textbooks

Knox R B et al. *Biology, An Australian Focus*. 4th ed. McGraw-Hill. 2010

#### BIOL1002

##### Living Systems

**Credit points:** 6 **Teacher/Coordinator:** Dr William Figueira **Session:** Semester 2 **Classes:** Two 1-hour lectures and one 2.5-hour practical per week and tutorials every few weeks. **Prohibitions:** BIOL1500, BIOL1902; BIOL1992 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments, quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Living Systems deals with the biology of organisms as individuals, within populations and as part of communities and ecosystems. A broad range of taxa is presented, from bacteria to large plants and animals, and emphasis is placed on understanding the ways in which they can live in different habitats. Behaviour is discussed as a key process linking organismal-level processes to population and community dynamics. The importance of energy in living systems, and how elements are used and recycled in biological communities, are introduced as the basis of ecosystems. The unit of study includes lectures and laboratory classes on the physiology and behaviour of animals and plants, the ways in which organisms control and integrate their activities and the processes controlling dynamics of populations and community. These themes are revisited within applied contexts to discuss issues such as management and conservation. This unit of study provides a good foundation for intermediate biology units of study.

##### Textbooks

Knox R B et al. *Biology. An Australian Focus*. 4th ed. McGraw-Hill. 2010.

#### CLAW1001

##### Foundations of Business Law

**Credit points:** 6 **Teacher/Coordinator:** Mr Giuseppe Carabetta **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Assessment:** Mid-Semester exam (20%), Case Analysis Assignment (20%), Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. Every decision in business, and every transaction and relationship, is made in the context of this legal regime. The aim of Foundations of Business Law is to introduce the students to the legal framework and regulatory systems which underlie all business activity and to expose them to the legal implications of commercial conduct. This unit of study introduces the Australian legal system and key areas of substantive business law including contracts, torts (in particular negligence and privacy), property and securities, white collar crime, intellectual property, competition and consumer law (in particular advertising,

product liability and unfair contracts), business structures and operations, misleading and unconscionable conduct and dispute resolution.

### GEOS1001

#### Earth, Environment and Society

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Jody Webster, A/Prof Bill Pritchard, Prof Jonathan Aitchison, Dr Josephine Gillespie **Session:** Semester 1 **Classes:** One 2 hour lecture and one 2 hour practical per week. **Prohibitions:** ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902 **Assessment:** Exam (50%), 1500 word essay (20%), practical reports (15%), presentation (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is the gateway unit of study for Human Geography, Physical Geography, Environmental Studies and Geology. Its objective is to introduce the big questions relating to the origins and current state of the planet: climate change, environment, landscape formation, and the growth of the human population. During the semester you will be introduced to knowledge, theories and debates about how the world's physical and human systems operate. The first module investigates the system of global environmental change, specifically addressing climate variability and human impacts on the natural environment. The second module presents Earth as an evolving and dynamic planet, investigating how changes take place, the rate at which they occur and how they have the potential to dramatically affect the way we live. Finally, the third module, focuses on human-induced challenges to Earth's future. This part of the unit critically analyses the relationships between people and their environments, with central consideration to debates on population change, resource use and the policy contexts of climate change mitigation and adaptation.

### GEOS1002

#### Introductory Geography

**Credit points:** 6 **Teacher/Coordinator:** Dr Kurt Iveson, Dr Dan Penny. **Session:** Semester 2 **Classes:** One 2 hour lecture per week and eight 2 hour practicals during semester. **Prohibitions:** GEOG1001, GEOS1902, GEOG1002 **Assessment:** One 2 hour exam, one 2000 word essay, two online quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides a geographical perspective on the ways in which people interact with each other and the physical world, focussing on the processes that generate spatial variation and difference. This unit will consider the development and characteristics of natural environments across the globe, and will explore how these environments both constrain, and are influenced by, humans. Therefore, the unit of study will consider the biophysical, political, economic, cultural and urban geographies that shape contemporary global society. Each of these themes will be discussed with reference to key examples (such as Hurricane Katrina, the Earthquake in Haiti/Dominican Republic, the conflict in Darfur, and mega-deltas in the developing world), in order to consider the ways in which the various processes (both physical and human) interact. 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.

### GOVT1101

#### Australian Politics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** 1x1800wd Essay (40%), 1x450wd Critical Research Exercise (10%), 1x2hr Examination (40%), Tutorial participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

#### Introduction to Political Science

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** 1x1000wd Reading assignment (20%), 1x1500wd Essay (30%), 1x1.5hr Examination (40%), Tutorial participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to the study of politics through a focus on the key organising principle of power. Different ways in which power is theorised and structured are considered. This includes power between individuals, groups, classes and genders as well as different power-sharing arrangements within and across political institutions. In critically assessing these different approaches, students will be exposed to a range of political science theories and methods, which will equip them for future study in Government and International Relations. The empirical focus of this unit is on Australia, with reference to other developed countries.

### GOVT1105

#### Geopolitics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** 1x1500wd Essay (30%), 1hr mid-term exam (20%), 2hr Final exam (40%), Tutorial participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week or equivalent intensive **Assessment:** 1x450wd Case Essay (10%), 1x1600wd Essay (35%), 1x2hr Examination (40%), Tutorial participation (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: In Summer School this unit is available to current HSC students only.*

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.

### INFS1000

#### Digital Business Innovation

**Credit points:** 6 **Teacher/Coordinator:** Barney Tan **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr lab workshop per week **Prohibitions:** INFO1000, ISYS1003 **Assessment:** group work (10%), group project (25%), mid-semester test (25%), and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Digital Economy, with its focus on information as a key business resource, has changed the way Business Information Systems (BIS) are viewed in organisations. BIS are now seen as enablers of innovation in which people, supported by powerful technology, are considered to be the most important component. This is because problem-solving, innovation and critical thinking skills cannot be outsourced or easily acquired by competitors. This unit is designed to develop your understanding of how businesses operate. It shows how information systems support business operations and management through integration of people, business processes and

systems. You will be provided with an introduction to state-of-the-art business analysis techniques, frameworks and models to assist in understanding the nature and contribution of BIS in a range of business contexts. With its emphasis on business rather than IT, this unit does not require prior IT-related experience. In this unit you will learn about the increasingly important role of IT in business and acquire valuable business analysis and problem-solving skills.

### MATH1011

#### Applications of Calculus

**Credit points:** 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1001, ENVX1001, MATH1901, MATH1906, MATH1111, BIOM1003 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed for science students who do not intend to undertake higher year mathematics and statistics. It establishes and reinforces the fundamentals of calculus, illustrated where possible with context and applications. Specifically, it demonstrates the use of (differential) calculus in solving optimisation problems and of (integral) calculus in measuring how a system accumulates over time. Topics studied include the fitting of data to various functions, the interpretation and manipulation of periodic functions and the evaluation of commonly occurring summations. Differential calculus is extended to functions of two variables and integration techniques include integration by substitution and the evaluation of integrals of infinite type.

#### Textbooks

As set out in the Junior Mathematics Handbook

### MATH1013

#### Mathematical Modelling

**Credit points:** 3 **Session:** Semester 2, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1003, MATH1903, MATH1907 **Assumed knowledge:** HSC Mathematics or a credit or higher in MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

MATH1013 is designed for science students who do not intend to undertake higher year mathematics and statistics.

In this unit of study students learn how to construct, interpret and solve simple differential equations and recurrence relations. Specific techniques include separation of variables, partial fractions and first and second order linear equations with constant coefficients. Students are also shown how to iteratively improve approximate numerical solutions to equations.

#### Textbooks

As set out in the Junior Mathematics Handbook

### MKTG1001

#### Marketing Principles

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeaney Yip **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prohibitions:** MKTG2001 **Assessment:** group assignment (17%), mid-semester exam (25%), group presentation (21%), tutorial participation (5%), research component (2%), and final exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### PSYC1001

#### Psychology 1001

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **Session:** Semester 1, Summer Main **Classes:** Three 1 hour lectures and one 1 hour tutorial per week, plus 1 hour per week of additional web-based (self-paced) material related to the tutorial. **Assessment:** One 2.5hr exam, one 1000w essay, multiple tutorial tests, experimental participation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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: science and statistics in psychology; behavioural neuroscience; applied psychology; social psychology; personality theory; human development.

This unit is also offered in the Sydney Summer School. For more information consult the website:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

#### Textbooks

Course Coordinator will advise

### PSYC1002

#### Psychology 1002

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **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 (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Psychology 1002 is a further general introduction to the main topics and methods of psychology, and it is the basis for advanced work as well as being of use to those not proceeding with the subject. Psychology 1002 covers the following areas: human mental abilities; learning, motivation and emotion; visual perception; cognitive processes; abnormal psychology.

This unit is also offered in the Sydney Summer School. For more information consult the web site:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

#### Textbooks

Course Coordinator will advise

### WORK1003

#### Foundations of Work and Employment

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Associate Professor Rae Cooper; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Assessment:** quiz (10%), participation (10%), mid-semester (20%), final quiz (20%), and essay (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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.

Modern Language (Level 1 or higher) units, with the approval of the Dean of Agriculture and Environment

## Table 2 BAgrEc Years 2 and 3 elective units

### AGEC2102

#### Agribusiness Marketing

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/fortnight **Prerequisites:** AGECE1006 or AGECE1102 or RSEC1031 **Assessment:** Group presentation (15%), 1x2000wd case study (25%), and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an introductory understanding of agribusiness marketing in a modern context. The unit will provide students in the Sciences degrees with an understanding of how the economic theory taught in first year in AGE1006 can be treated in an applied context. For BAgEc students, it is an intermediate level unit in the Agribusiness major.

Students will study the theory relating to the firm-level marketing mix and marketing strategy. The emphasis will be on 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 to demonstrate how marketing decisions are made along the marketing chain. At the end of this unit students will be able to use marketing theory to analyse the steps in the marketing chain and be aware of the forces for change within that chain.

By completing this unit, students should have improved their ability to master key theories, identify and frame problems, organise knowledge, carry out individual and group research, and synthesise information. They should also have improved their information literacy skills, and communication skills through group presentations and individual research.

### LWSC2002

#### Introductory Hydrology

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 2 **Classes:** Lec 2hr/wk; practical: 3hr/wk; field work: 25hr/wk (for 3 days only) **Prerequisites:** 6cp of Junior Geoscience or AGEN1002 **Assessment:** 1x 2 hr exam (50%), laboratory and practical reports (3x10%), field trip report (20%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces students to hydrology and water management in the context of Australian integrated catchment management. It particularly focuses on the water balances, rainfall runoff modeling, analysis and prediction of streamflow and environmental flows, water quality and sustainable practices in water management. Through theoretical work and case studies, the students will engage with problems related water quantity and quality in Australia and the world. The unit builds on knowledge gained in AGEN 1001 and AGEN 1002, and establishes the foundation for later units in the hydrology and water area. The unit provides one of the essential building blocks for a career related to water management and hydrology. The unit consists of two parts; the first part will involve a series of lectures, tutorials, practical exercises and case studies. The second part of the unit consists of a field excursion to regional NSW. During the field excursions, which are aligned with the ENVX3001 unit in the AVCC week, students will engage with current water problems and engage in basic hydrometric and water quality data collection. The data will be used later to analyse catchment condition and water quantity issues.

After completion of this unit, you should be able to:

- Explain the different processes in the hydrological cycle
- Measure and interpret hydrometric and basic water quality data
- Elucidate the processes involved in generation of streamflow from rainfall.
- Distinguish the link between water quantity and water quality and its implications for water management.
- Demonstrate a deeper understanding of the unique nature of Australian Hydrology

#### Textbooks

Ladson (2007) Hydrology an Australian Introduction. Oxford University press. Chapters 1 & 6, Gordon, N. D., McMahon, T. A., Finlayson, B. L., Gippel, C. J., and Nathan, R. J. (2004) Stream hydrology: an introduction for ecologists, John Wiley & Sons Inc.

### SOIL2003

#### Soil Properties and Processes

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Balwant Singh (Coordinator), Prof Alex McBratney, A/Prof. Stephen Cattle **Session:** Semester 1 **Classes:** 3x1hr lectures and 1x3hr practical/week, commencing week 1, and a compulsory field excursion to be held on the Thursday and Friday in the week preceding

the first semester. **Assessment:** Soil description report (10%), Quizzes (or Essay) (15%), Practical exercise book (20%), Practical exam (15%) and Written exam (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce students to the fundamental concepts within pedology, soil physics and soil chemistry. These concepts are part of the grounding principles that underpin crop and animal production, nutrient and water cycling, and environmental sustainability taught by other units of study in the Faculty. Students will participate in a two-day field excursion in the first week of semester to examine some common soils of the Sydney Basin, they will also learn to describe soil, and measure soil chemical and physical properties in the field. Referring to common soil profiles of the Sydney Basin, students will concentrate on factors affecting soil formation, the rudiments of soil description, and analysis of soil properties that are used in soil classification. Students will also develop knowledge of the physics of water and gas movement, soil strength, soil chemical properties, inorganic and organic components, nutrient cycles and soil acidity in an agricultural context. At the end of this unit students will become familiar with the factors that determine a soil's composition and behaviour, and will have an understanding of the most important soil physical and chemical properties. Students will develop communication skills through essay, report and practical exercises. The final report and laboratory exercise questions are designed to develop team work and collaborative efforts.

#### Textbooks

Campbell, K.O. & Bowyer, J.W. (eds) (1988). The Scientific Basis of Modern Agriculture. Sydney University Press.  
White, R.E. (2006). Principles and Practice of Soil Science: the Soil as a Natural Resource. 4th ed., Blackwell Science, Oxford.  
Charman, P.E.V. & Murphy, B.W. (2000). Soils: Their properties and management. 2nd ed. Oxford University Press, Melbourne.

### ENVX3001

#### Environmental GIS

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** Three-day field trip, (2 lec & 2 prac/wk). **Prerequisites:** AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology **Assessment:** One 15 min presentation (10%), 3500w prac report (35%), 1500w report on trip excursion (15%), 2 hr exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to impart knowledge and skills in spatial analysis and geographical information science (GISc) for decision-making in an environmental context. The lecture material will present several themes: principles of GISc, geospatial data sources and acquisition methods, processing of geospatial data and spatial statistics. Practical exercises will focus on learning geographical information systems (GIS) and how to apply them to land resource assessment, including digital terrain modelling, land-cover assessment, sub-catchment modelling, ecological applications, and soil quality assessment for decisions regarding sustainable land use and management. A 3 day field excursion during the mid-semester break will involve a day of GPS fieldwork at Arthursleigh University farm and two days in Canberra visiting various government agencies which research and maintain GIS coverages for Australia. By the end of this UoS, students should be able to: differentiate between spatial data and spatial information; source geospatial data from government and private agencies; apply conceptual models of spatial phenomena for practical decision-making in an environmental context; apply critical analysis of situations to apply the concepts of spatial analysis to solving environmental and land resource problems; communicate effectively results of GIS investigations through various means- oral, written and essay formats; and use a major GIS software package such as ArcGIS.

#### Textbooks

Burrough, P.A. and McDonnell, R.A. 1998. Principles of Geographic Information Systems. Oxford University Press: Oxford.  
Clarke, K. C. 2003. Getting Started With Geographic Information Systems. 4th Edition. Prentice Hall: Upper Saddle River, New Jersey.

Any level 2 or 3 semester units in Accounting (ACCT), Agricultural and Resource Economics (AREC), 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 FAE. 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 degree, with approval of the Dean FAE and the Degree Coordinator. 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

# Agricultural Economics major

## Junior (Level 1) units

### AGEC1102

#### Agricultural and Resource Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 3x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prohibitions:** AGEC1002 **Assumed knowledge:** HSC Mathematics or HSC Mathematics Extension 1 **Assessment:** 1x1hr exam (25%), 1 x assignment (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit applies the principles studied in introductory microeconomics to the agricultural and resource sectors. Some descriptive content regarding Australia's agricultural markets, natural resource assets and industries is included. The first part of the unit is focused on basic concepts of supply, demand, equilibrium in agricultural and resource markets, and how markets can be modeled mathematically. Subsequent parts of the unit are focused on introductory production economics and natural resource management (under conditions of market failure, and as dynamic processes). Sources of risk in agriculture and resource markets, alternative management strategies, and basic techniques of decision making in the face of risk are explored.

### AGEN1001

#### Shaping our Landscapes

**Credit points:** 6 **Teacher/Coordinator:** Dr Peter Ampt **Session:** Semester 1 **Classes:** 2x1hr lect, 1x2hr tut, 4x1 day (6.5hr) field (ave 2hrs/week) **Prohibitions:** AFNR1001 **Assessment:** 1x 2hr exam (40%), Field class reports (10%), Group work participation (10%), Journal (10%), Problem based learning project (30%) **Practical field work:** Preparation, revision and private study 3hrs/week **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to help students develop understanding of our non-urban landscapes and the physical, biological, economic and cultural factors that have shaped them, with particular emphasis on the interaction between production and environment. It is a core first year unit for students in BScAgr, BEnvSys, BAgREc, BResEc and BANetBioSc. The unit begins with a review of the current global issues around population, food, agriculture and environment and the place of Australia in this global context. Australia's current production (plant and animal based) and environmental systems and landscapes are described with an emphasis on the physical, biological, economic and cultural factors that have shaped them, concluding with an account of future production and environment scenarios. At the end of this unit, students should be able to describe global production and environment issues and key Australian landscapes and production systems, explain the factors that have shaped them and apply this understanding to a specific location and production system. They should analyse the situation of natural resource managers and evaluate the options available to them to maintain or improve profitable production and achieve sustainability. The students will gain research and inquiry skills through research-based group projects, information literacy and communication skills through on-line discussion postings,

tutorial discussions and presentations and personal and intellectual autonomy through working in groups and individually.

*Textbooks*

To be advised during semester.

## Level 2 and 3 units

### AGEC2101

#### Market and Price Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 2 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** AGEC1006 or (AGEC1003 and AGEC1004) or AGEC1002 or AGEC1102 or RSEC1031 or AGEC1031 **Prohibitions:** AGEC2001 **Assessment:** 1x1hr in-class mid-term exam (20%), 1x3000wd assignment (20%), 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

N.B. Available to 2nd year students in Faculty of Economics and Business.

Advised prerequisite: AGEC2105 or ECMT2110

or

### AREC2002

#### Commodity Market and Price Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGEC1006 or AGEC1102 **Assessment:** 1x50min Mid-semester Test (20%), 1xGroup Assignment (1000wd equiv) (20%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AGEC2103

#### Production Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) or RESEC1031 **Prohibitions:** AGEC2003 **Assessment:** 2 x assignments (40%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on microeconomic principles studied in first year and applies them to the analysis of firms' decisions. Emphasis is put on the formalization of the firm's problem and in the use of duality. The topics include: production functions (single and multi-output); distance functions and their use in the measurement of productivity; the decomposition of productivity and productivity changes; production under risk; cost and profit functions.

N.B. Available to 2nd year students in the Faculty of Economics and Business

*Textbooks*

Collection of readings

or

## AREC2001

### Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

## AGECE3102

### Agricultural and Resource Policy

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 1 **Classes:** 1x2-hr lecture + 1x1-hr lectures/week, 1x1-hr tutorial/fortnightly **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE3002 **Assessment:** 1x2.5hr exam (70%) and 3x600 wd problem sets (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit covers the theoretical framework for economic analysis of policy interventions (welfare economics and public choice theory). Emphasis is put on building the skills needed to analyze the incidence of economic policy and on the design of policies under asymmetric information. An understanding of the institutional structure of agricultural and resource policy in Australia is promoted through the direct contact with policy makers, public agencies and lobbying groups. N.B. Available to 3rd year students in the Faculty of Economics and Business

*Textbooks*

To be advised

## AGECE3101

### Agribusiness Management

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** AGECE2103 or AGECE2003 or AGECE1006 **Prohibitions:** AGECE3001, AGECE1102, AGECE3103 **Assessment:** 1x2hr exam (50%) and 1x50 min mid-semester exam (15%) and 1 assignment (25%) and workshop reports (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to introduce decision making problems encountered by firms and agribusiness firms and general methods of solving microeconomic decision making problems. It is unit of study that builds on knowledge gained in junior units of study in particular AGECE1006, AGECE2103 and AGECE2102. Students will review production economics and activity analysis and show how budgeting methods can be used to relate them. They will extend these budgeting techniques to problems of time and risk, using capital and parametric budgeting. Students will also be introduced to linear programming and show how this tool is a practical method of solving decision making problems. Students will learn to consider methods for solving decision making problems where the outcomes are not known with certainty. The students will gain skills through workshop based tasks, an assignment, information literacy and communication skills through the presentation of the workshop reports and discussion throughout the workshop.

or

## AREC3001

### Production Modelling and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making

problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

or

## AGECE3103

### Applied Optimisation

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE3101, AGECE3001 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study deals with constrained optimization problems in which one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The main focus of the unit is on linear programming (LP) problems, viz. problems in which the objective function and the constraint functions are all linear, and the application of LP in agricultural and other planning contexts. Topics include graphical and mathematical representation of LP problems, solution methods, solution information, stability of optimal solutions, primal and dual formulations and parametric programming. After covering the essentials of LP and its extension to integer LP, the focus shifts to modelling real world scenarios as optimization problems. Students are streamed: one group deals with specialized LP formulations (e.g. transportation model, stochastic programming). The other examines dynamic optimization for problems that involve inter-temporal resource allocation. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (e.g. LINDO).

Plus two designated Year 4 AGECE, AREC or ECOS elective units

# Non-Agricultural Economics majors

## Accounting

### Junior (Level 1) units

#### ACCT1006

##### Accounting and Financial Management

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Janine Coupe; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** ACCT1005 or BUSS1030 **Prohibitions:** ACCT1003, ACCT1004, ACCT1001, ACCT1002 **Assessment:** Tutorial work (10%), practice set (15%), mid-semester exam (25%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Accounting and Financial Management is an introduction to financial reporting, and the gateway unit to further study in accounting leading to a major in accounting. This unit builds upon the accounting context, presented in BUSS1030 Accounting, Business and Society, with the aim of developing the technical skills of recording basic business transactions through accounting systems. In addition to this technical focus, specific attention will be given to the way in which the accounting information can be used to undertake financial management and analysis, to give students the ability to produce and interpret financial reports.

#### BUSS1030

##### Accounting, Business and Society

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Paul Blayney; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prohibitions:** ACCT1001, ACCT1003, ACCT1004, ACCT1005, ACCT1002 **Assessment:** Tutorial contribution (15%), written assessment (10%), mid-semester examination (25%) and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This unit of study is a compulsory part of the Bachelor of Commerce and combined Bachelor of Commerce degrees.*

This unit investigates the fundamentals of accounting and aims to provide a broad understanding of the role of accounting in the context of business and society. The format of the unit is designed to show that there are many uses of accounting data. The focus moves from accountability to decision making; both functions are explained through examples such as the 'double entry equation', and from an output (financial statements) perspective. Some more technical aspects of accounting are outlined, including the elements of assets, liabilities, revenues and expenses within simple, familiar scenarios. Besides developing an understanding of the role of accounting via conventional financial reports, recent developments including the discharge of accountability by companies through the release of corporate social and environmental reports and the global financial crisis, are explored through an accounting lens.

### ECMT1010

#### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

### Level 2 and 3 units

#### ACCT2011

##### Financial Accounting A

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Eagle Zhang; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture and 1x1hr tutorial per week **Prerequisites:** (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) and (ECMT1010 or BUSS1020) **Prohibitions:** ACCT2001 **Assessment:** Group assignment (15%), mid-semester examination (35%) and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the accounting and reporting practices of reporting entities, particularly listed public companies. Emphasis is placed on developing an understanding of, and the ability to critically evaluate, the various regulatory requirements (professional and statutory) governing financial reporting. The unit commences with an overview of the financial reporting environment and theories that seek to explain the accounting policy choices of management. This framework provides a basis for examining a range of specific issues in financial accounting. Emphasis throughout the unit is on both the application of specific accounting techniques/rules and the conceptual/theoretical issues associated with alternative accounting methods.

#### ACCT2012

##### Management Accounting A

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Geoff Frost; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1 x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** (ACCT1001 or ACCT1005 or BUSS1030) and (ACCT1002 or ACCT1006) **Prohibitions:** ACCT2002 **Assessment:** Computer assignments (10%), quizzes (10%), case study assignment (10%); SAP assignment (10%), and final examination (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This course provides students with an introduction to the basics of management/cost accounting; it equips them with necessary skills to use an industry-standard accounting system and management accounting information efficiently and effectively. Areas specifically covered include: cost terms and purposes, cost behaviour, cost-volume-profit analysis, cost estimation, basic and alternative product costing methods, detailed study of the mechanics of the

budgeting process (master budgets, flexible budgets, standard costing and variance analysis, capital budgeting), sustainability and environmental management accounting, decision making using relevant costs/revenues and cost allocation.

Any four of the following:

#### ACCT3011

##### Financial Accounting B

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Matthew Egan; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture and 1x1hr tutorial per week **Prerequisites:** ACCT2011 or ACCT2001 **Prohibitions:** ACCT3001 **Assessment:** Mid-semester examination (30%), group presentations (10%), individual assignment (10%), and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces students to accounting for investments in entities that are controlled, significantly influenced, or jointly controlled by the investor. The first part of the unit focuses on assessing whether an investment should be consolidated, the process of consolidation, the preparation of consolidated financial statements for corporate groups, including the treatment of goodwill, intra-group transactions and non-controlling interests. Other aspects of group accounting, such as equity accounting, segment disclosures, related party disclosures, and accounting for joint operations are investigated. The first part of the unit concludes with a critical analysis of group accounting, including the outcomes of related processes, and the impact on users. The second part of the unit focuses on critically evaluating current issues in accounting regulation and practice, such as the politics of the standard-setting process, using accounting for financial instruments as a special case. Finally, voluntary disclosures for social and environmental reporting are considered. This unit aims to further develop students' written communication skills and critical and analytic skills within the context of corporate group activities.

#### ACCT3012

##### Management Accounting B

**Credit points:** 6 **Teacher/Coordinator:** Chang Loh **Session:** Semester 1, Semester 2 **Classes:** 1x1.5hr lecture and 1x1.5hr tutorial per week **Prerequisites:** ACCT2012 or ACCT2002 **Prohibitions:** ACCT3002 **Assessment:** Tutorial participation (5%), tutorial presentation (10%), tutorial critique (10%), mid-semester exam (25%), and Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Discipline Permission required for students who have not passed ACCT2012 (or ACCT2002)*

Management Accounting B deals with the theory and practice of a selection of contemporary management accounting issues. The course begins by examining the influences that impact upon the design of an organisation and its management accounting system. Behavioural factors, rather than technical factors, are highlighted and a range of organisational settings and management levels are reviewed. The unit then examines advanced issues relevant to operational management accounting. While this section of the course builds on the foundations laid in Management Accounting A, the focus remains on the behavioural implications of accounting techniques for making decisions in organisations.

#### ACCT3013

##### Financial Statement Analysis

**Credit points:** 6 **Teacher/Coordinator:** Stewart Jones **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** (ACCT2011 or ACCT2001) and (FINC2011 or FINC2001) **Prohibitions:** ACCT3003 **Assessment:** tutorial participation (10%), mid-semester examination (20%), group case studies (15%), and final examination (55%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Although the appropriate 'form' of financial analysis depends largely on the specific context (e.g. equity investment, credit extension, analysis of supplier/customer health, competitor analysis, regulatory overview or intervention, valuation for takeover/restructuring), many of the techniques of financial analysis are common to each. A primary purpose of this course is to develop an understanding of these techniques, as well as the inherent difficulties in their application. Specific issues addressed include the analysis of business performance and disclosure, the analysis of earnings quality, cash



flow assessment, credit worthiness and accounting-based valuation methods.

### ACCT3014 Auditing and Assurance

**Credit points:** 6 **Teacher/Coordinator:** Semester 1: Eric Clubb; Semester 2: TBA **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture and 1x1hr tutorial per week **Prerequisites:** ACCT3011 or ACCT3001 **Prohibitions:** ACCT3004 **Assessment:** Group assignment (20%), mid-semester examination (20%), two online quizzes (10%), and final examination (50%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study examines the process of auditing, highlighting the important concepts which underpin the practice of auditing. Although the focus of attention is on the audit of corporate financial reports undertaken in compliance with the Corporation Act 2001 (Cth), reference is also made to other forms of audit and assurance activities. This unit of study is intended to provide an overview of the audit process within the context of Australian Auditing Standards. The course is both practical and theoretical, with students expected to apply their knowledge to practical case studies developed from practice.

### ACCT3031 International Corporate Governance

**Credit points:** 6 **Teacher/Coordinator:** Wesley Hamilton-Jessop **Session:** Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** ACCT2011 or ACCT2001 **Assumed knowledge:** CLAW2201 **Assessment:** Individual assessment (20%), mid-semester exam (20%), group assessment (25%), and final exam (35%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the evolving view of corporate governance from an international perspective, with reference to Australian principles. Corporate governance from a narrow view is concerned with how a corporation is controlled, to the establishment of sets of arrangements affecting the conduct of an organisation and its relationship with stakeholders. Specific issues examined in this unit include the legal framework; control and culture of the modern corporation; operations of a Board; role of board sub-committees; Boards and the development or endorsement of strategies; measuring and rewarding performance; corporate governance, financial reporting and disclosure; corporate governance and the audit process; governance within the global financial crisis.

### ACCT3032 Current Issues in Management Accounting

**Credit points:** 6 **Teacher/Coordinator:** Max Baker **Session:** Semester 1 **Classes:** 1x 1hr lecture and 1x 2hr tutorial per week **Prerequisites:** ACCT2012 or ACCT2002 **Assessment:** In-class tests (20%), research presentation (20%), tutorial contribution (10%), and final examination (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit builds on the fundamentals of management accounting practice (ACCT2012) by introducing a series of advanced management accounting topics such as strategic management accounting, accounting innovation, human resource management, social and environmental accounting and designing management accounting systems. In addition, this unit relaxes the hitherto held assumption that management accounting works in a world characterised by certainty and rationality and instead shows that management accounting more often operates in a world characterised by fuzziness and ambiguity. This real-world view requires students to develop their judgemental skills and to adopt a more critical and reflective approach that challenges their beliefs about how management accounting works in practice. This is a perfect subject for those students aspiring to become strategic consultants.

### CLAW2201 Corporations Law

**Credit points:** 6 **Teacher/Coordinator:** Ms Juliette Overland **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Prerequisites:** Any 4 full semester junior units of study including CLAW1001 **Prohibitions:** CLAW2001 **Assessment:** Mid semester test (20%),

assignment (20%), tutorial work and participation (10%), and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Companies are an integral part of our business environment. All participants in the world of business have dealings with companies - whether as employees, clients, customers, directors, shareholders, creditors, debtors, suppliers, vendors, consultants or professional advisers. This makes it essential to have an understanding of the legal nature and characteristics of companies and the manner in which their activities and management are regulated. In this unit, the legal "life cycle" of a company is examined along with a comparison of companies to other business entities. The ways in which important activities undertaken by companies are regulated are explored including: entering contracts, raising funds, issuing shares, paying dividends. Consideration is given to the duties and obligations the law places upon those who manage companies, and the consequences which may result from any breach of those duties and obligations. The position of companies in financial difficulty and the final stages in the life cycle of an insolvent company are also addressed.

See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Agribusiness

### Junior (Level 1) units

Some junior elective units of WORK, IBUS or INFS may be required to meet the prerequisites of Level 2/3 units listed for this major.

### Level 2 and 3 units

#### AGEC2102

##### Agribusiness Marketing

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/fortnight **Prerequisites:** AGECE1006 or AGECE1102 or RSEC1031 **Assessment:** Group presentation (15%), 1x2000wd case study (25%), and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an introductory understanding of agribusiness marketing in a modern context. The unit will provide students in the Sciences degrees with an understanding of how the economic theory taught in first year in AGECE1006 can be treated in an applied context. For BAgREc students, it is an intermediate level unit in the Agribusiness major.

Students will study the theory relating to the firm-level marketing mix and marketing strategy. The emphasis will be on 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 to demonstrate how marketing decisions are made along the marketing chain. At the end of this unit students will be able to use marketing theory to analyse the steps in the marketing chain and be aware of the forces for change within that chain.

By completing this unit, students should have improved their ability to master key theories, identify and frame problems, organise knowledge, carry out individual and group research, and synthesise information. They should also have improved their information literacy skills, and communication skills through group presentations and individual research.

#### AGEC4104

##### Industrial Organization of Agribusiness

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Assessment:** 1x2000 wd assignment (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

### ECOS3005

#### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

### AGEC4101

#### Agricultural Marketing Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Elizabeth Nolan **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, commencing week 1 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC4004 **Assessment:** Problem sets (30%) 1x2hr exam (40%) 1x3000wd essay (30%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. Its content is analytical, and draws heavily on applied microeconomics. The unit addresses price analysis and pricing efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. The main learning aims of the unit are development of student skills in understanding the fundamental concepts in marketing theory and applying them to the agribusiness industry, and further development of students' analytical abilities in the context of agricultural marketing. Extensive reading will be required.

*Textbooks*

To be advised

or

### AREC3002

#### Agricultural Markets

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. It addresses price analysis and efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. Building on the application of microeconomic theory to both production and consumption in agricultural markets, its content is analytical.

### AGEC4109

#### Agricultural Finance and Risk

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1. **Prerequisites:** {(AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)} OR (AGEC1102 and AGEC3103) **Prohibitions:** AGEC4009 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

### AREC3005

#### Agricultural Finance and Risk

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or AREC2002 or AGEC2101 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (70%), 2x1500wd Assignments (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Agricultural production is typically risky, adding complexity to decision analysis and increasing need of risk consideration in agricultural policy design. This unit explores this theme, and has two related components: risk and risk management in agriculture, and issues of agricultural producer finance. These two components cover a broad range of topics that incorporate production risk and other sources of risk in agriculture.

Either 12 credit points INFS level 2/3 units or 12 credit points WORK level 2/3 units or 12 credit points of IBUS level 2/3 units

## Agricultural Finance

### Junior (Level 1) units

Some junior elective units may be required to meet the prerequisites of Level 2/3 units listed for this major

### Level 2 and Level 3

#### FINC2011

##### Corporate Finance I

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early, Winter Main **Classes:** 1 x 2hr lecture and 1 x 1hr tutorial per week **Prohibitions:** FINC2001 **Assumed knowledge:** ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) **Assessment:** Mid-semester exam (20%), major assignment (30%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.*

This unit provides an introduction to basic concepts in corporate finance and their application to (1) valuation of risky assets including stocks, bonds and entire corporations, (2) pricing of equity securities, and (3) corporate financial policy decisions including dividend, capital structure and risk management policies. Emphasis is placed on the application of the material studied and current practices in each of the topic areas.

#### FINC2012

##### Corporate Finance II

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 or FINC2001 **Prohibitions:** FINC2002 **Assessment:** Mid-semester exam (15%), essay (20%), and final exam (65%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on FINC2011 Corporate Finance I, by extending basic concepts in corporate financing, investing and risk management. The unit presents current theories of corporate financing and their practical

application in corporate investment and capital budgeting. The unit also examines securities and securities markets with an emphasis on pricing, investment characteristics and their use by corporations to manage risk. The securities examined include: bonds and related fixed income products; futures and options. The goal of the unit is to broaden students' knowledge of corporate finance in preparation for further study in finance in 300 level courses.

#### AGEC4104

##### Industrial Organization of Agribusiness

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Assessment:** 1x2000 wd assignment (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

#### ECOS3005

##### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

#### AGEC4108

##### Quantitative Planning Methods

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2 tut/lab session)/wk, commencing week 1 **Prerequisites:** AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 **Prohibitions:** AGEC4008 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sector level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are also discussed. Topics include non-linear programming, stochastic programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (e.g. 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 may include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization.

or

#### AGEC4107

##### Special Topics

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1, Semester 2 **Classes:** Individual research and consultation **Prohibitions:** AGEC4007 **Assessment:** Research paper (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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.

#### AGEC4109

##### Agricultural Finance and Risk

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1. **Prerequisites:** {(AGEC3001 or AGEC3101) and (AGEC2003 or AGEC2103)} OR (AGEC1102 and AGEC3103) **Prohibitions:** AGEC4009 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

#### AREC3005

##### Agricultural Finance and Risk

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or AREC2002 or AGEC2101 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (70%), 2x1500wd Assignments (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Agricultural production is typically risky, adding complexity to decision analysis and increasing need of risk consideration in agricultural policy design. This unit explores this theme, and has two related components: risk and risk management in agriculture, and issues of agricultural producer finance. These two components cover a broad range of topics that incorporate production risk and other sources of risk in agriculture.

Plus three FINC3000 units

## Agricultural Marketing

### Junior (Level 1) units

#### MKTG1001

##### Marketing Principles

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeaney Yip **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prohibitions:** MKTG2001 **Assessment:** group assignment (17%), mid-semester exam (25%), group presentation (21%), tutorial participation (5%), research component (2%), and final exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

## Level 2 and 3 units

### AGEC2102

#### Agribusiness Marketing

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/fortnight **Prerequisites:** AGECE1006 or AGECE1102 or RSEC1031 **Assessment:** Group presentation (15%), 1x2000wd case study (25%), and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an introductory understanding of agribusiness marketing in a modern context. The unit will provide students in the Sciences degrees with an understanding of how the economic theory taught in first year in AGECE1006 can be treated in an applied context. For BAgREc students, it is an intermediate level unit in the Agribusiness major.

Students will study the theory relating to the firm-level marketing mix and marketing strategy. The emphasis will be on 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 to demonstrate how marketing decisions are made along the marketing chain. At the end of this unit students will be able to use marketing theory to analyse the steps in the marketing chain and be aware of the forces for change within that chain.

By completing this unit, students should have improved their ability to master key theories, identify and frame problems, organise knowledge, carry out individual and group research, and synthesise information. They should also have improved their information literacy skills, and communication skills through group presentations and individual research.

### AGEC4104

#### Industrial Organization of Agribusiness

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Assessment:** 1x2000 wd assignment (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

### ECOS3005

#### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

### MKTG2112

#### Consumer Behaviour

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001) **Prohibitions:** MKTG2002 **Assessment:** ongoing work portfolio (15%), class participation (15%), project interview transcripts (individual component) (15%), final project group presentation (10%), final project group report (20%), and midterm exam (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the psychological, social, and cultural aspects of consumer behaviour on the marketing decisions of public and private organisations. Concepts and principles are drawn from disciplines such as cognitive psychology, social psychology, sociology, anthropology, and demography to discover and understand various aspects of consumer behaviour. Specific topics of study include: cultural, demographic and psychographic influences; reference group influences; household decision processes and consumption behaviour; consumer perception and learning; motivation, personality and emotion; consumer attitudes; and purchase decision processes.

### MKTG3118

#### Marketing Strategy and Planning

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001), MKTG2112 (or MKTG2002), and (MKTG2113 or MKTG1002 or MKTG2003) **Prohibitions:** MKTG3201 **Assessment:** consultant group presentation (20%), rationale for strategies - consultant group (10%), reflective journal entries (18%), participation (10%), final exam (40%), and research component (2%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will focus on strategic and managerial aspects of marketing. It will cover the development of innovative, business models; segmentation, positioning and lifecycle strategies; and key aspects of managing and organising marketing activities, and measuring performance. The central theme is how marketing strategy and its management can create superior and sustainable value for both customers and shareholders. Assessment will reflect the Unit's strategic decision-making approach, requiring students to take on the roles of marketing advisors and managers.

Plus two other MKTG3000 units

### AGEC4101

#### Agricultural Marketing Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Elizabeth Nolan **Session:** Semester 2 **Classes:** 2x1-hr lectures/week, commencing week 1 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE4004 **Assessment:** Problem sets (30%) 1x2hr exam (40%) 1x3000wd essay (30%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. Its content is analytical, and draws heavily on applied microeconomics. The unit addresses price analysis and pricing efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. The main learning aims of the unit are development of student skills in understanding the fundamental concepts in marketing theory and applying them to the agribusiness industry, and further development of students' analytical abilities in the context of agricultural marketing. Extensive reading will be required.

*Textbooks*

To be advised

or

### AREC3002

#### Agricultural Markets

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. It addresses price

analysis and efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. Building on the application of microeconomic theory to both production and consumption in agricultural markets, its content is analytical.

## Commercial Law

### Junior (Level 1) units

#### CLAW1001

##### Foundations of Business Law

**Credit points:** 6 **Teacher/Coordinator:** Mr Giuseppe Carabetta **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Assessment:** Mid-Semester exam (20%), Case Analysis Assignment (20%), Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. Every decision in business, and every transaction and relationship, is made in the context of this legal regime. The aim of Foundations of Business Law is to introduce the students to the legal framework and regulatory systems which underlie all business activity and to expose them to the legal implications of commercial conduct. This unit of study introduces the Australian legal system and key areas of substantive business law including contracts, torts (in particular negligence and privacy), property and securities, white collar crime, intellectual property, competition and consumer law (in particular advertising, product liability and unfair contracts), business structures and operations, misleading and unconscionable conduct and dispute resolution.

### Level 2 and 3 units

A minimum of six CLAW2000 and 3000 units See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Econometrics

### Junior (Level 1) units

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

#### ECMT1020

##### Introduction to Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 2x1hr lectures/week, 1x2hr workshop/week **Prerequisites:** ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 **Assessment:** 3x quizzes (25%), workshop questions/homework (10%), assignment (15%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 is intended to be an introduction to the classical linear regression model (CLRM), the underlying assumptions, and the problem of estimation. Further, we consider hypothesis testing, and interval estimation, and regressions with dummy variables and limited dependent variable models. Finally, we consider different functional

forms of the regression model and the problem of heteroskedasticity. Throughout we will try to emphasise the essential interplay between econometric theory and economic applications.

## Compulsory senior units

#### ECMT2150

##### Cross Section Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

#### ECMT2160

##### Time Series Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2150 or ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on time series techniques and more advanced econometrics methods (e.g. MLE, GMM, model specification analysis). This unit starts with a review of probability and statistics and cross sectional methods, followed by advanced methodologies that are useful for analysing time series data. The unit is ended with a selected list of special topics. The lectures and assessments will be application-oriented. Computer software (e.g., Stata, SAS, R) will be used throughout the unit.

### Level 2 and 3 units

At least four senior elective units of study (24 credit points) selected from the following options with a minimum of three at the 3000 level:

#### ECMT2130

##### Financial Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2110 or ECMT2010 or ECMT1020 **Prohibitions:** ECMT2030 **Assessment:** 2x assignments (2x20%) and 1x2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Over the last decade econometric modelling of financial data has become an important part of the operations of merchant banks and major trading houses and a vibrant area of employment for econometricians. This unit provides an introduction to some of the widely used econometric models for financial data and the procedures used to estimate them. Special emphasis is placed upon empirical work and applied analysis of real market data. Topics covered may include the statistical characteristics of financial data, the specification, estimation and testing of asset pricing models, the analysis of high frequency financial data, and the modelling of volatility in financial returns.

#### ECMT2160

##### Time Series Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2150 or ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on time series techniques and more advanced econometrics methods (e.g. MLE, GMM, model specification analysis). This unit starts with a review of probability and statistics and cross sectional methods, followed by advanced methodologies that are useful for analysing time series data. The unit is ended with a selected list of special topics. The lectures and assessments will be

application-oriented. Computer software (e.g., Stata, SAS, R) will be used throughout the unit.

### ECMT3120

#### Applied Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT3110 or ECMT3010 or (ECMT2150 and ECMT2160) **Prohibitions:** ECMT3020 **Assessment:** group project (25%), Mid-semester test (25%), 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Econometric theory provides techniques to quantify the strength and form of relationships between variables. Applied Econometrics is concerned with the appropriate use of these techniques in practical applications in economics and business. General principles for undertaking applied work are discussed and necessary research skills developed. In particular, the links between econometric models and the underlying substantive knowledge or theory for the application are stressed. Topics will include error correction models, unit roots and cointegration and models for cross section data, including limited dependent variables. Research papers involving empirical research are studied and the unit features all students participating in a group project involving econometric modelling.

### ECMT3130

#### Forecasting for Economics and Business

**Credit points:** 6 **Session:** Semester 2 **Classes:** 2x1hr lectures/week, 1x1hr lab/week **Prerequisites:** ECMT2110 or ECMT2010 or (ECMT2150 and ECMT2160) **Prohibitions:** ECMT3030 **Assessment:** assignment (20%), group assignment (25%), Mid-semester test (20%) and 2.5hr Final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The need to forecast or predict future values of economic time series arises frequently in many branches of applied economic and commercial work. It is, moreover, a topic which lends itself naturally to econometric and statistical treatment. The specific feature which distinguishes time series from other data is that the order in which the sample is recorded is of relevance. As a result of this, a substantial body of statistical methodology has developed. This unit provides an introduction to methods of time series analysis and forecasting. The material covered is primarily time domain methods designed for a single series and includes the building of linear time series models, the theory and practice of univariate forecasting and the use of regression methods for forecasting. Throughout the unit a balance between theory and practical application is maintained.

### ECMT3150

#### The Econometrics of Financial Markets

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr lab/week **Prerequisites:** ((ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) and (ECMT2110 or ECMT2010) and (ECMT2130 or ECMT2030)) or (ECMT2130 and ECMT2150 and ECMT2160) **Prohibitions:** ECMT3050 **Assessment:** assignment (20%), group assignment (30%), Mid-semester test (15%) and 2.5hr Final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit studies and develops the econometric models and methods employed for the analysis of data arising in financial markets. It extends and complements the material covered in ECMT2130. The unit will cover econometric models that have proven useful for the analysis of both synchronous and non-synchronous financial time series data over the last two decades. Modern Statistical methodology will be introduced for the estimation of such models. The econometric models and associated methods of estimation will be applied to the analysis of a number of financial datasets. Students will be encouraged to undertake hands-on analysis using an appropriate computing package. Topics covered include: Discrete time financial time series models for asset returns; modelling and forecasting conditional volatility; Value at Risk and modern market risk measurement and management; modelling of high frequency and/or non-synchronous financial data and the econometrics of market microstructure issues. The focus of the unit will be in the econometric models and methods that have been developed recently in the area of financial econometrics and their application to modelling and forecasting market risk measures.

### ECMT3170

#### Computational Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 2x1hr lecture/week, 1x1hr computer laboratory/week **Prerequisites:** ECMT2160 or ECMT2110 **Assessment:** 1x2hr Final Exam (50%), 1x1500wd Computer Project (30%), 2x500wd Computer Assignment (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to modern computationally intensive algorithms, their implementation and application for carrying out statistical inference on econometric models. Students will learn modern programming techniques such as Monte Carlo simulation and parallel computing to solve econometric problems. The computational methods of inference include Bayesian approach, bootstrapping and other iterative algorithms for estimation of parameters in complex econometric models. Meanwhile, students will be able to acquire at least one statistical programming language.

See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Economics

### Junior (Level 1) units

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

#### ECMT1020

##### Introduction to Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 2x1hr lectures/week, 1x2hr workshop/week **Prerequisites:** ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 **Assessment:** 3x quizzes (25%), workshop questions/homework (10%), assignment (15%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 is intended to be an introduction to the classical linear regression model (CLRM), the underlying assumptions, and the problem of estimation. Further, we consider hypothesis testing, and interval estimation, and regressions with dummy variables and limited dependent variable models. Finally, we consider different functional forms of the regression model and the problem of heteroskedasticity. Throughout we will try to emphasise the essential interplay between econometric theory and economic applications.

#### ECON1001

##### Introductory Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prohibitions:** BUSS1040 **Assessment:** online quizzes (10%), 1xMid-semester test (30%), 1xEssay (10%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### ECON1002

#### Introductory Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** Tutorial participation (5%), 5x online quizzes (10%), Mid-semester test (25%), Essay (10%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 and an alternative core unit for the Bachelor of Economic and Social Sciences. 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### Level 2 and 3 units

#### ECOS2001

##### Intermediate Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or BUSS1040 **Corequisites:** ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECON2001, ECOS2901, ECON2901 **Assessment:** Tutorial participation (10%), 2x in-class tests (40%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

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:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1002 **Corequisites:** ECMT1020 **Prohibitions:** ECON2002, ECOS2902, ECON2902 **Assessment:** Mid-semester test (30%), assignments (20%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

This unit of study develops models of the goods, money and labour markets, and 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.

Any four further ECOS2000 or ECOS3000 units, of which at least three must be at the 3000 level. See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Finance

### Junior (Level 1) units

Any one junior unit of study (six credit points) from the University of Sydney Business School.

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

#### ECON1001

##### Introductory Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prohibitions:** BUSS1040 **Assessment:** online quizzes (10%), 1xMid-semester test (30%), 1xEssay (10%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

#### ECON1002

##### Introductory Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** Tutorial participation (5%), 5x online quizzes (10%), Mid-semester test (25%), Essay (10%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 and an alternative core unit for the Bachelor of Economic and Social Sciences. 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### Level 2 and 3 units

#### FINC2011

##### Corporate Finance I

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early, Winter Main **Classes:** 1 x 2hr lecture and 1 x 1hr tutorial per week **Prohibitions:**

**FINC2001 Assumed knowledge:** ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) **Assessment:** Mid-semester exam (20%), major assignment (30%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.*

This unit provides an introduction to basic concepts in corporate finance and their application to (1) valuation of risky assets including stocks, bonds and entire corporations, (2) pricing of equity securities, and (3) corporate financial policy decisions including dividend, capital structure and risk management policies. Emphasis is placed on the application of the material studied and current practices in each of the topic areas.

## FINC2012

### Corporate Finance II

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 or FINC2001 **Prohibitions:** FINC2002 **Assessment:** Mid-semester exam (15%), essay (20%), and final exam (65%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on FINC2011 Corporate Finance I, by extending basic concepts in corporate financing, investing and risk management. The unit presents current theories of corporate financing and their practical application in corporate investment and capital budgeting. The unit also examines securities and securities markets with an emphasis on pricing, investment characteristics and their use by corporations to manage risk. The securities examined include: bonds and related fixed income products; futures and options. The goal of the unit is to broaden students' knowledge of corporate finance in preparation for further study in finance in 300 level courses.

## FINC3017

### Investments and Portfolio Management

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 **Prohibitions:** FINC3007 **Assessment:** 2 x reports (15% each), essay (15%) and final exam (55%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Students who achieved less than a credit in FINC2011 are advised not to attempt FINC3017 until they have completed FINC2012.*

This unit is designed to provide a comprehensive analytical approach to the modern theory of investments. Topics covered include: mean-variance analysis; Markowitz type portfolio analysis; portfolio construction; asset pricing theories; market efficiency and anomalies; hedge funds and investment fund performance evaluation. Although analytical aspects of investments theory are stressed, there is also an equal amount of coverage on the practical aspects of portfolio management. Current research on investments is emphasised in the course.

A minimum of three (18 credit points) further FINC3000 level units See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Geography

### Junior (Level 1) units and Level 2 units

Some junior elective and intermediate GEOG/GEOS units may be required to meet the prerequisites of Level 3 units for this major.

### Level 3 units

24 CP made up of:

#### GEOS3333

##### Geographical Concepts, Skills & Methods

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Bill Pritchard, Dr Dan Penny **Session:** Semester 2 **Classes:** 1 lecture, 2 tutorials per week **Prerequisites:** Assumed Knowledge: Basic knowledge of ARC GIS software. **Prohibitions:** GEOS3933 **Assessment:** One 2hr exam, one practical report, one 2000w fieldwork report (100%) **Practical field work:** 24 hours of fieldwork per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3333 is designed to be the 'capstone' for a Major in Geography. Its aim is to bring together the core concepts within the discipline; connect these to methodological practices, and further develop the field-based skills associated with geographical research. Reflecting the straddle of the discipline across the natural and social sciences, this unit draws on a wide diversity of material to impart key insights about the essential qualities of 'doing Geography'. This includes (i) a weekly lecture program which addresses three thematic concerns of Geography (human-environment interactions; spatial relations; and politics, policy and practice) using examples from the natural and social science perspectives at global, national and local scales; (ii) a two-hour prac class each week which introduces key methods (relevant to both the natural and social science parts of the discipline) and which leads to a major research proposal exercise; and (iii) 24 hours fieldwork through the semester, which can take the form either of a three-day field trip to rural NSW or three separate day-trips within Sydney. GEOS3333 is one of two compulsory units for the Geography Major (the other is GEOS3053) and is highly recommended for students contemplating Honours in Geography.

or

#### GEOS3933

##### Geog. Concepts, Skills & Methods (Adv)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Bill Pritchard, Dr Dan Penny **Session:** Semester 2 **Classes:** 1 lecture, 2 tutorials per week **Prerequisites:** Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002. **Prohibitions:** GEOS3333 **Assessment:** One 2hr exam, one practical report, one 2000w fieldwork report (100%) **Practical field work:** 24 hours of fieldwork per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3933 has the same thematic content as GEOS3333 however with elements taught at an Advanced level.

#### GEOS3053

##### Southeast Asia Field School

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Intensive July **Classes:** Five pre-departure lectures during Semester 1 2015, three weeks in-country intensive involving lectures, fieldwork and field-based methods training, readings and small group discussions. **Prerequisites:** 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. **Prohibitions:** GEOS3953, GEOG3201 **Assessment:** One pre-departure background report, one short field essay, group participation, one consolidation report, one exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than September in the year before taking this unit.*

The unit of study can be taken only with prior permission from the unit of study coordinator. It constitutes a Field School run over a three-week period in July, prior to the commencement of the second semester. In 2015 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (three of the Mekong countries China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on three main themes; rural social, environmental and economic change; regional economic integration and its local effects; regional environmental change and natural resources governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and students interested in the 2014 Field School should indicate expression of interest to Dr Jeff Neilson by 26th September 2014.

or

#### GEOS3953

##### Southeast Asia Field School (Adv)

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Intensive July **Classes:** Five pre-departure lectures during Semester 1 2014, three weeks in-country intensive involving lectures, fieldwork and field-based methods training, readings and small group discussions. **Prerequisites:** 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment. **Prohibitions:** GEOS3053 **Assessment:** One pre-departure project



proposal, one short field essay, group participation, one field-based research report, one exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than September in the year before taking this unit.*

The unit of study can be taken only with prior permission from the unit of study coordinator. It constitutes a Field School run over a three-week period in July, prior to the commencement of the second semester. In 2015 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (three of the Mekong countries China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on three main themes; rural social, environmental and economic change; regional economic integration and its local effects; regional environmental change and natural resources governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and students interested in the 2014 Field School should indicate expression of interest to Dr Jeff Neilson by 26th September 2014.

Plus any of the following units:

### ENVI3111

#### Environmental Law and Ethics

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** 12 credit points of intermediate units of study **Prohibitions:** ENVI3911 **Assessment:** Exam (40%) Essays (40%, 20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

**Shared Teaching Arrangements:** This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). Environmental regulation and governance plays an important role in regulating human impacts on the environment. The law and governance part of this unit provides an introduction and overview to environmental regulation. We investigate key environmental issues through an examination of legal policies, legislation and case law at a variety of scales (international, national and state/local). This unit also highlights the ways in which environmental law and governance is increasingly interconnected to other areas of environmental studies. 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.

or

### ENVI3911

#### Environmental Law and Ethics (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** Distinction average across 12 credit points of intermediate units of study **Prohibitions:** ENVI3111 **Assessment:** Fieldwork component (40%), essay (20%) and exam (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

**Shared Teaching Arrangements:** This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). This advanced unit of study will cover the same core lecture material as for ENVI3111, but students will be required to carry out more challenging practical assignments based on a fieldtrip activity. The fieldwork will take the form of a Land and Environment Court visit and students will be required to provide a report on environmental decision making as part of this assessment.

### ENVI3112

#### Environmental Assessment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus **Session:** Semester 2 **Classes:** One 2-hour lecture per week and one 2-hour tutorial per week. **Prerequisites:** (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units **Prohibitions:** ENVI3912, ENVI3004, ENVI3002 **Assessment:** Literature review, individual report, presentation (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study focuses on environmental impact assessment as part of environmental planning. It seeks to establish a critical understanding of environmental planning and the tools available to improve environmental outcomes. The unit of study addresses the theory and practice of environmental impact statements (EIS) and environmental impact assessment processes (EIA) from scientific, economic, social and cultural value perspectives. Emphasis is placed on gaining skills in group work and 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.

or

### ENVI3912

#### Environmental Assessment (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus **Session:** Semester 2 **Classes:** One 2-hour lecture per week and one 2-hour tutorial per week. **Prerequisites:** Distinction average in ((GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units) **Prohibitions:** ENVI3112, ENVI3004, ENVI3002 **Assessment:** Essay, individual report, presentation (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This advanced unit of study will cover the same core lecture, tutorial and group practical material as for ENVI3112. The difference in the Advanced unit of study is that students will be required to write a 3000-word essay that is worth 40% of their semester marks, rather than writing a literature review. The essay will explore the more theoretical and conceptual debates within impact assessment.

### GEOS3520

#### Urban Citizenship & Sustainability

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus, Dr Kurt Iveson **Session:** Semester 1 **Classes:** 2 hour lecture and 1 hour tutorial per week, six 2 hours practical sessions. **Prerequisites:** 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOILS2002, LWSC2002 **Prohibitions:** GEOS3920 **Assessment:** One 2hr exam, one 2000w essay, one 2000w group-based prac report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Cities are now the predominant home for humanity. More than half of the world's population reside in cities. The contemporary growth of cities, however, is attached to profound political questions about what it means to be urban, and what 'being urban' means for the planet. This Unit of Study provides grounding to these crucial questions. In the first half of the semester, lectures address the question: are cities sustainable? Why or why not? And for whom? This focus addresses utopian visions for cities, urban history, ecological footprint analysis, bioregionalism, transport options, urban form and urban policy, with reference to sustainable futures and the role of custodianship. During the second half of the semester, lectures address the question: what does it mean to be a 'citizen', and what has this got to do with cities and different approaches to urban sustainability? This includes consideration of historical and contemporary configurations of citizenship. Case studies illustrate ways in which new forms of citizenship are produced through struggles over rights to the city and the urban environment. Through the semester a practicals program enables students to develop urban-based research projects.

or

### GEOS3920

#### Urban Citizenship & Sustainability (Adv)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus, Dr Kurt Iveson **Session:** Semester 1 **Classes:** 2 hour lecture and 2 hour tutorial per week **Prerequisites:** Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112,

GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002 **Prohibitions:** GEOS3520 **Assessment:** One 2hr exam, one 2000w essay, one 2000w group-based prac report. **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3920 has the same thematic content as GEOS3520 however with elements taught at an Advanced level

#### GEOS3524

##### Global Development and Livelihoods

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson, Dr Yayoi Lagerqvist **Session:** Semester 1 **Classes:** 2 lectures, 1 tutorial per week **Prerequisites:** 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience **Prohibitions:** GEOS2112, GEOS3924, GEOS2912 **Assessment:** One 2hr exam, one practical report, one 2000w essay, tutorial papers (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides students with grounding in core theories and frameworks used in Geography to account for the social, spatial and environmental unevenness in global development. During the first half of the semester, we focus on questions relating to who are the winners and losers from contemporary patterns of global economic change. This includes the analysis of relevant conceptual approaches to these questions (including comparative advantage, global value chain theory, regionalism, economic governance, development and post-development), plus 'hands-on' examination of the key institutions (such as the WTO and World Bank) and policy approaches that drive these changes. Then, in the second half of the semester, we adopt a livelihoods approach to assess these processes. In general, issues are tailored to themes being played out in Asia-Pacific countries. Students are expected to participate in a variety of practical class exercises throughout the semester. This unit provides a feeder-unit into the Asia-Pacific Field School.

or

#### GEOS3924

##### Global Development and Livelihoods (Adv)

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Semester 1 **Classes:** 2 lectures, 1 tutorial per week **Prerequisites:** 24 credit points of Intermediate units of study including a distinction in 6 credit points of Intermediate Geoscience **Prohibitions:** GEOS2912, GEOS2112, GEOS3524 **Assessment:** One 2hr exam, one practical report, one 2000w essay, tutorial papers (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3924 has the same thematic content as GEOS3524 however with elements taught at an Advanced level.

#### GEOS3009

##### Coastal Environments and Processes

**Credit points:** 6 **Teacher/Coordinator:** Dr Jody Webster, Dr Ana Vila-Concejo **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour practical per week; weekend excursion. **Prerequisites:** (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906)) **Prohibitions:** MARS3003, MARS3105, GEOS3909 **Assessment:** One 2 hour exam, research reports and an online quiz (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this course is to introduce students to a variety of Coastal Environments and the major physical and chemical processes which control the morphodynamic evolution of these systems. The course offers a unique opportunity of learning the full spectrum of marine sedimentary environments from siliciclastic, temperate, highly urbanised and impacted estuarine ecosystems to carbonate, tropical, pristine and undeveloped/protected coastal and continental margin environments. The course may include field work in temperate environments and at One Tree Island on the Great Barrier Reef (GBR). The two parts of the course comprise physical processes in siliciclastic (temperate) and carbonate-dominated (tropical) coastal and continental margin environments. The first part of the course covers basic coastal environments and processes in estuarine and open coast environments and focuses on the morphodynamics of those environments, a fieldtrip to an open beach within Sydney is envisaged where students will learn basic skills for beach monitoring. The second part of the course covers the basic morphodynamics and processes

impacting carbonate-dominated coastal and continental margin environments. The focus is on carbonate reefal and margin systems and their geologic and biologic responses to past, present and future environmental changes. These systems may also be studied in the field at The University of Sydney One Tree Island Research Station in the GBR and in some practicals Students who are unable to participate in the GBR field trip will be given an alternative assignment.

##### Textbooks

Recommended:  
Short, A D (ed) Beach and Shoreface Morphodynamics. John Wiley & Sons, Chichester. 1999.

Course notes will be available from the Photocopy Centre and/or online.

or

#### GEOS3909

##### Coastal Environments and Processes (Adv)

**Credit points:** 6 **Teacher/Coordinator:** Dr Ana Vila Concejo **Session:** Semester 1 **Classes:** Three 1 hour lectures, two 3 hour practicals per week, fieldwork. **Prerequisites:** Distinction average in ((6 credit points of Intermediate Geoscience\* units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))) **Prohibitions:** MARS3105, GEOS3009, MARS3003 **Assessment:** One 2 hour exam, two 1500 word reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.*

Advanced students will complete the same core lecture material as for GEOS3009 but will carry out more challenging projects, practicals, assignments and tutorials.

#### GEOS3014

##### GIS in Coastal Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Eleanor Bruce **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour practical per week. **Prerequisites:** Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. **Prohibitions:** MARS3104, GEOS3914 **Assessment:** One 2 hour exam, two project reports, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Coastal Management is about how scientific knowledge is used to support policy formulation and planning decisions in coastal environments. The course links coastal science to policy and practice in management of estuaries, beaches and the coastal ocean. The principles are exemplified through specific issues, such as coastal erosion, pollution, and impacts of climate-change. The issues are dealt with in terms of how things work in nature, and how the issues are handled through administrative mechanisms. These mechanisms involve planning strategies like Marine Protected Areas and setback limits on civil development in the coastal zone. The coastal environments and processes that are more relevant to coastal management including: rocky coasts; beaches, barriers and dunes; and coral reefs will also be introduced. At a practical level, the link between science and coastal management is given substance through development and use of 'decision-support models'. These models involve geocomputing methods that entail application of simulation models, remotely sensed information, and Geographic Information Systems (GIS). The course therefore includes both principles and experience in use of these methods to address coastal-management issues. (It thus also involves extensive use of computers.) Although the focus is on the coast, the principles and methods have broader relevance to environmental management in particular, and to problem-solving in general. That is, the course has vocational relevance in examining how science can be exploited to the benefit of society and nature conservation.

or

#### GEOS3914

##### GIS in Coastal Management (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr Eleanor Bruce, Dr Ana Vila Concejo **Session:** Semester 2 **Classes:** Two hours of lectures, one 3 hour practical per week comprising one 1 hour practical demonstration and one 2 hour practical

**Prerequisites:** Distinction average in either 12 credit points of Intermediate Geoscience units or [(GEOS2115 or GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. **Prohibitions:** GEOS3014, MARS3104 **Assessment:** One 2 hour exam, project work, two practical-based project reports, fortnightly progress quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: A distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.*

Advanced students will complete the same core lecture material as for GEOS3014 but will carry out more challenging projects, practicals, assignments and tutorials.

## GEOS3101

### Earth's Structure and Evolution

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Patrice Rey, Prof Geoff Clarke **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week, and a 3-day excursion. **Prerequisites:** (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School **Prohibitions:** GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003 **Assumed knowledge:** GEOS2114, GEOS2124 **Assessment:** One 2 hour exam, practical and field reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Earth's crust and upper mantle, or lithosphere, are a consequence of dynamic and thermal processes operating since the beginning of the Archaean. This unit focuses on information and techniques that enable an understanding of these processes. The main topics presented in this unit include: the formation and evolution of oceanic and continental lithosphere; tectonic deformation, magmatism and metamorphism at plate boundaries; and the mesoscopic and microscopic analysis of igneous and metamorphic rocks. Practical classes and field exercises are designed to enable students to competently and independently identify the common crystalline rocks in hand-specimen; and to gather and interpret the structural field data which enables the determination of the structural style and deformational history presented in particular tectonic settings. The concepts and content presented in this unit are generally considered to be essential knowledge for geologists and geophysicists and provide a conceptual framework for their professional practice. Students wishing to specialise in the field and become professional geologists will normally need to expand upon the knowledge gained from this unit and either complete an honours project or progress to postgraduate coursework in this field.

or Different pathways are available for this major. See the Faculty of Science handbook at [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

## Government and International Relations

### Junior (Level 1) units

Two level 1000 Government (GOVT) units

### Level 2 and 3 units

At least 36 senior credit points of Level 2000 and Level 3000 GOVT units, including at least 6 credit points from Level 3000 units of units of study. Note. Students may also complete a maximum of 12 credit points in cross-listed non-'GOVT' senior units of study as electives for this major. For details of all non-'GOVT' units of study that may be cross listed with this major, see the Faculty of Arts and Social Sciences website

## Management

### Level 1

One junior prerequisite unit of study (six credit points) from the Business School.

### Level 2 and 3 units

#### WORK2201

##### Foundations of Management

**Credit points:** 6 **Teacher/Coordinator:** Dr David Oliver **Session:** Semester 1 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 24 credit points of junior units of study **Prohibitions:** WORK2001, IREL2001 **Assessment:** participation (10%), quiz (20%), essay (40%), and final quiz (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day *Note: This is a compulsory unit of study for the Management major.*

This unit serves both as a stand-alone unit for students who wish to obtain an overview of management methods and approaches and as the basis of study for advanced and specialised undergraduate units listed in the Management major. It examines management as a process of planning, organising, leading and controlling the efforts of organisational members and discusses how recent trends such as globalisation, economic change and the effects of new technology have led to profound changes in how organisations are managed. It explores these issues with respect to both large and small, public and private, and domestic and foreign organisations.

#### WORK2210

##### Strategic Management

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Leanne Cutcher **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Prohibitions:** WORK2010 **Assessment:** mid-term quiz (30%), tutorial group discussion (10%), tutorial group paper (20%), case study assignment (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This is the compulsory unit of study for the Management major.*

The aim of this unit is to critically examine the concept of strategy in the management of organisations. It examines different approaches to strategy and strategic management and traces the development of strategic management as an academic discipline. It takes students through the classical strategic management process as it is presented in most textbooks and it also introduces students to a range of current debates in strategic management. This unit can be taken as a stand alone introduction to strategy or as part of a broader program of study in management.

#### WORK2218

##### Managing Organisational Behaviour

**Credit points:** 6 **Teacher/Coordinator:** Dr Helena Nguyen **Session:** Semester 1 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 24 junior credit points **Assessment:** individual case study (30%), group presentation (15%), individual group work reflection (25%), and exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: This is the compulsory unit of study for the Management major.*

This unit aims to give students the ability to understand how organisations operate. As an introductory organisational behaviour unit, it covers key debates across a range of social science disciplines including business, management, psychology, sociology, and communication studies. Key topics explored include power, control, networks, and organisational culture.

A minimum of three units from:

#### IBUS2102

##### Cross-Cultural Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Amanda Budde-Sung **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1 x 1hr workshop per week **Prerequisites:** 36 junior credit points **Prohibitions:** IBUS2002 **Assessment:** Participation (10%), mid-term assessment (30%), presentation (20%), in-class quizzes (10%), and final exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Critical to effective management in international and multi-cultural business environments is an understanding of cultural differences and how to manage such differences. The aim of this unit of study is to provide conceptual frameworks and evidence from practice that will develop an understanding of the ways in which cultures differ, how these differences can impact management, and how cultural issues can limit organisational effectiveness. Strategies for managing and harnessing cultural differences are also evaluated. The subject

is explored from an internal perspective as well as from an external perspective, looking at issues within the company as well as issues between the multinational company and its host environment. Major topics include the significance of culture in international management; the meaning and dimensions of culture; comparative international management styles; managing communication across cultures; global business ethics; cross-cultural negotiations; cross-cultural leadership and motivation; culture and consumer behaviour; and cultural views of intellectual property around the world.

### IBUS3107

#### Business Negotiations

**Credit points:** 6 **Teacher/Coordinator:** Professor Dan Lovallo **Session:** Semester 1 **Classes:** 1x 1.5hr lecture and 1x 1.5hr tutorial per week **Prerequisites:** 48 credit points **Assessment:** in-class exercises (25%), exam (25%), writing a ten page negotiator's handbook (25%), and written assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: This unit will require student's participation in a number of negotiations. Preparation for these negotiations, which are a large part of your grade, will require time-pressured reading of material in class.*

The purpose of this course is to help you understand the theory of negotiation as it is practiced in a variety of strategic settings. The aim is to help you feel more comfortable and confident with the negotiation process. The course is designed to be relevant to the broad spectrum of negotiation problems that are faced by managers but we use specific examples from international strategy such as M&A and joint ventures. The course will provide participants with an opportunity to develop skills experientially and to understand negotiation in useful analytic frameworks. Considerable emphasis will be placed on role-playing exercises and case studies. Note: this unit will require your participation in a number of negotiations. Preparation for these negotiations, which are a large part of your grade, will require time-pressured reading of material in class.

### QBUS2350

#### Project Planning and Management

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** BUSS1020 or ECMT1010 or equivalent **Prohibitions:** CIVL3805, ECMT3640 **Assessment:** Team project (20%), homework (30%), and exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Project management provides business organisations with a powerful set of tools that improve their ability to plan, implement, and manage activities to accomplish specific organisational objectives. But project management is more than just a set of tools; it is a results-oriented management style that places a premium on building collaborations among a diverse cast of characteristics. This unit introduces students to the planning and management of projects by focusing on a variety of practical topics including project network, PERT, resource scheduling, learning curves, cost and time management in projects, and the use of project management support systems. It also discusses the organisational, leadership, cultural, technological challenges that project managers might face.

### WORK2209

#### Managing Organisational Change

*This unit of study is not available in 2015*

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Prohibitions:** WORK2009 **Assessment:** Seminar participation (10%), essay (40%) and exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this unit is to provide an understanding of the processes and structures that influence the way people behave in organisations, with an emphasis on organisational change. Managing change is a critical skill for managers to master and it has been recognised as an increasingly vital part of the toolkit managers need to perform their roles effectively. The unit takes students through the macro, micro and individual issues in the change process. Topics focus on theories and strategies in change management. Students will gain an insight into group dynamics, organisational power and politics and

organisational culture as they relate to organisational change. At the end of the unit, students will have developed the ability to reason, debate and critically examine a range of topical organisational issues as they relate to the management of organisational change.

### WORK2211

#### Human Resource Strategies

*This unit of study is not available in 2015*

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points of units of study including (WORK1003 or WORK1002) **Prohibitions:** WORK2011, IREL2011 **Assessment:** readiness assessments (30%), team strategy activities (20%), reflective journal assignment (30%), and final strategy assessment (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the links between human resource management and strategic management in different kinds of organisations, both in Australia and overseas. It provides a critical and in-depth analysis of the human resource management theories, paying particular attention to the concepts of strategy, people management and organisational performance. The unit considers contemporary and controversial issues in human resource management, which may include downsizing, outsourcing, knowledge management, governance and social responsibility.

### WORK2217

#### International Human Resource Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Dimitria Groustis **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study including either (WORK1003 or WORK1001) OR (IBUS2101 or IBUS2001) **Prohibitions:** WORK2017 **Assessment:** tutorial participation (15%), tutorial facilitation (15%), short essay (15%), major assignment (35%), and exam (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit considers the opportunities and challenges associated with managing employees in international and cross-cultural contexts, with specific emphasis on international recruitment, selection, preparation, placement, management development, performance management, reward and remuneration in the international, multi-national and trans-national corporation. Within the context of global labour markets, the unit considers the implications of internationalisation and globalisation for human resource management (HRM), the difference between domestic and international HRM, and the challenges of cross-cultural management. This unit will provide students with a theoretical understanding of IHRM and cross-cultural management, as well as a practical understanding of the issues and challenges associated with managing employees in international, global and cross-cultural contexts.

### WORK2219

#### Managing Organisational Sustainability

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Leanne Cutcher **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Assessment:** individual reflection (15%), individual essay (25%), poster (25%), exam (25%), and tutorial attendance and participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Managing organisational sustainability is critical to for effective, contemporary managers. This unit focuses on how to conceptualise and to practice sustainability in its broadest sense. Topics covered include the ethical aspects of management and organisational practice, corporate social responsibility, governance models in organisations and managing in diverse environments. Students will be encouraged to enhance their understanding of the roles and responsibilities of management and the impact of organisations on stakeholders including staff, government and community.

### WORK2221

#### Organisational Communication

**Credit points:** 6 **Teacher/Coordinator:** Dr Anya Johnson **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** 40 credit points worth of units of study **Assessment:** Tutorial attendance & Participation (10%), communication analysis report (30%), Team Case Analysis &

Presentation (25%), and final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Communication is integral to many organisational processes; for instance, effective planning, decision-making, negotiation, conflict management, change management and leadership all rely upon effective communication by organisational actors. At the same time, organisational communication has become more complex due to increasing levels of diversity in the workplace and an increasing reliance on emergent and rapidly changing communication technologies. Drawing on communication research models, theories and case studies, the unit will provide students with insight into how to manage the complexities of contemporary organisational communication. The unit will focus primarily on internal organisational communication and will examine communication processes at various levels: interpersonal (dyadic), group and organisation.

#### WORK2222

##### Leadership in Organisations

**Credit points:** 6 **Teacher/Coordinator:** Dr Eric Knight **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 40 credit points worth of units of study **Assumed knowledge:** WORK2201 or WORK2218 **Assessment:** Group Assessment (30%), Case Studies (30%) and final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Leadership is increasingly seen to be a key factor affecting the performance of contemporary organisations and is an important area of study in the fields of management and organisational behaviour. While leadership principles are often associated with the work of senior management, they also have potential application to all members of organisations. This unit explores conventional and alternative perspectives on leadership and also examines the practice of leadership in diverse organisational contexts. Practitioner perspectives, experiences and case studies of business leaders are also presented. The unit builds on foundational units of study in Management, IR and HRM and International Business.

#### WORK2227

##### Regulation at Work

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2 hour lecture and 1x 1 hour tutorial hour per week **Prerequisites:** 24 credit points of junior units of study including WORK1003 **Prohibitions:** WORK2208, WORK2207 **Assessment:** Case study (30%), Seminar presentation (20%), Seminar participation (10%), Exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study examines the regulatory framework that exists around paid work in Australia. It examines the development of employee and employer rights and responsibilities through the employment contract and labour law. It focuses on both individual and collective regulation of work in Australia paying particular attention to the industrial sphere, as well as health and safety and discrimination. Both the aim and purpose of industrial regulation and the impact of this regulation on workplace relations is analysed.

#### WORK3922

##### Organisational Research Methods

**Credit points:** 6 **Teacher/Coordinator:** Dr Jane Lê **Session:** Semester 2 **Classes:** 1x 3 hour seminar per week **Prerequisites:** 40 credit points worth of units of study **Prohibitions:** IREL3902, WORK3902 **Assessment:** Research Question & Justification 1,500 words (25%) Interview Design & Conduct (15%) Questionnaire Design & Conduct (15%) Methods Section 3,000 words (35%) Participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is assessed using a research portfolio which may include some of the following elements: theoretical framing, formulating a research question, interview exercise, questionnaire development, writing a methods section, and presenting findings. Participation is a critical part of the course and also assessed.

See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Marketing

### Junior (Level 1) units

#### MKTG1001

##### Marketing Principles

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeane Yip **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prohibitions:** MKTG2001 **Assessment:** group assignment (17%), mid-semester exam (25%), group presentation (21%), tutorial participation (5%), research component (2%), and final exam (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### Level 2 and 3 units

#### MKTG2112

##### Consumer Behaviour

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001) **Prohibitions:** MKTG2002 **Assessment:** ongoing work portfolio (15%), class participation (15%), project interview transcripts (individual component) (15%), final project group presentation (10%), final project group report (20%), and midterm exam (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the psychological, social, and cultural aspects of consumer behaviour on the marketing decisions of public and private organisations. Concepts and principles are drawn from disciplines such as cognitive psychology, social psychology, sociology, anthropology, and demography to discover and understand various aspects of consumer behaviour. Specific topics of study include: cultural, demographic and psychographic influences; reference group influences; household decision processes and consumption behaviour; consumer perception and learning; motivation, personality and emotion; consumer attitudes; and purchase decision processes.

#### MKTG2113

##### Marketing Research

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 **Prohibitions:** MKTG1002 **Assessment:** group project (planning and executing market research (18%) and analysing quantitative data (18%)), tutorial participation (10%), research participation (6%), and exams (mid-semester (20%) and final (28%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

#### MKTG3118

##### Marketing Strategy and Planning

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** MKTG1001 (or MKTG2001), MKTG2112 (or MKTG2002), and (MKTG2113 or MKTG1002 or MKTG2003) **Prohibitions:** MKTG3201 **Assessment:** consultant group presentation (20%), rationale for

strategies - consultant group (10%), reflective journal entries (18%), participation (10%), final exam (40%), and research component (2%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will focus on strategic and managerial aspects of marketing. It will cover the development of innovative, business models; segmentation, positioning and lifecycle strategies; and key aspects of managing and organising marketing activities, and measuring performance. The central theme is how marketing strategy and its management can create superior and sustainable value for both customers and shareholders. Assessment will reflect the Unit's strategic decision-making approach, requiring students to take on the roles of marketing advisors and managers.

Plus three other MKTG2000 or 3000 units See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Psychology

Note: A Psychology major requires the completion of 60 credit points of PSYC units

### Junior (Level 1) units

#### PSYC1001

##### Psychology 1001

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **Session:** Semester 1, Summer Main **Classes:** Three 1 hour lectures and one 1 hour tutorial per week, plus 1 hour per week of additional web-based (self-paced) material related to the tutorial. **Assessment:** One 2.5hr exam, one 1000w essay, multiple tutorial tests, experimental participation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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: science and statistics in psychology; behavioural neuroscience; applied psychology; social psychology; personality theory; human development.

This unit is also offered in the Sydney Summer School. For more information consult the website:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

*Textbooks*

Course Coordinator will advise

#### PSYC1002

##### Psychology 1002

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **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 (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Psychology 1002 is a further general introduction to the main topics and methods of psychology, and it is the basis for advanced work as well as being of use to those not proceeding with the subject. Psychology 1002 covers the following areas: human mental abilities; learning, motivation and emotion; visual perception; cognitive processes; abnormal psychology.

This unit is also offered in the Sydney Summer School. For more information consult the web site:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

*Textbooks*

Course Coordinator will advise

### Level 2 and 3 units

#### PSYC2011

##### Brain and Behaviour

**Credit points:** 6 **Teacher/Coordinator:** Dr Ian Johnston **Session:** Semester 1 **Classes:** Three 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** PSYC1001 and PSYC1002. **Prohibitions:** PSYC2911, PSYC2111 **Assessment:** One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This Unit of Study examines a range of phenomena and principles in behaviour, learning and perception, and their relations to underlying neural substrates. The emphasis in learning is on instrumental conditioning and the principle of reinforcement, ranging from applications of this principle to its neural substrates. Also covered are motivational aspects of behaviour, such as punishment and avoidance, anxiety and depression, addiction, sex and appetite, together with related neurochemical mechanisms and the effects of various psychopharmacological agents on these processes. A number of perceptual phenomena will be studied, such as motion detection, recognition of faces, identification of emotion, hearing and hearing loss, taste discrimination, and chronic pain. The practical classes are designed for students with an interest in clinical and therapeutic Psychology, and will allow students to design and implement a behaviour modification programme.

#### PSYC2012

##### Statistics & Research Methods for Psych

**Credit points:** 6 **Teacher/Coordinator:** Dr Ben Colagiuri **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week, plus one 1 hour lecture and one 1 hour tutorial per fortnight. **Prerequisites:** PSYC1001 and PSYC1002 **Prohibitions:** PSYC2112 **Assumed knowledge:** Recommended: HSC Mathematics, any level **Assessment:** One 2 hour final exam, class tests, one 1500 word written assignment, one 45 minute mid-semester exam (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim is to introduce students to fundamental concepts in statistics as applied to psychological research. These include summary descriptive statistics, an introduction to the principles and practice of research design, and the use of inferential statistics. Building upon this framework, the unit of study aims to develop each student's expertise in understanding the rationale for, and application of, a variety of statistical tests to the sorts of data typically obtained in psychological research.

#### PSYC2013

##### Cognitive and Social Psychology

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Fiona White **Session:** Semester 2 **Classes:** Three 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** PSYC1001 and PSYC1002. **Prohibitions:** PSYC2113 **Assessment:** One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quiz) (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit expands the depth and range of topics introduced in the first year lectures on Cognitive Processes, Developmental Psychology and Social Psychology. The section on Cognitive Processes focuses on current theories of memory, attention, problem solving and decision making and discusses the methods and issues involved in investigating these processes in both healthy individuals and people with cognitive disorders. The section on Developmental Psychology discusses early social and cognitive development. The section on Social Psychology examines salient topics in social psychology, such as impression management, social cognition, and prejudice.

#### PSYC2014

##### Personality and Intelligence 1

**Credit points:** 6 **Teacher/Coordinator:** Dr Niko Tiliopoulos **Session:** Semester 2 **Classes:** Three 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** PSYC1001 and PSYC1002 **Prohibitions:** PSYC2114 **Assessment:** One 2 hour exam, major assignment (1500-2000 word essay/report), minor assignment (short written practical exercise and/or tutorial quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The main aim of this course is to introduce students to a number of influential theories in personality and intelligence. Students will be exposed to some conceptual analysis and will be expected to gain an understanding and be able to examine critically the various theories covered. Furthermore, students will be introduced to key topics in the scientific study and assessment of individual differences (Psychometrics) in personality and intelligence. The course will cover both conceptual (e.g. validity and reliability) and applied (e.g. Factor Analysis) elements of statistical psychometric inference.

## PSYC3018

### Abnormal Psychology

**Credit points:** 6 **Teacher/Coordinator:** Dr Ilona Juraskova **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week. **Prerequisites:** At least two intermediate Psychology units of study from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014 and PSYC2114. **Prohibitions:** PSYC3203 **Assumed knowledge:** (PSYC2012 or PSYC2112) and (PSYC2014 or PSYC2114) **Assessment:** One 2 hour exam, one 2000 or 2500 word essay, quiz, participation and tutorial presentation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study critically examines core issues in Abnormal Psychology, concerning the description, explanation and treatment of psychological disorders. The unit of study will include topics such as:

- (a) Adult abnormal psychology: Anxiety disorders (specific phobias, panic disorder, generalised anxiety disorder, OCD); Addictive disorders (drug, alcohol, gambling); Eating disorders (anorexia nervosa, bulimia nervosa); Mood disorders (dysthymia, major depressive disorder, cyclothymia, bipolar disorder); Schizophrenia, Personality disorders.
- (b) Child abnormal psychology: Attention Deficit Hyperactivity disorder; Conduct disorder; Anxiety disorders, Depression.

#### Textbooks

Rieger, E. (Ed.) (2008) *Abnormal Psychology: Leading researcher perspectives*. Sydney: McGraw-Hill Education. (2nd Ed).

At least three Senior units of study, which must include:

## PSYC3015

### Personality and Intelligence 2

**Credit points:** 6 **Teacher/Coordinator:** Dr Carolyn MacCann **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week. **Prerequisites:** (PSYC2014 or PSYC2114) and (PSYC2011 or PSYC2911 or PSYC2111 or PSYC2012 or PSYC2112 or PSYC2013 or PSYC2113) **Assumed knowledge:** (PSYC2012 or PSYC2112); (PSYC2013 or PSYC2113) **Assessment:** One 2 hour exam; one major written assignment (1500 words), one minor written assignment (750 words), and tutorial activities (in-class quizzes and/or presentations) (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this unit of study is to provide an overview of the different areas of research and practice in personality, intelligence, and individual differences. Students will be exposed to a wide variety of different theoretical models of personality, intelligence, and metacognition and encouraged to critically evaluate these theories based on the supporting research evidence. The methods of conducting and evaluating individual differences research will also be a focus of the course. Students will be encouraged to take multiple perspectives, evaluating theories of personality and intelligence in terms of their empirical and theoretical support as well as their potential applications.

## PSYC3016

### Developmental Psychology

**Credit points:** 6 **Teacher/Coordinator:** Dr Micah Goldwater **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week. **Prerequisites:** PSYC2013 or PSYC2113 and at least one other Intermediate Psychology unit from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 and PSYC2114. **Prohibitions:** PSYC3206 **Assessment:** One 2 hour exam, two short (600 & 750 words) essays, one extended (1200 word) essay (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines our understanding of human psychological development, focusing on selected issues and empirical traditions within the discipline of Developmental Psychology. Students are expected to gain an understanding of the theoretical influences that have come to dominate developmental research, and students will also be introduced to a range of theoretical and research approaches in contemporary Developmental Science. These include: attachment, gender role and identity, conceptual development, children's thinking, social cognition, moral reasoning and behaviour, self-understanding and self-worth, and the role of genetic and environmental influences on development. The course will also consider applications of developmental research and theory in developmental psychopathology and in educational contexts, as well as exploring children's experience

of art, literature and drama. Students are expected to gain knowledge of, and develop a critical approach to, the analysis of current research and theoretical issues in these areas.

## PSYC3017

### Social Psychology

**Credit points:** 6 **Teacher/Coordinator:** Dr Ilan Dar-Nimrod **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week. **Prerequisites:** PSYC2013 or PSYC2113 and at least one other Intermediate Psychology Unit of Study from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 and PSYC2114. **Prohibitions:** PSYC3212 **Assumed knowledge:** PSYC2012 or PSYC2112. **Assessment:** One 2 hour exam, one 2500 word research report, and tutorial presentation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit continues the coverage of topics in Social Psychology begun in PSYC1001 and PSYC2013. The unit is divided into topic areas, where the emphasis is on evaluating theories and the relevant evidence. Topics areas include: antisocial behaviours, discrimination, the self, emotion, ostracism, and interpersonal attraction. Tutorials provide first-hand experience of research by involving students in a small group research project based on topics covered in the lectures. The tutorials also provide an opportunity to discuss issues pertaining to each step of the research process (e.g., ethical issues that underlie social psychological research, proper practice when collecting and handling data, how to communicate research findings in written and verbal form).

## PSYC3020

### Applications of Psychological Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Catalina Lawsin **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week **Prerequisites:** 12 credit points of junior psychology and 12 credit points in Intermediate Psychology **Prohibitions:** PSYC3019 **Assessment:** One 2 hour examination (50%), one 2500 word written assignment (30%), class quizzes (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this unit is to introduce students to various ways in which psychological theory and research can be applied in the real world. In particular, this unit will focus on Health Psychology, Forensic Psychology, and Organisational Psychology. The Health Psychology component of this course may include investigation into why we engage in risky health behaviours including smoking, overeating and alcohol use; inequalities in health including Aboriginal and Torres Strait Island health; dealing with chronic illness including death & dying, and survivorship. The Forensic Psychology component of the course may include investigation into lie detection, criminal offenders, victims of crime, and eyewitness memory. The Organisational Psychology component of the course may focus on personnel selection, training in organisations, performance measurement, workplace motivation, and leadership.

and at least one of:

## PSYC3011

### Learning and Behaviour

**Credit points:** 6 **Teacher/Coordinator:** Dr Evan Livesey **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour tutorial per week. **Prerequisites:** (PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014 or PSYC2114. **Prohibitions:** PSYC3209 **Assumed knowledge:** PSYC2012 or PSYC2112 **Assessment:** One 2 hour exam, one 2000 word prac report, tutorial quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit addresses the fundamental concepts and more important research findings related to contemporary theories of associative learning in animals and humans. It examines the application of such fundamental research to issues such as drug use and food choice. It is designed to foster skills in reading primary sources in this area, and provide the opportunity for hands-on experience in carrying out a research project.

#### Textbooks

Bouton, M. E. (2007). *Learning and Behavior: A contemporary synthesis*. Sunderland, MA: Sinauer.

**PSYC3012****Cognition, Language and Thought**

**Credit points:** 6 **Teacher/Coordinator:** Prof Sally Andrews **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour practical per week. **Prerequisites:** (PSYC2013 or PSYC2113) and at least one other Intermediate Psychology unit from PSYC2011, PSYC2911, PSYC2111, PSYC2012, PSYC2112, PSYC2014 or PSYC2114. **Prohibitions:** PSYC3205 **Assumed knowledge:** PSYC2012 or PSYC2112 **Assessment:** One 2 hour exam, 2000 word prac report, practical exercise(s) (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit extends the theories and methods of investigating memory and attentional processes discussed in PSYC2013 to consider a number of domains of higher cognitive processing. One strand of the course will focus on the cognitive processes involved in speech perception, language comprehension, language production, and reading. The remainder of the course will deal with the cognitive processes involved in reasoning and skill acquisition. The practical program will expose students to a variety of the research methods used to investigate higher cognitive processes, develop their understanding of how these methods can be used to investigate hypotheses about mental processes and consider applications of cognitive research to real-world problems and issues.

**PSYC3013****Perceptual Systems**

**Credit points:** 6 **Teacher/Coordinator:** Prof David Alais **Session:** Semester 2 **Classes:** Two 1-hour lectures and one 2-hour tutorial per week. **Prerequisites:** (PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from PSYC2012, PSYC2112, PSYC2013, PSYC2113, PSYC2014, PSYC2114 or ANAT2010 **Prohibitions:** PSYC3210 **Assumed knowledge:** PSYC2012 **Assessment:** One 2-hour exam, one 2000 word report, tutorial quiz, group presentation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Perception poses many challenges: how do we see colour and movement? How do we perceive surfaces and materials? How does combining information from multiple senses improve our perception? This unit draws on behavioural and neurophysiological perspectives to deepen understanding of current research topics in perception. The emphasis is on how visual information is processed to accomplish functions such as perceiving a single edge, extracting the contours that form a face, or the spatial relations needed to call offside on the sports field. Students also gain conceptual tools for evaluating the empirical and theoretical worth of recent research in perception. During the tutorial component of the course students will develop a practical experiment in which they formulate and test a hypothesis. In this way students gain important research experience that gives them valuable insight into the scientific process as it exists both in professional work and in the empirical research project required for the Honours degree.

*Textbooks*

Sensation & Perception, Third Edition  
Jeremy M. Wolfe, Keith R. Kluender, Dennis M. Levi, Linda M. Bartoshuk, Rachel S. Herz, Roberta L. Klatzky, Susan J. Lederman, and Daniel M. Merfeld

**PSYC3014****Behavioural and Cognitive Neuroscience**

**Credit points:** 6 **Teacher/Coordinator:** Dr Laura Corbit **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 2 hour practical per week. **Prerequisites:** Either ((PSYC2011 or PSYC2911 or PSYC2111) and at least one other Intermediate Psychology Unit from (PSYC2012 or PSYC2112), (PSYC2013 or PSYC2113), (PSYC2014 or PSYC2114)) OR ((PSYC2011 or PSYC2911 or PSYC2111 or PSYC2013) and ANAT2010 and PCOL2011) **Prohibitions:** PSYC3215, PSYC3204, PSYC3914 **Assumed knowledge:** PSYC2113 or PSYC2013 **Assessment:** One 2 hour exam, one major essay/report 2000-2500 words, tutorial quiz and participation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study will focus on approaches to studying neurosciences incorporating molecular, pre-clinical and clinical models of brain function. These biological models of brain function will be linked with behavioural, affective and cognitive function and dysfunction. The implications of focal cognitive deficits in neurological patients for models of normal cognitive function will also be explored. Specific topics to be covered will be selected from the following areas: sensorimotor integration, and the neural and molecular basis of learning and memory, attention, language, visual cognition and praxis.

In addition to lectures, a practical component will cover basic neuroanatomy, histology and neuropharmacology, and will introduce students to experimental and case-study approaches to studying neurosciences.

See the Faculty of Science handbook at [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)





# Bachelor of Resource Economics

## Course rules

No new admissions from 2015.

## Bachelor of Resource Economics

### Bachelor of Resource Economics (Honours)

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

## Course resolutions

### 1 Course codes

Code	Course title
BH004	Bachelor of Resource Economics

### 2 Attendance pattern

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

### 3 Admission to candidature

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

### 4 Requirements for award

- (1) The units of study that may be taken for the courses are set out in the Table of units of study for the Bachelor of Resource Economics. The Dean may approve some variation in units of study required for the degree for exceptionally talented students.
- (2) To qualify for the degrees of Bachelor of Resource Economics a candidate must successfully complete 192 credit points, comprising of core and elective units as per the table of units of study.

### 5 Majors

Completion of a major is not a requirement of the course. A major requires the completion of 48 credit points chosen from units of study listed in the table for that major. Units of study counted towards one major may not count toward any other major completed. The majors available are:

- (a) Agricultural Science
- (b) Biology
- (c) Chemistry
- (d) Commercial Law
- (e) Econometrics
- (f) Economics
- (g) Finance
- (h) Geography
- (i) Geology
- (j) Government and International Relations

- (k) Marine Science
- (l) Mathematics
- (m) Soil Science
- (n) Statistics

### 6 Award of the degree

- (1) The Bachelor of Resource Economics is awarded as either Pass or with Honours. Honours are awarded in classes ranging from First Class to Second Class.

### 7 Weighted average mark (WAM)

- (1) For the Bachelor Resource Economics, the Faculty of Agriculture and Environment uses a Year 2/3 WAM that includes all 2000 level and 3000 level units of study. All 4000 level units of study count towards Year 4 WAM.
- (2) The WAM calculations use the following formula:

WAM =	$\frac{\text{sum}(Wc \times Mc)}{\text{sum}(Wc)}$
-------	---

where Wc is the unit of study credit points x the unit weighting and Mc is the mark achieved for the unit. The mark used for units with a grade AF is zero. Pass/fail units and credited units from other institutions are not counted. All units carry a weighting of one, except the individual research components of undergraduate degrees, which carry a weighting of two.

### 8 Award of the degree of Bachelor with Honours

1. For the degree of Bachelor of Resource Economics
  - 1.1 To qualify for the award of Honours a student must normally:
    - (a) have a Year 2/3 WAM of at least 65; and
    - (b) complete an independent research component as part of the final year of the program with an overall honours mark of at least 65.
  - 1.2 The overall honours mark shall be the average of the Year 2/3 WAM and the Year 4 WAM.
  - 1.3 Honours is awarded in the following classes:

Level of honours	Overall honours mark	Minimum WAM Years 2/3
First Class	mark >= 75	65
Second Class, Division 1	70 <= mark < 75	65
Second Class, Division 2	65 <= mark < 70	65
Honours not awarded	mark <65	n/a

### 8 Transitional provisions

- (1) These resolutions apply to persons who commenced their candidature after 1 January, 2013 and persons who commenced their candidature prior to 1 January, 2013 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2013 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2018. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.





# Bachelor of Resource Economics

## Units of study table

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Year 2</b>			
<b>AGEC2103</b> <b>Production Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> ECON1001 or AGECE1006 or (AGECE1003 and AGECE1004) or RESEC1031 <b>N</b> AGECE2003	Semester 1
or			
<b>AREC2001</b> <b>Econ of Biological Production Systems</b>	6	<b>P</b> ECON1001 or AGECE1006 or AGECE1102	Semester 1
<b>AGEC2105</b> <b>Applied Econometric Modelling 1</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (ECMT1010 or MATH1905 or MATH1005 or MATH1015) and ECMT1020 <b>N</b> AGECE2005, ECMT2110	Semester 1
or			
<b>ECMT2150</b> <b>Cross Section Econometrics</b>	6	<b>P</b> (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 <b>N</b> ECMT2110	Semester 1 Semester 2
<b>ECOS2001</b> <b>Intermediate Microeconomics</b>	6	<b>P</b> ECON1001 or BUSS1040 <b>C</b> ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECON2001, ECOS2901, ECON2901 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
<b>AGEC2101</b> <b>Market and Price Analysis</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGECE1006 or (AGECE1003 and AGECE1004) or AGECE1002 or AGECE1102 or RESEC1031 or AGECE1031 <b>N</b> AGECE2001	Semester 2
or			
<b>AREC2002</b> <b>Commodity Market and Price Analysis</b>	6	<b>P</b> ECON1001 or AGECE1006 or AGECE1102	Semester 2
<b>ECOS2002</b> <b>Intermediate Macroeconomics</b>	6	<b>P</b> ECON1002 <b>C</b> ECMT1020 <b>N</b> ECON2002, ECOS2902, ECON2902 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
<b>RSEC2031</b> <b>Resource Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>N</b> RSEC1031, AGECE1031	Semester 2
or			
<b>AREC2003</b> <b>Concepts in Enviro and Resource Economics</b>	6	<b>P</b> ECON1001 or AGECE1006 or AGECE1102	Semester 1
And 2 elective units from Tables RE2 and RE3, with a view to completing a Table RE3 non-ResEc major			
<b>Year 3</b>			
Year 3 will have a minimum of 48 credit points comprised of:			
<b>AGEC3102</b> <b>Agricultural and Resource Policy</b>	6	<b>P</b> (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) <b>N</b> AGECE3002	Semester 1
<b>AGEC3103</b> <b>Applied Optimisation</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) <b>N</b> AGECE3101, AGECE3001	Semester 1
or			
<b>AREC3001</b> <b>Production Modelling and Management</b>	6	<b>P</b> AREC2001 or AGECE2103 or ECOS2001 or ECOS2901	Semester 2
<b>ENVI3111</b> <b>Environmental Law and Ethics</b>	6	<b>P</b> 12 credit points of intermediate units of study <b>N</b> ENVI3911	Semester 1
And 1 elective unit from Table 2, with a view to completing a Table 4 non-ResEc major			
<b>AGEC3104</b> <b>Research Methods</b>	6	<b>P</b> AGECE2105 <b>N</b> AGECE3004	Semester 2
Economics level 3 ECOS3000 unit Level 2/3 units of study from the School of Economics or Sydney Business School			
And 1 elective unit from Table 2, with a view to completing a Table RE3 non-ResEc major			
<b>Year 4</b>			
Year 4 WAM will be calculated based on the units chosen from the Year 4 Units of Study Table.			



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>AFNR4001</b> Professional Development	6	<b>N</b> AGRF4000 <i>Note: Department permission required for enrolment</i>	Semester 2
and			
<b>AGEC4121</b> Research Exercises A	9	<b>P</b> 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC 3104 or AGEC3004 <b>N</b> AGEC4112, AGEC4012	Semester 1
and			
<b>AGEC4122</b> Research Exercises B	9	<b>P</b> 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC3104, or AGEC3004 <b>N</b> AGEC4113, AGEC4013	Semester 2
or			
<b>RSEC4141</b> Resource Economics Project A	9	<b>P</b> AGEC3104 or AGEC3004 or AGEC4041 <b>N</b> AGEC4112, AGEC4012 <i>Note: Department permission required for enrolment</i>	Semester 1
and			
<b>RSEC4142</b> Resource Economics Project B	9	<b>P</b> AGEC3104 or AGEC4112 or AGEC4041 <b>N</b> AGEC4113, AGEC4013 <i>Note: Department permission required for enrolment</i>	Semester 2
and two electives each semester from below.			
Note, you cannot double count units in your degree, i.e. if you have completed ECOS3006, you can only count this unit of study as either a year 3 or year 4 unit, likewise units of study can only count towards one major.			
<b>AGEC4103</b> International Agricultural Trade <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC4003	Semester 1
or			
<b>ECOS3006</b> International Trade	6	<b>P</b> (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) <b>N</b> ECON3006	Semester 1
<b>AGEC4104</b> Industrial Organization of Agribusiness <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 1
or			
<b>ECOS3005</b> Industrial Organisation	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
<b>AGEC4107</b> Special Topics	6	<b>N</b> AGEC4007 <i>Note: Department permission required for enrolment</i>	Semester 1 Semester 2
<b>AGEC4108</b> Quantitative Planning Methods <i>This unit of study is not available in 2015</i>	6	<b>P</b> AGEC3101 or AGEC3103 or AGEC3031 or AGEC3001 <b>N</b> AGEC4008 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>RSEC4133</b> Economics of Mineral & Energy Industries <i>This unit of study is not available in 2015</i>	6	<b>A</b> (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 <b>P</b> (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) <b>N</b> ECON3013	Semester 2
or			
<b>AREC3003</b> Econ of Minerals and Energy Industries	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>AGEC4102</b> Agricultural Development Economics <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103)	Semester 2
or			
<b>ECOS3002</b> Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
<b>AGEC4107</b> Special Topics	6	<b>N</b> AGEC4007 <i>Note: Department permission required for enrolment</i>	Semester 1 Semester 2
or			
<b>RSEC4134</b> Economics of Water & Bio-resources <i>This unit of study is not available in 2015</i>	6	<b>A</b> (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 <b>P</b> (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) <b>N</b> ECON3013	Semester 2
or			
<b>AREC3004</b> Economics of Water and Bio-Resources	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1

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

- Students may count no more than 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).
- Prerequisites apply for many second semester units.

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>BIOL1001</b> Concepts in Biology	6	<b>A</b> HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). <b>N</b> BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911	Semester 1 Summer Main

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>BIOL1002</b> Living Systems	6	<b>A</b> HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). <b>N</b> BIOL1500, BIOL1902; BIOL1992	Semester 2
<b>BIOL1902</b> Living Systems (Advanced)	6	<b>P</b> Distinction or better in the BIOL1001 or BIOL1911 or BIOL1991 or BIOL1003 or BIOL1903 or BIOL1993, OR HSC Biology equal to 90 or greater <b>N</b> BIOL1500, BIOL1002; BIOL1992, BIOL1904, BIOL1905 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>CHEM1001</b> Fundamentals of Chemistry 1A	6	<b>A</b> 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. <b>N</b> CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903	Semester 1
<b>CHEM1101</b> Chemistry 1A	6	<b>A</b> HSC Chemistry and Mathematics <b>N</b> CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901	Semester 1 Semester 2 Summer Main
<b>CHEM1901</b> Chemistry 1A (Advanced)	6	<b>P</b> HSC Chemistry result of 80 or more <b>N</b> CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 <i>Note: Department permission required for enrolment</i>	Semester 1
<b>CHEM1002</b> Fundamentals of Chemistry 1B	6	<b>P</b> CHEM1001 or CHEM1101 or equivalent <b>N</b> CHEM1102, CHEM1902, CHEM1907, CHEM1904, CHEM1108, CHEM1908	Semester 2
<b>CHEM1102</b> Chemistry 1B	6	<b>P</b> CHEM1101 or CHEM1901 or a Distinction in CHEM1001 or equivalent <b>N</b> CHEM1904, CHEM1907, CHEM1902, CHEM1108, CHEM1908, CHEM1002	Semester 1 Semester 2 Summer Main
<b>CHEM1902</b> Chemistry 1B (Advanced)	6	<b>P</b> CHEM1901 or CHEM1903 or Distinction in CHEM1101 or equivalent <b>N</b> CHEM1102, CHEM1904, CHEM1002, CHEM1908, CHEM1907, CHEM1108 <i>Note: Department permission required for enrolment</i>	Semester 2
<b>CLAW1001</b> Foundations of Business Law	6		Semester 1 Semester 2
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>GEOS1001</b> Earth, Environment and Society	6	<b>N</b> ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902	Semester 1
<b>GEOS1002</b> Introductory Geography	6	<b>N</b> GEOG1001, GEOS1902, GEOG1002	Semester 2
<b>GEOS1003</b> Introduction to Geology	6	<b>N</b> GEOS1903, GEOL1501, GEOL1002, GEOL1902	Semester 2 Summer Late
<b>GOVT1101</b> Australian Politics	6		Semester 1
<b>GOVT1202</b> World Politics	6	<i>In Summer School this unit is available to current HSC students only.</i>	Semester 1 Semester 2 Summer Main
<b>PSYC1001</b> Psychology 1001	6		Semester 1 Summer Main
<b>PSYC1002</b> Psychology 1002	6		Semester 2 Summer Main
Modern Language (Level 1 or higher) units, with the approval of the Dean FAE.			

### Table RE2: Electives available for inclusion in years 2 or 3 of the BResEc degree

Units of study in the following discipline areas (level 2000 or level 3000 unless otherwise specified):

- Agricultural Economics (level 3000)
- Biology (including plant science units)
- Commercial Law
- Econometrics
- Economics
- Environmental Science
- Finance
- Geography
- Geology
- Government
- Mathematics (including Statistics)
- Psychology
- Soil Science

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

### Table RE3: 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 University of Sydney Business School and the Faculty of Science can be found in the respective faculty handbooks.

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

- 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.

<i>Unit of study</i>	<i>Credit points</i>	<i>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</i>	<i>Session</i>
<b>Resource Economics Major</b>			
<b>Junior (Level 1) units</b>			
<b>AGEC1102</b> <b>Agricultural and Resource Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>A</b> HSC Mathematics or HSC Mathematics Extension 1 <b>N</b> AGEC1002	Semester 2
Two of:			
<b>MATH1001</b> <b>Differential Calculus</b>	3	<b>A</b> HSC Mathematics Extension 1 <b>N</b> MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001	Semester 1 Summer Main
and			
<b>MATH1002</b> <b>Linear Algebra</b>	3	<b>A</b> HSC Mathematics or MATH1111 <b>N</b> MATH1902, MATH1012, MATH1014	Semester 1 Summer Main
or			
<b>MATH1003</b> <b>Integral Calculus and Modelling</b>	3	<b>A</b> HSC Mathematics Extension 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 <b>N</b> MATH1013, MATH1903, MATH1907	Semester 2 Summer Main
and			
<b>MATH1005</b> <b>Statistics</b>	3	<b>A</b> HSC Mathematics <b>N</b> STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021	Semester 2 Summer Main Winter Main
or			
<b>ECMT1010</b> <b>Introduction to Economic Statistics</b>	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
or			
<b>ECMT1020</b> <b>Introduction to Econometrics</b>	6	<b>P</b> ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 <i>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.</i>	Semester 1 Semester 2
<b>Level 2 and 3 units</b>			
<b>AGEC2103</b> <b>Production Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) or RESEC1031 <b>N</b> AGEC2003	Semester 1
or			
<b>AREC2001</b> <b>Econ of Biological Production Systems</b>	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 1
<b>AGEC3103</b> <b>Applied Optimisation</b> <i>This unit of study is not available in 2015</i>	6	<b>P</b> (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) <b>N</b> AGEC3101, AGEC3001	Semester 1
or			
<b>AREC3001</b> <b>Production Modelling and Management</b>	6	<b>P</b> AREC2001 or AGEC2103 or ECOS2001 or ECOS2901	Semester 2
<b>RSEC2031</b> <b>Resource Economics</b> <i>This unit of study is not available in 2015</i>	6	<b>N</b> RSEC1031, AGEC1031	Semester 2
or			
<b>AREC2003</b> <b>Concepts in Enviro and Resource Economics</b>	6	<b>P</b> ECON1001 or AGEC1006 or AGEC1102	Semester 1
At least three elective units of study from the Year 4 level units.			
<b>Non-Resource Economics majors</b>			
<b>Biology</b>			
Departmental permission is required to undertake this major.			
<b>Junior (Level 1) units</b>			
Two BIOL1000 units			
<b>Level 2 and 3 units</b>			
Two BIOL2000 units			
Four BIOL3000 units			
See the Faculty of Science handbook at <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Chemistry</b>			
Departmental Permission is required to undertake this major.			
<b>Junior (Level 1) units</b>			
Two CHEM1000 units			
12 credit points of junior maths:			
<b>MATH1001 Differential Calculus</b>	3	<b>A</b> HSC Mathematics Extension 1 <b>N</b> MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001	Semester 1 Summer Main
<b>MATH1002 Linear Algebra</b>	3	<b>A</b> HSC Mathematics or MATH1111 <b>N</b> MATH1902, MATH1012, MATH1014	Semester 1 Summer Main
<b>MATH1003 Integral Calculus and Modelling</b>	3	<b>A</b> HSC Mathematics Extension 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 <b>N</b> MATH1013, MATH1903, MATH1907	Semester 2 Summer Main
and			
<b>MATH1005 Statistics</b>	3	<b>A</b> HSC Mathematics <b>N</b> STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021	Semester 2 Summer Main Winter Main
<b>Level 2 and 3 units</b>			
24 credit points from senior units of study listed in this subject area, which must include the associated laboratory units as per the Faculty of Science Handbook			
See the Faculty of Science handbook at <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			
<b>Commercial Law</b>			
<b>Junior (Level 1) units</b>			
<b>CLAW1001 Foundations of Business Law</b>	6		Semester 1 Semester 2
<b>Level 2 and 3 units</b>			
A minimum of six CLAW2000 or 3000 units			
See the Business School handbook at <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Econometrics</b>			
<b>Junior (Level 1) units</b>			
<b>ECMT1010 Introduction to Economic Statistics</b>	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECMT1020 Introduction to Econometrics</b>	6	<b>P</b> ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 <i>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.</i>	Semester 1 Semester 2
<b>Compulsory senior units</b>			
<b>ECMT2150 Cross Section Econometrics</b>	6	<b>P</b> (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 <b>N</b> ECMT2110	Semester 1 Semester 2
<b>ECMT2160 Time Series Econometrics</b>	6	<b>P</b> ECMT2150 or ECMT2110	Semester 2
<b>Level 2 and 3 units</b>			
<b>ECMT2150 Cross Section Econometrics</b>	6	<b>P</b> (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 <b>N</b> ECMT2110	Semester 1 Semester 2
<b>ECMT2160 Time Series Econometrics</b>	6	<b>P</b> ECMT2150 or ECMT2110	Semester 2
Four senior elective units of study (24 credit points) selected from the following options with a maximum of three at the 3000 level:			
<b>ECMT2130 Financial Econometrics</b>	6	<b>P</b> ECMT2110 or ECMT2010 or ECMT1020 <b>N</b> ECMT2030	Semester 2
<b>ECMT3120 Applied Econometrics</b>	6	<b>P</b> ECMT3110 or ECMT3010 or (ECMT2150 and ECMT2160) <b>N</b> ECMT3020	Semester 2
<b>ECMT3130 Forecasting for Economics and Business</b>	6	<b>P</b> ECMT2110 or ECMT2010 or (ECMT2150 and ECMT2160) <b>N</b> ECMT3030	Semester 2
<b>ECMT3150 The Econometrics of Financial Markets</b>	6	<b>P</b> ((ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) and (ECMT2110 or ECMT2010) and (ECMT2130 or ECMT2030)) or (ECMT2130 and ECMT2150 and ECMT2160) <b>N</b> ECMT3050	Semester 1
<b>ECMT3170 Computational Econometrics</b>	6	<b>P</b> ECMT2160 or ECMT2110	Semester 2
ECMT3160 and ECMT3170 are not offered in 2014.			
A minimum of three further ECMT2000 and ECMT3000 units			
See the Faculty of Arts and Social Sciences handbook <a href="http://sydney.edu.au/handbooks/arts">sydney.edu.au/handbooks/arts</a>			



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Economics</b>			
<b>Junior (Level 1) units</b>			
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECMT1020</b> Introduction to Econometrics	6	<b>P</b> ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 <i>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.</i>	Semester 1 Semester 2
<b>ECON1001</b> Introductory Microeconomics	6	<b>N</b> BUSS1040	Semester 1 Semester 2 Summer Main
<b>ECON1002</b> Introductory Macroeconomics	6		Semester 1 Semester 2 Summer Main
<b>Level 2 and 3 units</b>			
<b>ECOS2001</b> Intermediate Microeconomics	6	<b>P</b> ECON1001 or BUSS1040 <b>C</b> ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 <b>N</b> ECON2001, ECOS2901, ECON2901 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
<b>ECOS2002</b> Intermediate Macroeconomics	6	<b>P</b> ECON1002 <b>C</b> ECMT1020 <b>N</b> ECON2002, ECOS2902, ECON2902 <i>Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.</i>	Semester 1 Semester 2 Summer Main
Any four further ECOS2000 or ECOS3000 units, of which at least three must be at the 3000 level			
See the Faculty of Arts and Social Sciences handbook <a href="http://sydney.edu.au/handbooks/arts">sydney.edu.au/handbooks/arts</a>			
<b>Finance</b>			
<b>Junior (Level 1) units</b>			
Any one junior unit of study (six credit points) from the University of Sydney Business School.			
<b>ECMT1010</b> Introduction to Economic Statistics	6	<b>N</b> ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001	Semester 1 Semester 2
<b>ECON1001</b> Introductory Microeconomics	6	<b>N</b> BUSS1040	Semester 1 Semester 2 Summer Main
<b>ECON1002</b> Introductory Macroeconomics	6		Semester 1 Semester 2 Summer Main
<b>Level 2 and 3 units</b>			
<b>FINC2011</b> Corporate Finance I	6	<b>A</b> ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) <b>N</b> FINC2001 <i>Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.</i>	Semester 1 Semester 2 Summer Early Winter Main
<b>FINC2012</b> Corporate Finance II	6	<b>P</b> FINC2011 or FINC2001 <b>N</b> FINC2002	Semester 1 Semester 2 Summer Main
<b>FINC3017</b> Investments and Portfolio Management	6	<b>P</b> FINC2011 <b>N</b> FINC3007 <i>Students who achieved less than a credit in FINC2011 are advised not to attempt FINC3017 until they have completed FINC2012.</i>	Semester 1 Semester 2 Summer Early
A minimum of three (18 credit points) further FINC3000 level units			
See the Business School handbook <a href="http://sydney.edu.au/handbooks/business_school">sydney.edu.au/handbooks/business_school</a>			
<b>Geography</b>			
<b>Junior (Level 1) units and Level 2 units</b>			
Some junior elective and intermediate GEOG/GEOS units may be required to meet the prerequisites of Level 3 units for this major.			
<b>Level 3 units</b>			
24 CP made up of:			
<b>GEOS3333</b> Geographical Concepts, Skills & Methods	6	<b>P</b> Assumed Knowledge: Basic knowledge of ARC GIS software. <b>N</b> GEOS3933	Semester 2
or			
<b>GEOS3933</b> Geog. Concepts, Skills & Methods (Adv)	6	<b>P</b> Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002. <b>N</b> GEOS3333	Semester 2

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>GEOS3053</b> Southeast Asia Field School	6	<b>P</b> 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. <b>N</b> GEOS3953, GEOG3201 <i>Note: Department permission required for enrolment</i> <i>Students must contact the unit coordinator no later than September in the year before taking this unit.</i>	Intensive July
or			
<b>GEOS3953</b> Southeast Asia Field School (Adv)	6	<b>P</b> 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment. <b>N</b> GEOS3053 <i>Note: Department permission required for enrolment</i> <i>Students must contact the unit coordinator no later than September in the year before taking this unit.</i>	Intensive July
Plus any of the following units:			
<b>GEOS3101</b> Earth's Structure and Evolution	6	<b>A</b> GEOS2114, GEOS2124 <b>P</b> (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School <b>N</b> GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003	Semester 1
or			
<b>ENVI3111</b> Environmental Law and Ethics	6	<b>P</b> 12 credit points of intermediate units of study <b>N</b> ENVI3911	Semester 1
or			
<b>ENVI3911</b> Environmental Law and Ethics (Advanced)	6	<b>P</b> Distinction average across 12 credit points of intermediate units of study <b>N</b> ENVI3111	Semester 1
<b>ENVI3112</b> Environmental Assessment	6	<b>P</b> (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units <b>N</b> ENVI3912, ENVI3004, ENVI3002	Semester 2
or			
<b>ENVI3912</b> Environmental Assessment (Advanced)	6	<b>P</b> Distinction average in ((GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units) <b>N</b> ENVI3112, ENVI3004, ENVI3002	Semester 2
<b>GEOS3520</b> Urban Citizenship & Sustainability	6	<b>P</b> 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOILS2002, LWSC2002 <b>N</b> GEOS3920	Semester 1
or			
<b>GEOS3920</b> Urban Citizenship & Sustainability (Adv)	6	<b>P</b> Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002 <b>N</b> GEOS3520	Semester 1
<b>GEOS3524</b> Global Development and Livelihoods	6	<b>P</b> 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience <b>N</b> GEOS2112, GEOS3924, GEOS2912	Semester 1
or			
<b>GEOS3924</b> Global Development and Livelihoods (Adv)	6	<b>P</b> 24 credit points of Intermediate units of study including a distinction in 6 credit points of Intermediate Geoscience <b>N</b> GEOS2912, GEOS2112, GEOS3524	Semester 1
<b>GEOS3009</b> Coastal Environments and Processes	6	<b>P</b> (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906)) <b>N</b> MARS3003, MARS3105, GEOS3909	Semester 1
or			
<b>GEOS3909</b> Coastal Environments and Processes (Adv)	6	<b>P</b> Distinction average in ((6 credit points of Intermediate Geoscience* units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))) <b>N</b> MARS3105, GEOS3009, MARS3003 <i>A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</i>	Semester 1
<b>GEOS3014</b> GIS in Coastal Management	6	<b>P</b> Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. <b>N</b> MARS3104, GEOS3914	Semester 2
or			
<b>GEOS3914</b> GIS in Coastal Management (Advanced)	6	<b>P</b> Distinction average in either 12 credit points of Intermediate Geoscience units or [(GEOS2115 or GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. <b>N</b> GEOS3014, MARS3104 <i>Note: Department permission required for enrolment</i> <i>A distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.</i>	Semester 2
Different pathways are available for this major. See the Faculty of Science handbook <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			
<b>Geology and Geophysics</b>			
<b>Junior (Level 1) units and Level 2 units</b>			
Some junior elective and intermediate GEOS units may be required to meet the prerequisites of Level 3 units listed for this major			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Level 3 units</b>			
Four units (24 credit points) of Senior Geology and Geophysics units of study, including:			
<b>GEOS3008</b> Field Geology	6	<b>P</b> GEOS2124 or GEOS2924 <b>N</b> GEOS3908	Semester 2a
<b>GEOS3908</b> Field Geology (Adv)	6	<b>P</b> GEOS2124 or GEOS2924 with a mark of 65% or greater <b>N</b> GEOS3008 <i>Note: Department permission required for enrolment</i>	Semester 2a
<b>GEOS3101</b> Earth's Structure and Evolution	6	<b>A</b> GEOS2114, GEOS2124 <b>P</b> (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School <b>N</b> GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003	Semester 1
<b>GEOS3801</b> Earth's Structure and Evolutions (Adv)	6	<b>A</b> GEOS2114, GEOS2124 <b>P</b> Distinctions in (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School <b>N</b> GEOS3904, GEOS3917, GEOS3906, GEOS3006, GEOS3101, GEOS3017, GEOS3004, GEOS3003, GEOS3903	Semester 1
and at least two of:			
<b>GEOS3102</b> Global Energy and Resources	6	<b>A</b> GEOS2114 and GEOS2124 <b>P</b> (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 and GEOS1903 with permission of the Head of School <b>N</b> GEOS3003, GEOS3904, GEOS3006, GEOS3017, GEOS3917, GEOS3004, GEOS3906, GEOS3802, GEOS3903	Semester 1
<b>GEOS3802</b> Global Energy and Resources (Adv)	6	<b>P</b> Distinction in (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School. <b>N</b> GEOS3917, GEOS3906, GEOS3006, GEOS3903, GEOS3904, GEOS3017, GEOS3004, GEOS3102, GEOS3003	Semester 1
<b>GEOS3103</b> Environmental and Sedimentary Geology	6	<b>A</b> GEOS1003, GEOS2124 <b>P</b> (GEOS2124 or GEOS2924) and (GEOS2111 or (GEOS2911) or (GEOS2114 or GEOS2914) or (GEOS2113 or GEOS2913); or (GEOS1003 or GEOS1903) and 24 credit points of Intermediate Science units of study with permission of the Head of School. <b>N</b> GEOS3803	Semester 2
<b>GEOS3014</b> GIS in Coastal Management	6	<b>P</b> Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. <b>N</b> MARS3104, GEOS3914	Semester 2
<b>GEOS3803</b> Environmental & Sedimentary Geology(Adv)	6	<b>A</b> GEOS1003, GEOS2124 <b>P</b> Distinctions in (GEOS2114 or (GEOS2914) and (GEOS2124 or (GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with permission of the Head of School. <b>N</b> GEOS3103	Semester 2
<b>GEOS3804</b> Geophysical Methods (Advanced)	6	<b>P</b> Distinction in GEOS2114 or GEOS2914 and GEOS2124 or GEOS2924; Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School <b>N</b> GEOS3006, GEOS3104, GEOS3016, GEOS3917, GEOS3903, GEOS3017, GEOS3916, GEOS3003, GEOS3906	Semester 2
See the Faculty of Science handbook <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			
<b>Government and International Relations</b>			
<b>Junior (Level 1) units</b>			
Two level 1000 Government (GOVT) units			
<b>Level 2 and 3 units</b>			
At least 36 credit points of Level 2000 and Level 3000 GOVT units of study with at least 6 credit points of Level 3000 GOVT units of study.			
See the Faculty of Arts and Social Sciences handbook <a href="http://sydney.edu.au/handbooks/arts">sydney.edu.au/handbooks/arts</a>			
Note. Students may also complete a maximum of 12 credit points in cross-listed non-'GOVT' senior units of study as electives for this major. For details of all non-'GOVT' units of study that may be cross listed with this major, see the Faculty of Arts and Social Sciences website			
<b>Mathematics</b>			
<b>Junior (Level 1) units</b>			
<b>MATH1001</b> Differential Calculus	3	<b>A</b> HSC Mathematics Extension 1 <b>N</b> MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001	Semester 1 Summer Main
<b>MATH1002</b> Linear Algebra	3	<b>A</b> HSC Mathematics or MATH1111 <b>N</b> MATH1902, MATH1012, MATH1014	Semester 1 Summer Main
<b>MATH1003</b> Integral Calculus and Modelling	3	<b>A</b> HSC Mathematics Extension 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 <b>N</b> MATH1013, MATH1903, MATH1907	Semester 2 Summer Main
<b>MATH1004</b> Discrete Mathematics	3	<b>A</b> HSC Mathematics or MATH1111 <b>N</b> MATH2011, MATH1904	Semester 2 Summer Main
<b>MATH1005</b> Statistics	3	<b>A</b> HSC Mathematics <b>N</b> STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021	Semester 2 Summer Main Winter Main
Or parallel advanced units.			

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Level 2 and 3 units</b>			
Two of:			
<b>MATH2061</b> Linear Mathematics and Vector Calculus	6	<b>P</b> (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) and (MATH1003 or MATH1903 or MATH1907) <b>N</b> MATH2961, MATH2067, MATH2901, MATH2902, MATH2001, MATH2002	Semester 1 Summer Main
or			
<b>MATH2961</b> Linear Mathematics & Vector Calculus Adv	6	<b>P</b> (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) and (MATH1903 or MATH1907 or Credit in MATH1003) <b>N</b> MATH2901, MATH2002, MATH2001, MATH2902, MATH2067, MATH2061	Semester 1
<b>MATH2065</b> Partial Differential Equations (Intro)	6	<b>P</b> (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) and (MATH1003 or MATH1903 or MATH1907) <b>N</b> MATH2965, MATH2005, MATH2905, MATH2067	Semester 2 Summer Main
or			
<b>MATH2965</b> Partial Differential Equations Intro Adv	6	<b>P</b> MATH2961 or Credit in MATH2061 <b>N</b> MATH2065, MATH2905, MATH2005, MATH2067	Semester 2
<b>MATH2068</b> Number Theory and Cryptography	6	<b>A</b> MATH1014 or MATH1002 or MATH1902 <b>P</b> 6 credit points of Junior level Mathematics <b>N</b> MATH3009, MATH3024, MATH2988	Semester 2
or			
<b>MATH2968</b> Algebra (Advanced)	6	<b>P</b> 9 credit points of Junior Mathematics (advanced level or Credit at normal level) including (MATH1902 or Credit in MATH1002) <b>N</b> MATH2918, MATH2008, MATH2908	Semester 2
<b>MATH2069</b> Discrete Mathematics and Graph Theory	6	<b>P</b> 6 credit points of Junior level Mathematics <b>N</b> MATH2011, MATH2009, MATH2969	Semester 1
or			
<b>MATH2969</b> Discrete Mathematics & Graph Theory Adv	6	<b>P</b> 9 credit points of Junior Mathematics (advanced level or Credit at the normal level) <b>N</b> MATH2069, MATH2009, MATH2011	Semester 1
<b>MATH2070</b> Optimisation and Financial Mathematics	6	<b>A</b> MATH1003 or MATH1903 or MATH1907 <b>P</b> (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) <b>N</b> MATH2933, MATH2970, MATH2033, ECMT3510, MATH2010 <i>Students may enrol in both MATH2070 and MATH3075 in the same semester</i>	Semester 2
or			
<b>MATH2970</b> Optimisation & Financial Mathematics Adv	6	<b>A</b> MATH1903 or MATH1907 or Credit in MATH1003 <b>P</b> (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) <b>N</b> MATH2033, MATH2933, MATH2070, ECMT3510, MATH2010 <i>Students may enrol in both MATH2970 and MATH3975 in the same semester</i>	Semester 2
<b>MATH2962</b> Real and Complex Analysis (Advanced)	6	<b>P</b> (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) and (MATH1903 or MATH1907 or Credit in MATH1003) <b>N</b> MATH2907, MATH2007	Semester 1
<b>MATH2968</b> Algebra (Advanced)	6	<b>P</b> 9 credit points of Junior Mathematics (advanced level or Credit at normal level) including (MATH1902 or Credit in MATH1002) <b>N</b> MATH2918, MATH2008, MATH2908	Semester 2
<b>MATH2916</b> Working Seminar A (SSP)	3	<b>P</b> By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics <i>Note: Department permission required for enrolment</i>	Semester 1
<b>MATH2917</b> Working Seminar B (SSP)	3	<b>P</b> By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics <i>Note: Department permission required for enrolment</i>	Semester 2
24 credits points from MATH3000 units			
See the Faculty of Science handbook <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			
<b>Soil Science</b>			
Departmental Permission is required to undertake this major.			
<b>Junior (Level 1) and level 2 units</b>			
Some junior and intermediate AGCH, MICR, LWSC or SOIL elective units may be required to meet the prerequisites of Level 3 units listed for this major. Please check each unit of study for further details			
<b>Level 3 units</b>			
<b>ENVX3001</b> Environmental GIS	6	<b>P</b> AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology	Semester 2
<b>SOIL3009</b> Contemporary Field and Lab Soil Science	6	<b>P</b> SOIL2003	Semester 1
<b>SOIL3010</b> The Soil at Work	6	<b>P</b> SOIL2003 or SOIL2004	Semester 2
and one of			
<b>AGCH3033</b> Environmental Chemistry	6	<b>A</b> SOIL2003, LWSC2002 <b>P</b> 12 cp of Junior Chemistry <b>N</b> CHEM2404	Semester 2
<b>LWSC3007</b> Advanced Hydrology and Modelling	6	<b>P</b> LWSC2002	Semester 1
<b>PPAT4005</b> Soil Biology <i>This unit of study is not available in 2015</i>	6	<b>P</b> MICR2024 or MICR2021 or MICR2921 or MICR2022 or MICR2922	Semester 1

<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
Note. Some senior units for this major may have specific prerequisites for enrolment. Please check each unit of study for further detail			
<b>Statistics</b>			
<b>Junior (Level 1) units</b>			
<b>MATH1001 Differential Calculus</b>	3	<b>A</b> HSC Mathematics Extension 1 <b>N</b> MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001	Semester 1 Summer Main
<b>MATH1002 Linear Algebra</b>	3	<b>A</b> HSC Mathematics or MATH1111 <b>N</b> MATH1902, MATH1012, MATH1014	Semester 1 Summer Main
<b>MATH1003 Integral Calculus and Modelling</b>	3	<b>A</b> HSC Mathematics Extension 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 <b>N</b> MATH1013, MATH1903, MATH1907	Semester 2 Summer Main
<b>MATH1005 Statistics</b>	3	<b>A</b> HSC Mathematics <b>N</b> STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021	Semester 2 Summer Main Winter Main
Or parallel advanced units.			
<b>Level 2 and 3 units</b>			
<b>STAT2011 Statistical Models</b>	6	<b>P</b> (MATH1001 or MATH1901 or MATH1906 or MATH1011) and (MATH1005 or MATH1905 or MATH1015 or STAT1021 or ECMT1010 or BUSS1020) <b>N</b> STAT2001, STAT2901, STAT2911	Semester 1
or			
<b>STAT2911 Probability and Statistical Models (Adv)</b>	6	<b>P</b> (MATH1903 or MATH1907 or Credit in MATH1003) and (MATH1905 or MATH1904 or Credit in MATH1005 or Credit in ECMT1010 or Credit in BUSS1020) <b>N</b> STAT2001, STAT2901, STAT2011	Semester 1
<b>STAT2012 Statistical Tests</b>	6	<b>P</b> MATH1005 or MATH1905 or MATH1015 or ECMT1010 or BUSS1020 <b>N</b> STAT2912, STAT2004	Semester 2
or			
<b>STAT2912 Statistical Tests (Advanced)</b>	6	<b>A</b> STAT2911 <b>P</b> MATH1905 or Credit in MATH1005 or Credit in ECMT1010 or Credit in BUSS1020 <b>N</b> STAT2004, STAT2012	Semester 2
And 24 credit points of STAT3000 units			
See the Faculty of Science handbook <a href="http://sydney.edu.au/handbooks/science">sydney.edu.au/handbooks/science</a>			

# Bachelor of Resource Economics

## Units of study

### Year 2

#### AGEC2103

##### Production Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** ECON1001 or AGECE1006 or (AGECE1003 and AGECE1004) or RESEC1031 **Prohibitions:** AGECE2003 **Assessment:** 2 x assignments (40%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on microeconomic principles studied in first year and applies them to the analysis of firms' decisions. Emphasis is put on the formalization of the firm's problem and in the use of duality. The topics include: production functions (single and multi-output); distance functions and their use in the measurement of productivity; the decomposition of productivity and productivity changes; production under risk; cost and profit functions.

N.B. Available to 2nd year students in the Faculty of Economics and Business

##### Textbooks

Collection of readings

or

#### AREC2001

##### Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

#### AGEC2105

##### Applied Econometric Modelling 1

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECMT1010 or MATH1905 or MATH1005 or MATH1015) and ECMT1020 **Prohibitions:** AGECE2005, ECMT2110 **Assessment:** 1x1hr exam (25%), 1 x assignment (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Applied Econometric Modelling is designed to provide students with a sound understanding of the application of applied econometric methods to the agricultural and resource sectors. Topics covered will include: single and multiple regression, forecasting, dummy variables, violations of OLS assumptions, dynamics, binary choice models, and an introduction to cointegration. 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.

This unit of study is designed to develop student understanding and capability in applied regression analysis.

It is a core unit for students in BAgEc and BResEc, students and a non core unit for BScAgr students.

Students will become familiar with exploring data sets and estimating, interpreting, and assessing regressions that represent economic relationships.

At the end of this unit, students will be able to understand the major concepts and principles of applied regression analysis, estimate simple regressions in EVIEWS and interpret the output, and be able to read, understand, and possibly replicate recent literature in agricultural and resource economics journals that apply econometric methods.

The students will gain research and computing skills.

##### Textbooks

D.N. Gujarati & D.C. Porter, Basic Econometrics, 5th Ed. (McGraw-Hill Irwin), New York.

or

#### ECMT2150

##### Cross Section Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

#### ECOS2001

##### Intermediate Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or BUSS1040 **Corequisites:** ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECON2001, ECOS2901, ECON2901 **Assessment:** Tutorial participation (10%), 2x in-class tests (40%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

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.

#### AGEC2101

##### Market and Price Analysis

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 2 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** AGECE1006 or (AGECE1003 and AGECE1004) or AGECE1002 or AGECE1102 or RSEC1031 or AGECE1031 **Prohibitions:** AGECE2001 **Assessment:** 1x1hr in-class mid-term exam (20%), 1x3000wd assignment (20%), 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day



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.

N.B. Available to 2nd year students in Faculty of Economics and Business.

Advised prerequisite: AGEC2105 or ECMT2110

or

### AREC2002

#### Commodity Market and Price Analysis

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGEC1006 or AGEC1102 **Assessment:** 1x50min Mid-semester Test (20%), 1xGroup Assignment (1000wd equiv) (20%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### ECOS2002

#### Intermediate Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1002 **Corequisites:** ECMT1020 **Prohibitions:** ECON2002, ECOS2902, ECON2902 **Assessment:** Mid-semester test (30%), assignments (20%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

This unit of study develops models of the goods, money and labour markets, and 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.

### RSEC2031

#### Resource Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 3x 1hr lectures/week, 1x1 hr tutorial/week commencing week 2. **Prohibitions:** RSEC1031, AGEC1031 **Assessment:** 1x 1hr mid semester exam (25%), 1x assignment (15%), 1 x 2 hr end of semester exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the unit Agricultural and Resource Economics. Particular concepts in economics are used to provide insights into efficient and sustainable resource management. The primary focus of this unit 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.

or

### AREC2003

#### Concepts in Enviro and Resource Economics

**Credit points:** 6 **Session:** Semester 1 **Prerequisites:** ECON1001 or AGEC1006 or AGEC1102 **Assessment:** 1x50min Mid-semester Test (20%), 2x1000wd Assignments (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the concepts in microeconomics to provide insights into efficient and sustainable resource management. The primary focus of this unit 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 introductory material on economic valuation of environmental assets and benefit cost analysis is included.

And 2 elective units from Tables RE2 and RE3, with a view to completing a Table RE3 non-ResEc major

### Year 3

Year 3 will have a minimum of 48 credit points comprised of:

### AGEC3102

#### Agricultural and Resource Policy

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 1 **Classes:** 1x2-hr lecture + 1x1-hr lectures/week, 1x1-hr tutorial/fortnightly **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC3002 **Assessment:** 1x2.5hr exam (70%) and 3x600 wd problem sets (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit covers the theoretical framework for economic analysis of policy interventions (welfare economics and public choice theory). Emphasis is put on building the skills needed to analyze the incidence of economic policy and on the design of policies under asymmetric information. An understanding of the institutional structure of agricultural and resource policy in Australia is promoted through the direct contact with policy makers, public agencies and lobbying groups.

N.B. Available to 3rd year students in the Faculty of Economics and Business

*Textbooks*

To be advised

### AGEC3103

#### Applied Optimisation

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Prohibitions:** AGEC3101, AGEC3001 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study deals with constrained optimization problems in which one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The main focus of the unit is on linear programming (LP) problems, viz. problems in which the objective function and the constraint functions are all linear, and the application of LP in agricultural and other planning contexts. Topics include graphical and mathematical representation of LP problems, solution methods, solution information, stability of optimal solutions, primal and dual formulations and parametric programming. After covering the essentials of LP and its extension to integer LP, the focus shifts to modelling real world scenarios as optimization problems. Students are streamed: one group deals with specialized LP formulations (e.g. transportation model, stochastic programming). The other examines dynamic optimization for problems that involve inter-temporal resource allocation. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (e.g. LINDO).

or

**AREC3001****Production Modelling and Management**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

**ENVI3111****Environmental Law and Ethics**

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** 12 credit points of intermediate units of study **Prohibitions:** ENVI3911 **Assessment:** Exam (40%) Essays (40%, 20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Shared Teaching Arrangements: This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). Environmental regulation and governance plays an important role in regulating human impacts on the environment. The law and governance part of this unit provides an introduction and overview to environmental regulation. We investigate key environmental issues through an examination of legal policies, legislation and case law at a variety of scales (international, national and state/local). This unit also highlights the ways in which environmental law and governance is increasingly interconnected to other areas of environmental studies. 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.

And 1 elective unit from Table 2, with a view to completing a Table 4 non-ResEc major

**AGEC3104****Research Methods**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Michael Harris **Session:** Semester 2 **Classes:** 2x1-hr lectures/week & 1x1-hr tutorial/fortnight **Prerequisites:** AGEC2105 **Prohibitions:** AGEC3004 **Assessment:** 1x2500wd assignment(40%) and 1x2 hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data;; and methods of analysis of data. Topics are illustrated with examples of research in theoretical economics and empirical research. Students are expected to read widely. Development of practical research skills, including the ability to critically and statistically synthesise and interpret data will be fostered by the completion of applied computer-based workshop exercises. Information literacy skills and the ability to summarise and synthesise information and use it to inform an argument will be improved through the preparation of a literature review and a research proposal.

Economics level 3 ECOS3000 unit/Level 2/3 units of study from the School of Economics or Sydney Business School/And 1 elective unit from Table 2, with a view to completing a Table RE3 non-ResEc major

**Year 4**

Year 4 WAM will be calculated based on the units chosen from the Year 4 Units of Study Table.

**AFNR4001****Professional Development**

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 2 **Classes:** Workshops over four years **Prohibitions:** AGRF4000 **Assessment:** 1x blog posting (10%), 1x on-line (multi-media) (30%) and 1x portfolio (60%) **Practical field work:** 40 days of professional experience, 1 week long excursion **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study is designed to allow students to critically reflect on the relationship between the rural enterprise and environment and how they can contribute to the future decisions and management affecting the rural community. It is a core unit of study in 4th year for the BAgEc, BScAgr, BLWSc, BResEc, BHortSc which requires students to complete 40 days of professional experience with the expectation that students will examine the nature of facts from their degree in this environment. A minimum of 15 days must be completed on-farm/field. The remaining days may be at the student's discretion. The unit will be counted towards 4th year, but professional experience placements will normally be undertaken throughout the degree. In the early stages of the Professional Development program students participate in Faculty excursions that have been developed so they can experience a range of activities, such as research, extension, on-farm and industry both in the rural and urban environment to complement their learning within their individual degree programs. Building on this various workshops have been developed to assist students to identify a rural environment theme or issue of their interest with the specific emphasis being placed on them reflecting on how their new understandings of their theme of interest affects their personal and professional development. To complete this unit students will present a portfolio of their theme including critical reflection on the pivotal relationships between the academic degree, rural environment, professional experience, and beliefs and values of the rural community. Through developing these pivotal relationships, students will be able to use their new understandings to support and guide the future developments in the rural enterprise and environment. By developing and presenting the portfolio and engaging in other online activities the students will enhance their skills in inquiry, information literacy and communication. In particular the autonomous development of case studies reflecting the contemporary issues in agriculture and their professional placements the students will have to consider their understandings of ethical, social and professional issues and further develop the personal and intellectual autonomy.

Note: Department permission required for enrolment

and

**AGEC4121****Research Exercises A**

**Credit points:** 9 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 1 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGEC3101, AGEC3102, AGEC3103, AGEC3104 or AGEC3004 **Prohibitions:** AGEC4112, AGEC4012 **Assessment:** Group report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study should be 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 work 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 prepare individual and/or group written reports and/or oral presentations concerning data acquisition, analysis and interpretation of results. Students who undertake this unit will not be eligible for honours.

and



## AGEC4122

### Research Exercises B

**Credit points:** 9 **Teacher/Coordinator:** A/Prof Dilip Dutta **Session:** Semester 2 **Classes:** 1x2-hr lectures/week **Prerequisites:** 2 units out of AGECE3101, AGECE3102, AGECE3103, AGECE3104, or AGECE3004 **Prohibitions:** AGECE4113, AGECE4013 **Assessment:** Group report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is taken in conjunction with the companion unit, AGECE4121 Research Exercises A. See AGECE4121 for details.

or

## RSEC4141

### Resource Economics Project A

**Credit points:** 9 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 1x2-hr lectures/week **Prerequisites:** AGECE3104 or AGECE3004 or AGECE4041 **Prohibitions:** AGECE4112, AGECE4012 **Assessment:** Individual report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day  
*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). Student 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.

and

## RSEC4142

### Resource Economics Project B

**Credit points:** 9 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 1x2-hr lectures/week **Prerequisites:** AGECE3104 or AGECE4112 or AGECE4041 **Prohibitions:** AGECE4113, AGECE4013 **Assessment:** Individual report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day  
*Note: Department permission required for enrolment.*

This unit of study is taken in conjunction with the companion unit, RSEC4141 Resource Economics Project A. See RSEC4141 for details.

*Textbooks*

Not applicable as this is a research unit.

and two electives each semester from below. Note, you cannot double count units in your degree, i.e. if you have completed ECOS3006, you can only count this unit of study as either a year 3 or year 4 unit, likewise units of study can only count towards one major.

## AGEC4103

### International Agricultural Trade

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Prohibitions:** AGECE4003 **Assessment:** 1x1hr exam (25%), 1 x essay (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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*

Krugman and Obstfeld. International Economics: Theory and Policy, 9th Ed. (Pearson Addison Wesley), New York.

or

## ECOS3006

### International Trade

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3006 **Assessment:** problem sets (5%), Mid-semester test (35%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

## AGEC4104

### Industrial Organization of Agribusiness

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr David Ubilava **Session:** Semester 1 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGECE2001 or AGECE2101) and (AGECE2003 or AGECE2103) **Assessment:** 1x2000 wd assignment (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

or

## ECOS3005

### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

## AGEC4107

### Special Topics

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1, Semester 2 **Classes:** Individual research and consultation **Prohibitions:** AGECE4007 **Assessment:** Research paper (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** (2x1hr lec & 1x2 tut/lab session)/wk, commencing week 1 **Prerequisites:** AGECE3101 or AGECE3103 or AGECE3031 or AGECE3001 **Prohibitions:** AGECE4008 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sector level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are also discussed. Topics include non-linear programming, stochastic programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (e.g. 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 may include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization.

### RSEC4133

#### Economics of Mineral & Energy Industries

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 2 **Classes:** 2x1-hr lectures/week commencing week 1, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 **Assessment:** Excursion attendance and report (25%); 1x1hr mid-term exam (30%) and 1x2 hr final exam (45%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit provides theoretical and empirical background on the economics of minerals exploration, extraction and marketing and on the economics of energy generation, distribution and use. The economics of minerals and energy commodity markets will be discussed and analysed. 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 analysed. 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

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.

or

### AREC3003

#### Econ of Minerals and Energy Industries

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit builds on previously acquired economics training and develops advanced understanding of the economics of minerals exploration, extraction and marketing and the economics of energy generation, distribution and use. The implications of mineral extraction and energy generation activities for natural resources and the environment are explored. The unit will foster in-depth knowledge of the markets for minerals and energy, their industry structure and business environment, including the role of markets for derivatives on minerals and energy commodities.

### AGEC4102

#### Agricultural Development Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr. Shyamal Chowdhury **Session:** Semester 2 **Classes:** 1x2-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (AGEC2001 or AGEC2101) and (AGEC2003 or AGEC2103) **Assessment:** 1x2000 wd problem set (20%), 1x1000 wd review (10%), 1x15min presentation (5%), 1x1page evaluation of a peer (5%), and 1x2hr final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on the microeconomic analysis of development, with a special emphasis on the importance of market failures in financial markets as origin of persistent poverty. The unit also addresses policy interventions to overcome such failures and the challenges in their evaluation. A special emphasis is put in the discussion of the role of agriculture in development, and the evidence supporting its importance in poverty reduction.

#### Textbooks

Debraj Ray, *Development Economics*, Princeton University Press.

Abhijit Banerjee, Roland Bénabou and Dilip Mookherjee, *Understanding Poverty*, Oxford University Press.

World Bank, *Agriculture for Development - World Development Report 2008*, World Bank and Oxford University Press

N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

or

### ECOS3002

#### Development Economics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3002 **Assessment:** 2x in-class tests (30%) and 2.5hr Final exam (70%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### AGEC4107

#### Special Topics

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1, Semester 2 **Classes:** Individual research and consultation **Prohibitions:** AGEC4007 **Assessment:** Research paper (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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.

or

### RSEC4134

#### Economics of Water & Bio-resources

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Tihomir Ancev **Session:** Semester 2 **Classes:** 2x1-hr lectures/week commencing week 1, 1x1-hr tutorial/week commencing week 2 **Prerequisites:** (ECON2001 or ECOS2001) and (AGEC2103 or AGEC2003) **Prohibitions:** ECON3013 **Assumed knowledge:** (ECON2002 or ECOS2002), AGEC3001, AGEC2101, AGEC2105 **Assessment:** 1xessay (35%); 1x1hr mid-term exam (25%); 1x2hr final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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. There will be particular emphasis on 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 forestry.

#### 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.

or

### AREC3004

#### Economics of Water and Bio-Resources

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester Test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit develops knowledge and skills in natural resource economics built on previously gained economics training. The economics of dynamic natural systems is studied through application of advanced modelling approaches. Particular emphasis is given to the economic mechanisms for managing water and biological resources including property rights, water allocation and water markets. Key policy instruments (taxes, quotas, standards) are analysed. Institutional and policy aspects will also be considered via analysis of water policy reform in Australia and elsewhere.

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

1. Students may count no more than 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. Prerequisites apply for many second semester units.

### BIOL1001

#### Concepts in Biology

**Credit points:** 6 **Teacher/Coordinator:** Dr Charlotte Taylor **Session:** Semester 1, Summer Main **Classes:** Two 1-hour lectures and one 3-hour practical per week. **Prohibitions:** BIOL1101, BIOL1991, BIOL1500, BIOL1901, BIOL1911 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments tests and lab quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Concepts in Biology is an introduction to the major themes of modern biology. The unit covers fundamental cell biology, with a particular emphasis on cell structure and function; the foundations of molecular

biology from the role of DNA in protein synthesis to the genetics of organisms; and the theory of evolution and principles of phylogenetic analysis, including how these are used to interpret the origins of the diversity of extant organisms. Practical classes focus on students designing experiments, making and recording their observations and communicating their findings. The unit emphasises how biologists carry out scientific investigations, from the molecular and cellular level to the level of ecosystems. This unit of study provides a good foundation for intermediate biology units of study.

#### Textbooks

Knox R B et al. *Biology, An Australian Focus*. 4th ed. McGraw-Hill. 2010

### BIOL1002

#### Living Systems

**Credit points:** 6 **Teacher/Coordinator:** Dr William Figueira **Session:** Semester 2 **Classes:** Two 1-hour lectures and one 2.5-hour practical per week and tutorials every few weeks. **Prohibitions:** BIOL1500, BIOL1902; BIOL1992 **Assumed knowledge:** HSC Biology, however, students who have not completed HSC Biology (or equivalent) are strongly advised to take the Biology Bridging Course (in February). **Assessment:** One 2-hour exam, assignments, quizzes (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Living Systems deals with the biology of organisms as individuals, within populations and as part of communities and ecosystems. A broad range of taxa is presented, from bacteria to large plants and animals, and emphasis is placed on understanding the ways in which they can live in different habitats. Behaviour is discussed as a key process linking organismal-level processes to population and community dynamics. The importance of energy in living systems, and how elements are used and recycled in biological communities, are introduced as the basis of ecosystems. The unit of study includes lectures and laboratory classes on the physiology and behaviour of animals and plants, the ways in which organisms control and integrate their activities and the processes controlling dynamics of populations and community. These themes are revisited within applied contexts to discuss issues such as management and conservation. This unit of study provides a good foundation for intermediate biology units of study.

#### Textbooks

Knox R B et al. *Biology, An Australian Focus*. 4th ed. McGraw-Hill. 2010.

### BIOL1902

#### Living Systems (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Dr William Figueira **Session:** Semester 2 **Classes:** Two 1-hour lectures and one 2.5-hour practical per week and tutorials every few weeks. **Prerequisites:** Distinction or better in the BIOL1001 or BIOL1911 or BIOL1991 or BIOL1003 or BIOL1903 or BIOL1993, OR HSC Biology equal to 90 or greater **Prohibitions:** BIOL1500, BIOL1002; BIOL1992, BIOL1904, BIOL1905 **Assessment:** One 2-hour exam, assignments, quizzes, independent project (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit of study has the same overall structure as BIOL1002 but material is discussed in greater detail and at a more advanced level. Students enrolled in BIOL1902 participate in alternative components, which include a separate lecture and practical stream from BIOL1001 as well as a field trip to collect data for projects. The content and nature of these components may vary from year to year.

#### Textbooks

As for BIOL1002.

### 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 9 weeks. **Prohibitions:** CHEM1906, CHEM1909, CHEM1901, CHEM1101, CHEM1905, CHEM1109, CHEM1903 **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 (60%), laboratory work (15%), online assignments (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### 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 9 weeks. **Prohibitions:** CHEM1905, CHEM1906, CHEM1903, CHEM1001, CHEM1909, CHEM1109, CHEM1901 **Assumed knowledge:** HSC Chemistry and Mathematics **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. Chemistry 1A covers chemical theory and physical chemistry. Lectures: A series of 39 lectures, three per week throughout the semester.

#### Textbooks

A booklist is available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### CHEM1901 Chemistry 1A (Advanced)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1-hour lectures and one 1-hour tutorial per week; one 3-hour practical per week for 9 weeks. **Prerequisites:** HSC Chemistry result of 80 or more **Prohibitions:** CHEM1109, CHEM1001, CHEM1101, CHEM1905, CHEM1903, CHEM1909, CHEM1906 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### 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 9 weeks. **Prerequisites:** CHEM1001 or CHEM1101 or equivalent **Prohibitions:** CHEM1102, CHEM1902, CHEM1907, CHEM1904, CHEM1108, CHEM1908 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Practical field work:** A series of 9 three-hour laboratory sessions, one per week for 9 weeks of the semester. **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### 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 9 weeks. **Prerequisites:** CHEM1101 or CHEM1901 or a Distinction in CHEM1001 or equivalent **Prohibitions:** CHEM1904, CHEM1907, CHEM1902, CHEM1108, CHEM1908, CHEM1002 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Chemistry 1B is built on a satisfactory prior knowledge of Chemistry 1A and covers inorganic and organic chemistry. Successful completion of Chemistry 1B is an acceptable prerequisite for entry into Intermediate Chemistry units of study. Lectures: A series of 39 lectures, three per week throughout the semester.

#### Textbooks

A booklist is available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### 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 9 weeks. **Prerequisites:** CHEM1901 or CHEM1903 or Distinction in CHEM1101 or equivalent **Prohibitions:** CHEM1102, CHEM1904, CHEM1002, CHEM1908, CHEM1907, CHEM1108 **Assessment:** Theory examination (60%), laboratory work (15%), online assignment (10%) and continuous assessment quizzes (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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. Successful completion of 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 available from the First Year Chemistry website. <http://sydney.edu.au/science/chemistry/firstyear>

### CLAW1001 Foundations of Business Law

**Credit points:** 6 **Teacher/Coordinator:** Mr Giuseppe Carabetta **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Assessment:** Mid-Semester exam (20%), Case Analysis Assignment (20%), Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. Every decision in business, and every transaction and relationship, is made in the context of this legal regime. The aim of Foundations of Business Law is to introduce the students to the legal framework and regulatory systems which underlie all business activity and to expose them to the legal implications of commercial conduct. This unit of study introduces the Australian legal system and key areas of substantive business law including contracts, torts (in particular negligence and privacy), property and securities, white collar crime, intellectual property, competition and consumer law (in particular advertising, product liability and unfair contracts), business structures and operations, misleading and unconscionable conduct and dispute resolution.

### ECMT1010 Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference.

Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

### GEOS1001

#### Earth, Environment and Society

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Jody Webster, A/Prof Bill Pritchard, Prof Jonathan Aitchison, Dr Josephine Gillespie **Session:** Semester 1 **Classes:** One 2 hour lecture and one 2 hour practical per week. **Prohibitions:** ENSY1001, GEOS1901, GEOL1001, GEOG1001, GEOG1002, GEOL1002, GEOL1902 **Assessment:** Exam (50%), 1500 word essay (20%), practical reports (15%), presentation (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is the gateway unit of study for Human Geography, Physical Geography, Environmental Studies and Geology. Its objective is to introduce the big questions relating to the origins and current state of the planet: climate change, environment, landscape formation, and the growth of the human population. During the semester you will be introduced to knowledge, theories and debates about how the world's physical and human systems operate. The first module investigates the system of global environmental change, specifically addressing climate variability and human impacts on the natural environment. The second module presents Earth as an evolving and dynamic planet, investigating how changes take place, the rate at which they occur and how they have the potential to dramatically affect the way we live. Finally, the third module, focuses on human-induced challenges to Earth's future. This part of the unit critically analyses the relationships between people and their environments, with central consideration to debates on population change, resource use and the policy contexts of climate change mitigation and adaptation.

### GEOS1002

#### Introductory Geography

**Credit points:** 6 **Teacher/Coordinator:** Dr Kurt Iveson, Dr Dan Penny. **Session:** Semester 2 **Classes:** One 2 hour lecture per week and eight 2 hour practicals during semester. **Prohibitions:** GEOG1001, GEOS1902, GEOG1002 **Assessment:** One 2 hour exam, one 2000 word essay, two online quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides a geographical perspective on the ways in which people interact with each other and the physical world, focussing on the processes that generate spatial variation and difference. This unit will consider the development and characteristics of natural environments across the globe, and will explore how these environments both constrain, and are influenced by, humans. Therefore, the unit of study will consider the biophysical, political, economic, cultural and urban geographies that shape contemporary global society. Each of these themes will be discussed with reference to key examples (such as Hurricane Katrina, the Earthquake in Haiti/Dominican Republic, the conflict in Darfur, and mega-deltas in the developing world), in order to consider the ways in which the various processes (both physical and human) interact. 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:** A/Prof Tom Hubble, Prof Geoff Clarke **Session:** Semester 2, Summer Late **Classes:** Three 1 hour lectures and one 3 hour practical per week. **Prohibitions:** GEOS1903, GEOL1501, GEOL1002, GEOL1902 **Assessment:** One 2 hour exam, quizzes, tests, practical reports, field report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this unit of study is to examine the chemical and physical processes involved in mineral formation, the interior of the Earth, surface features, sedimentary environments, volcanoes, and metamorphism. Lectures and laboratory sessions on mountain building processes and the formation of mineral deposits will lead to an understanding of the forces controlling the geology of our planet. Processes such as weathering, erosion and nature of sedimentary environments are related to the origin of the Australian landscape. In addition to laboratory classes there is a one-day excursion to the

western Blue Mountains and Lithgow to examine geological objects in their setting.

#### Textbooks

The recommended text is Stephen Marshak, Earth: Portrait of a Planet. W. W. Norton & Company (2007) - Paperback - 832 pages - ISBN 039393036X

### GOVT1101

#### Australian Politics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** 1x1800wd Essay (40%), 1x450wd Critical Research Exercise (10%), 1x2hr Examination (40%), Tutorial participation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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?

### GOVT1202

#### World Politics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week or equivalent intensive **Assessment:** 1x450wd Case Essay (10%), 1x1600wd Essay (35%), 1x2hr Examination (40%), Tutorial participation (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day  
*Note: In Summer School this unit is available to current HSC students only.*

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.

### PSYC1001

#### Psychology 1001

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **Session:** Semester 1, Summer Main **Classes:** Three 1 hour lectures and one 1 hour tutorial per week, plus 1 hour per week of additional web-based (self-paced) material related to the tutorial. **Assessment:** One 2.5hr exam, one 1000w essay, multiple tutorial tests, experimental participation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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: science and statistics in psychology; behavioural neuroscience; applied psychology; social psychology; personality theory; human development.

This unit is also offered in the Sydney Summer School. For more information consult the website:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

#### Textbooks

Course Coordinator will advise

### PSYC1002

#### Psychology 1002

**Credit points:** 6 **Teacher/Coordinator:** Dr Caleb Owens **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 (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Psychology 1002 is a further general introduction to the main topics and methods of psychology, and it is the basis for advanced work as well as being of use to those not proceeding with the subject. Psychology 1002 covers the following areas: human mental abilities; learning, motivation and emotion; visual perception; cognitive processes; abnormal psychology.

This unit is also offered in the Sydney Summer School. For more information consult the web site:

[http://sydney.edu.au/summer\\_school/](http://sydney.edu.au/summer_school/)

*Textbooks*

Course Coordinator will advise

Modern Language (Level 1 or higher) units, with the approval of the Dean FAE.

*Notes:*

1. Students may count no more than 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/ACCT1005 and ACCT1003 are mutually exclusive.
3. Entry to ACCT1001/ACCT1005 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

Units of study in the following discipline areas (level 2000 or level 3000 unless otherwise specified):

Agricultural Economics (level 3000), Biology (including plant science units), Commercial Law, Econometrics, Economics, Environmental Science, Finance, Geography, Geology, Government, Mathematics (including Statistics), Psychology, Soil Science

1. *Notes:*

AGEC2102 is permitted for Year 2 only.

Prerequisites and/or corequisites apply for most units.

<i>Unit of study</i>	<i>Credit points</i>	<i>Session</i>
<b>BIOL1001</b> Concepts in Biology	6	Semester 1 Summer Main
<b>BIOL1002</b> Living Systems	6	Semester 2
<b>BIOL1902</b> Living Systems (Advanced)	6	Semester 2
<b>CHEM1001</b> Fundamentals of Chemistry 1A	6	Semester 1
<b>CHEM1101</b> Chemistry 1A	6	Semester 1 Semester 2 Summer Main
<b>CHEM1901</b> Chemistry 1A (Advanced)	6	Semester 1
<b>CHEM1002</b> Fundamentals of Chemistry 1B	6	Semester 2
<b>CHEM1102</b> Chemistry 1B	6	Semester 1 Semester 2 Summer Main
<b>CHEM1902</b> Chemistry 1B (Advanced)	6	Semester 2
<b>CLAW1001</b> Foundations of Business Law	6	Semester 1 Semester 2
<b>ECMT1010</b> Introduction to Economic Statistics	6	Semester 1 Semester 2
<b>GEOS1001</b> Earth, Environment and Society	6	Semester 1
<b>GEOS1002</b> Introductory Geography	6	Semester 2
<b>GEOS1003</b> Introduction to Geology	6	Semester 2 Summer Late
<b>GOVT1101</b> Australian Politics	6	Semester 1
<b>GOVT1202</b> World Politics	6	Semester 1 Semester 2 Summer Main
<b>PSYC1001</b> Psychology 1001	6	Semester 1 Summer Main
<b>PSYC1002</b> Psychology 1002	6	Semester 2 Summer Main

### 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 University of Sydney Business School and the Faculty of Science can be found in the respective faculty handbooks.

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

*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.

## Resource Economics Major

### Junior (Level 1) units

#### AGEC1102

#### Agricultural and Resource Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 3x1-hr lectures/week, 1x1-hr tutorial/week commencing week 2 **Prohibitions:** AGEC1002 **Assumed knowledge:** HSC Mathematics or HSC Mathematics Extension 1 **Assessment:** 1x1hr exam (25%), 1 x assignment (15%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit applies the principles studied in introductory microeconomics to the agricultural and resource sectors. Some descriptive content regarding Australia's agricultural markets, natural resource assets and industries is included. The first part of the unit is focused on basic concepts of supply, demand, equilibrium in agricultural and resource markets, and how markets can be modeled mathematically. Subsequent parts of the unit are focused on introductory production economics and natural resource management (under conditions of market failure, and as dynamic processes). Sources of risk in agriculture and resource markets, alternative management strategies, and basic techniques of decision making in the face of risk are explored.

Two of:

#### MATH1001

#### Differential Calculus

**Credit points:** 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

and

### 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 or MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

or

### 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 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

MATH1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various techniques of integration are considered, such as integration by parts. The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

*Textbooks*

As set out in the Junior Mathematics Handbook

and

### MATH1005

#### Statistics

**Credit points:** 3 **Session:** Semester 2, Summer Main, Winter Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

or

### ECMT1010

#### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012,

ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

or

### ECMT1020

#### Introduction to Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 2x1hr lectures/week, 1x2hr workshop/week **Prerequisites:** ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 **Assessment:** 3x quizzes (25%), workshop questions/homework (10%), assignment (15%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 is intended to be an introduction to the classical linear regression model (CLRM), the underlying assumptions, and the problem of estimation. Further, we consider hypothesis testing, and interval estimation, and regressions with dummy variables and limited dependent variable models. Finally, we consider different functional forms of the regression model and the problem of heteroskedasticity. Throughout we will try to emphasise the essential interplay between econometric theory and economic applications.

### Level 2 and 3 units

### AGEC2103

#### Production Economics

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** 2x1-hr lectures/week, 1x2-hr tutorial/week commencing week 2 **Prerequisites:** ECON1001 or AGECE1006 or (AGEC1003 and AGECE1004) or RESEC1031 **Prohibitions:** AGECE2003 **Assessment:** 2 x assignments (40%) and 1x2hr exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on microeconomic principles studied in first year and applies them to the analysis of firms' decisions. Emphasis is put on the formalization of the firm's problem and in the use of duality. The topics include: production functions (single and multi-output); distance functions and their use in the measurement of productivity; the decomposition of productivity and productivity changes; production under risk; cost and profit functions.

N.B. Available to 2nd year students in the Faculty of Economics and Business

*Textbooks*

Collection of readings

or

### AREC2001

#### Econ of Biological Production Systems

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 2x1000wd Assignment (40%), 1x2hr Final Exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is concerned with the application of microeconomic principles to management decisions in agricultural, forest, and fisheries systems. The unit builds on the theoretical knowledge acquired in previous studies and introduces the methods of applied economic analysis through a range of topics including: production functions (single and multi-output), cost and profit functions; methods for the measurement of productivity; optimisation in biological production systems; and production under risk.

**AGEC3103****Applied Optimisation**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 1 **Classes:** (2x1hr lec & 1x2hr tut/lab session)/wk, commencing week 1 **Prerequisites:** (AGEC2001 or AGECE2101) and (AGEC2003 or AGECE2103) **Prohibitions:** AGECE3101, AGECE3001 **Assessment:** 1x2hr exam (70%) and 2 assignments (better done one (18%), other (12%)) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study deals with constrained optimization problems in which one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The main focus of the unit is on linear programming (LP) problems, viz. problems in which the objective function and the constraint functions are all linear, and the application of LP in agricultural and other planning contexts. Topics include graphical and mathematical representation of LP problems, solution methods, solution information, stability of optimal solutions, primal and dual formulations and parametric programming. After covering the essentials of LP and its extension to integer LP, the focus shifts to modelling real world scenarios as optimization problems. Students are streamed: one group deals with specialized LP formulations (e.g. transportation model, stochastic programming). The other examines dynamic optimization for problems that involve inter-temporal resource allocation. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (e.g. LINDO).

or

**AREC3001****Production Modelling and Management**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGECE2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

**RSEC2031****Resource Economics**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Dr Shauna Phillips **Session:** Semester 2 **Classes:** 3x 1hr lectures/week, 1x1 hr tutorial/week commencing week 2. **Prohibitions:** RSEC1031, AGECE1031 **Assessment:** 1x 1hr mid semester exam (25%), 1x assignment (15%), 1 x 2 hr end of semester exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the unit Agricultural and Resource Economics. Particular concepts in economics are used to provide insights into efficient and sustainable resource management. The primary focus of this unit 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.

or

**AREC2003****Concepts in Enviro and Resource Economics**

**Credit points:** 6 **Session:** Semester 1 **Prerequisites:** ECON1001 or AGECE1006 or AGECE1102 **Assessment:** 1x50min Mid-semester Test (20%), 2x1000wd Assignments (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the concepts in microeconomics to provide insights into efficient and sustainable resource management. The primary

focus of this unit 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 introductory material on economic valuation of environmental assets and benefit cost analysis is included.

At least three elective units of study from the Year 4 level units.

## Non-Resource Economics majors

### Biology

Departmental permission is required to undertake this major.

#### Junior (Level 1) units

Two BIOL1000 units

#### Level 2 and 3 units

Two BIOL2000 units Four BIOL3000 units See the Faculty of Science handbook at [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

### Chemistry

Departmental Permission is required to undertake this major.

#### Junior (Level 1) units

Two CHEM1000 units 12 credit points of junior maths:

#### MATH1001

##### Differential Calculus

**Credit points:** 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 or MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day



MATH1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various techniques of integration are considered, such as integration by parts. The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

*Textbooks*

As set out in the Junior Mathematics Handbook

and

### MATH1005 Statistics

**Credit points:** 3 **Session:** Semester 2, Summer Main, Winter Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

### Level 2 and 3 units

24 credit points from senior units of study listed in this subject area, which must include the associated laboratory units as per the Faculty of Science Handbook. See the Faculty of Science handbook at [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

## Commercial Law

### Junior (Level 1) units

#### CLAW1001

##### Foundations of Business Law

**Credit points:** 6 **Teacher/Coordinator:** Mr Giuseppe Carabetta **Session:** Semester 1, Semester 2 **Classes:** Two hours of lectures and a one hour tutorial per week **Assessment:** Mid-Semester exam (20%), Case Analysis Assignment (20%), Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. Every decision in business, and every transaction and relationship, is made in the context of this legal regime. The aim of Foundations of Business Law is to introduce the students to the legal framework and regulatory systems which underlie all business activity and to expose them to the legal implications of commercial conduct. This unit of study introduces the Australian legal system and key areas of substantive business law including contracts, torts (in particular negligence and privacy), property and securities, white collar crime, intellectual property, competition and consumer law (in particular advertising, product liability and unfair contracts), business structures and operations, misleading and unconscionable conduct and dispute resolution.

### Level 2 and 3 units

A minimum of six CLAW2000 or 3000 units. See the Business School handbook at [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

## Econometrics

### Junior (Level 1) units

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

#### ECMT1020

##### Introduction to Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 2x1hr lectures/week, 1x2hr workshop/week **Prerequisites:** ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 **Assessment:** 3x quizzes (25%), workshop questions/homework (10%), assignment (15%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 is intended to be an introduction to the classical linear regression model (CLRM), the underlying assumptions, and the problem of estimation. Further, we consider hypothesis testing, and interval estimation, and regressions with dummy variables and limited dependent variable models. Finally, we consider different functional forms of the regression model and the problem of heteroskedasticity. Throughout we will try to emphasise the essential interplay between econometric theory and economic applications.

### Compulsory senior units

#### ECMT2150

##### Cross Section Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

#### ECMT2160

##### Time Series Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2150 or ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on time series techniques and more advanced econometrics methods (e.g. MLE, GMM, model specification analysis). This unit starts with a review of probability and statistics and cross sectional methods, followed by advanced methodologies that are useful for analysing time series data. The unit is ended with a selected list of special topics. The lectures and assessments will be application-oriented. Computer software (e.g., Stata, SAS, R) will be used throughout the unit.

## Level 2 and 3 units

### ECMT2150

#### Cross Section Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** (ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) AND ECMT1020 **Prohibitions:** ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will provide an introduction to the key issues involved in with the econometrics of cross-section and panel data. The topics this unit will cover include: instrumental variables; estimating systems by OLS and GLS; simultaneous equation models; discrete-choice models; treatment effects; and sample selection. Throughout the unit, emphasis will be placed on economic applications of the models. The unit will utilise practical computer applications, where appropriate.

### ECMT2160

#### Time Series Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2150 or ECMT2110 **Assessment:** 4x250wd Individual Assignments (20%), 1x1hr Mid-semester Test (30%), 1x2hr Final Exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit focuses on time series techniques and more advanced econometrics methods (e.g. MLE, GMM, model specification analysis). This unit starts with a review of probability and statistics and cross sectional methods, followed by advanced methodologies that are useful for analysing time series data. The unit is ended with a selected list of special topics. The lectures and assessments will be application-oriented. Computer software (e.g., Stata, SAS, R) will be used throughout the unit.

Four senior elective units of study (24 credit points) selected from the following options with a maximum of three at the 3000 level:

### ECMT2130

#### Financial Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT2110 or ECMT2010 or ECMT1020 **Prohibitions:** ECMT2030 **Assessment:** 2x assignments (2x20%) and 1x2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Over the last decade econometric modelling of financial data has become an important part of the operations of merchant banks and major trading houses and a vibrant area of employment for econometricians. This unit provides an introduction to some of the widely used econometric models for financial data and the procedures used to estimate them. Special emphasis is placed upon empirical work and applied analysis of real market data. Topics covered may include the statistical characteristics of financial data, the specification, estimation and testing of asset pricing models, the analysis of high frequency financial data, and the modelling of volatility in financial returns.

### ECMT3120

#### Applied Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECMT3110 or ECMT3010 or (ECMT2150 and ECMT2160) **Prohibitions:** ECMT3020 **Assessment:** group project (25%), Mid-semester test (25%), 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Econometric theory provides techniques to quantify the strength and form of relationships between variables. Applied Econometrics is concerned with the appropriate use of these techniques in practical applications in economics and business. General principles for undertaking applied work are discussed and necessary research skills developed. In particular, the links between econometric models and the underlying substantive knowledge or theory for the application are stressed. Topics will include error correction models, unit roots and cointegration and models for cross section data, including limited dependent variables. Research papers involving empirical research

are studied and the unit features all students participating in a group project involving econometric modelling.

### ECMT3130

#### Forecasting for Economics and Business

**Credit points:** 6 **Session:** Semester 2 **Classes:** 2x1hr lectures/week, 1x1hr lab/week **Prerequisites:** ECMT2110 or ECMT2010 or (ECMT2150 and ECMT2160) **Prohibitions:** ECMT3030 **Assessment:** assignment (20%), group assignment (25%), Mid-semester test (20%) and 2.5hr Final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The need to forecast or predict future values of economic time series arises frequently in many branches of applied economic and commercial work. It is, moreover, a topic which lends itself naturally to econometric and statistical treatment. The specific feature which distinguishes time series from other data is that the order in which the sample is recorded is of relevance. As a result of this, a substantial body of statistical methodology has developed. This unit provides an introduction to methods of time series analysis and forecasting. The material covered is primarily time domain methods designed for a single series and includes the building of linear time series models, the theory and practice of univariate forecasting and the use of regression methods for forecasting. Throughout the unit a balance between theory and practical application is maintained.

### ECMT3150

#### The Econometrics of Financial Markets

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr lab/week **Prerequisites:** ((ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015) and (ECMT2110 or ECMT2010) and (ECMT2130 or ECMT2030)) or (ECMT2130 and ECMT2150 and ECMT2160) **Prohibitions:** ECMT3050 **Assessment:** assignment (20%), group assignment (30%), Mid-semester test (15%) and 2.5hr Final exam (35%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit studies and develops the econometric models and methods employed for the analysis of data arising in financial markets. It extends and complements the material covered in ECMT2130. The unit will cover econometric models that have proven useful for the analysis of both synchronous and non-synchronous financial time series data over the last two decades. Modern Statistical methodology will be introduced for the estimation of such models. The econometric models and associated methods of estimation will be applied to the analysis of a number of financial datasets. Students will be encouraged to undertake hands-on analysis using an appropriate computing package. Topics covered include: Discrete time financial time series models for asset returns; modelling and forecasting conditional volatility; Value at Risk and modern market risk measurement and management; modelling of high frequency and/or non-synchronous financial data and the econometrics of market microstructure issues. The focus of the unit will be in the econometric models and methods that have been developed recently in the area of financial econometrics and their application to modelling and forecasting market risk measures.

### ECMT3170

#### Computational Econometrics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 2x1hr lecture/week, 1x1hr computer laboratory/week **Prerequisites:** ECMT2160 or ECMT2110 **Assessment:** 1x2hr Final Exam (50%), 1x1500wd Computer Project (30%), 2x500wd Computer Assignment (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to modern computationally intensive algorithms, their implementation and application for carrying out statistical inference on econometric models. Students will learn modern programming techniques such as Monte Carlo simulation and parallel computing to solve econometric problems. The computational methods of inference include Bayesian approach, bootstrapping and other iterative algorithms for estimation of parameters in complex econometric models. Meanwhile, students will be able to acquire at least one statistical programming language.

ECMT3160 and ECMT3170 are not offered in 2014. A minimum of three further ECMT2000 and ECMT3000 units. See the Faculty of Arts and Social Sciences handbook [sydney.edu.au/handbooks/arts](http://sydney.edu.au/handbooks/arts)

## Economics

### Junior (Level 1) units

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

#### ECMT1020

##### Introduction to Econometrics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 2x1hr lectures/week, 1x2hr workshop/week **Prerequisites:** ECMT1010 or ECOF1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECMT1001, ECMT1002, ECMT1003, ECMT1021, ECMT1022, ECMT1023 **Assessment:** 3x quizzes (25%), workshop questions/homework (10%), assignment (15%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*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 is intended to be an introduction to the classical linear regression model (CLRM), the underlying assumptions, and the problem of estimation. Further, we consider hypothesis testing, and interval estimation, and regressions with dummy variables and limited dependent variable models. Finally, we consider different functional forms of the regression model and the problem of heteroskedasticity. Throughout we will try to emphasise the essential interplay between econometric theory and economic applications.

#### ECON1001

##### Introductory Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prohibitions:** BUSS1040 **Assessment:** online quizzes (10%), 1xMid-semester test (30%), 1xEssay (10%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

#### ECON1002

##### Introductory Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** Tutorial participation (5%), 5x online quizzes (10%), Mid-semester test (25%), Essay (10%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 and an alternative core unit for the Bachelor of Economic and Social Sciences. 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### Level 2 and 3 units

#### ECOS2001

##### Intermediate Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1001 or BUSS1040 **Corequisites:** ECMT1010 or BUSS1020 or MATH1905 or MATH1005 or MATH1015 **Prohibitions:** ECON2001, ECOS2901, ECON2901 **Assessment:** Tutorial participation (10%), 2x in-class tests (40%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

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:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** ECON1002 **Corequisites:** ECMT1020 **Prohibitions:** ECON2002, ECOS2902, ECON2902 **Assessment:** Mid-semester test (30%), assignments (20%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the School of Economics Undergraduate Coordinator.*

This unit of study develops models of the goods, money and labour markets, and 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.

Any four further ECOS2000 or ECOS3000 units, of which at least three must be at the 3000 level. See the Faculty of Arts and Social Sciences handbook [sydney.edu.au/handbooks/arts](http://sydney.edu.au/handbooks/arts)

## Finance

### Junior (Level 1) units

Any one junior unit of study (six credit points) from the University of Sydney Business School.

#### ECMT1010

##### Introduction to Economic Statistics

**Credit points:** 6 **Session:** Semester 1, Semester 2 **Classes:** 1x2hr lecture/week, 1x2hr workshop/week **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021, ECOF1010, BUSS1020, ENVX1001 **Assessment:** homework (15%), quizzes (30%), assignment (15%) and 1x2hr Final exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit emphasises understanding the use of computing technology for data description and statistical inference. Both classical and modern statistical techniques such as bootstrapping will be introduced. Students will develop an appreciation for both the usefulness and limitations of modern and classical theories in statistical inference. Computer software (e.g., Excel, StatKey) will be used for analysing real datasets.

### ECON1001

#### Introductory Microeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prohibitions:** BUSS1040 **Assessment:** online quizzes (10%), 1xMid-semester test (30%), 1xEssay (10%) and 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### ECON1002

#### Introductory Macroeconomics

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Assessment:** Tutorial participation (5%), 5x online quizzes (10%), Mid-semester test (25%), Essay (10%) and 2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 and an alternative core unit for the Bachelor of Economic and Social Sciences. 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. It is assumed that students undertaking this unit will have a prior knowledge of mathematics.

### Level 2 and 3 units

#### FINC2011

##### Corporate Finance I

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early, Winter Main **Classes:** 1 x 2hr lecture and 1 x 1hr tutorial per week **Prohibitions:** FINC2001 **Assumed knowledge:** ECMT1010 or BUSS1020, BUSS1040 or (ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) **Assessment:** Mid-semester exam (20%), major assignment (30%) and final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Note: Study in Finance commences in second year. BUSS1020 (or ECMT1010), BUSS1040 (or ECON1001 and ECON1002) and BUSS1030 (or ACCT1001 and ACCT1002) are recommended for all students wanting to study Finance.*

This unit provides an introduction to basic concepts in corporate finance and their application to (1) valuation of risky assets including stocks, bonds and entire corporations, (2) pricing of equity securities, and (3) corporate financial policy decisions including dividend, capital structure and risk management policies. Emphasis is placed on the application of the material studied and current practices in each of the topic areas.

#### FINC2012

##### Corporate Finance II

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x 2hr lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 or FINC2001 **Prohibitions:** FINC2002 **Assessment:** Mid-semester exam (15%), essay (20%), and final exam (65%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on FINC2011 Corporate Finance I, by extending basic concepts in corporate financing, investing and risk management. The unit presents current theories of corporate financing and their practical application in corporate investment and capital budgeting. The unit also examines securities and securities markets with an emphasis on pricing, investment characteristics and their use by corporations to manage risk. The securities examined include: bonds and related fixed income products; futures and options. The goal of the unit is to broaden students' knowledge of corporate finance in preparation for further study in finance in 300 level courses.

#### FINC3017

##### Investments and Portfolio Management

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Early **Classes:** 1x 2h lecture and 1x 1hr tutorial per week **Prerequisites:** FINC2011 **Prohibitions:** FINC3007 **Assessment:** 2 x reports (15% each), essay (15%) and final exam (55%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Students who achieved less than a credit in FINC2011 are advised not to attempt FINC3017 until they have completed FINC2012.*

This unit is designed to provide a comprehensive analytical approach to the modern theory of investments. Topics covered include: mean-variance analysis; Markowitz type portfolio analysis; portfolio construction; asset pricing theories; market efficiency and anomalies; hedge funds and investment fund performance evaluation. Although analytical aspects of investments theory are stressed, there is also an equal amount of coverage on the practical aspects of portfolio management. Current research on investments is emphasised in the course.

A minimum of three (18 credit points) further FINC3000 level units See the Business School handbook [sydney.edu.au/handbooks/business\\_school](http://sydney.edu.au/handbooks/business_school)

### Geography

#### Junior (Level 1) units and Level 2 units

Some junior elective and intermediate GEOG/GEOS units may be required to meet the prerequisites of Level 3 units for this major.

#### Level 3 units

24 CP made up of:

#### GEOS3333

##### Geographical Concepts, Skills & Methods

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Bill Pritchard, Dr Dan Penny **Session:** Semester 2 **Classes:** 1 lecture, 2 tutorials per week **Prerequisites:** Assumed Knowledge: Basic knowledge of ARC GIS software. **Prohibitions:** GEOS3933 **Assessment:** One 2hr exam, one practical report, one 2000w fieldwork report (100%) **Practical field work:** 24 hours of fieldwork per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3333 is designed to be the 'capstone' for a Major in Geography. Its aim is to bring together the core concepts within the discipline; connect these to methodological practices, and further develop the field-based skills associated with geographical research. Reflecting the straddle of the discipline across the natural and social sciences, this unit draws on a wide diversity of material to impart key insights about the essential qualities of 'doing Geography'. This includes (i) a weekly lecture program which addresses three thematic concerns of Geography (human-environment interactions; spatial relations; and politics, policy and practice) using examples from the natural and social science perspectives at global, national and local scales; (ii) a two-hour prac class each week which introduces key methods (relevant to both the natural and social science parts of the discipline) and which leads to a major research proposal exercise; and (iii) 24 hours fieldwork through the semester, which can take the form either of a three-day

field trip to rural NSW or three separate day-trips within Sydney. GEOS3333 is one of two compulsory units for the Geography Major (the other is GEOS3053) and is highly recommended for students contemplating Honours in Geography.

or

### GEOS3933

#### Geog. Concepts, Skills & Methods (Adv)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Bill Pritchard, Dr Dan Penny  
**Session:** Semester 2 **Classes:** 1 lecture, 2 tutorials per week **Prerequisites:** Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002. **Prohibitions:** GEOS3333 **Assessment:** One 2hr exam, one practical report, one 2000w fieldwork report (100%) **Practical field work:** 24 hours of fieldwork per semester **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3933 has the same thematic content as GEOS3333 however with elements taught at an Advanced level.

### GEOS3053

#### Southeast Asia Field School

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Intensive July **Classes:** Five pre-departure lectures during Semester 1 2015, three weeks in-country intensive involving lectures, fieldwork and field-based methods training, readings and small group discussions. **Prerequisites:** 6 credit points of Intermediate units of study in Geography. Department permission is required for enrolment. **Prohibitions:** GEOS3953, GEOG3201 **Assessment:** One pre-departure background report, one short field essay, group participation, one consolidation report, one exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than September in the year before taking this unit.*

The unit of study can be taken only with prior permission from the unit of study coordinator. It constitutes a Field School run over a three-week period in July, prior to the commencement of the second semester. In 2015 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (three of the Mekong countries China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on three main themes; rural social, environmental and economic change; regional economic integration and its local effects; regional environmental change and natural resources governance. The Field School is run in close association with local universities, whose staff and students participate in some components of the course. Places are limited, and students interested in the 2014 Field School should indicate expression of interest to Dr Jeff Neilson by 26th September 2014.

or

### GEOS3953

#### Southeast Asia Field School (Adv)

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Intensive July **Classes:** Five pre-departure lectures during Semester 1 2014, three weeks in-country intensive involving lectures, fieldwork and field-based methods training, readings and small group discussions. **Prerequisites:** 6 credit points of Intermediate units of study in Geography. Department permission required for enrolment. **Prohibitions:** GEOS3053 **Assessment:** One pre-departure project proposal, one short field essay, group participation, one field-based research report, one exam. **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: Students must contact the unit coordinator no later than September in the year before taking this unit.*

The unit of study can be taken only with prior permission from the unit of study coordinator. It constitutes a Field School run over a three-week period in July, prior to the commencement of the second semester. In 2015 the Field School will be held in Indonesia (Java, Sulawesi and Bali). In other years it may be held in mainland Southeast Asia (three of the Mekong countries China, Thailand, Laos, Cambodia and Viet Nam). The Field School focuses on three main themes; rural social, environmental and economic change; regional economic integration and its local effects; regional environmental change and natural resources governance. The Field School is run in close association with local universities, whose staff and students participate in some

components of the course. Places are limited, and students interested in the 2014 Field School should indicate expression of interest to Dr Jeff Neilson by 26th September 2014.

Plus any of the following units:

### GEOS3101

#### Earth's Structure and Evolution

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Patrice Rey, Prof Geoff Clarke  
**Session:** Semester 1 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week, and a 3-day excursion. **Prerequisites:** (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School **Prohibitions:** GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003 **Assumed knowledge:** GEOS2114, GEOS2124 **Assessment:** One 2 hour exam, practical and field reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Earth's crust and upper mantle, or lithosphere, are a consequence of dynamic and thermal processes operating since the beginning of the Archaean. This unit focuses on information and techniques that enable an understanding of these processes. The main topics presented in this unit include: the formation and evolution of oceanic and continental lithosphere; tectonic deformation, magmatism and metamorphism at plate boundaries; and the mesoscopic and microscopic analysis of igneous and metamorphic rocks. Practical classes and field exercises are designed to enable students to competently and independently identify the common crystalline rocks in hand-specimen; and to gather and interpret the structural field data which enables the determination of the structural style and deformational history presented in particular tectonic settings. The concepts and content presented in this unit are generally considered to be essential knowledge for geologists and geophysicists and provide a conceptual framework for their professional practice. Students wishing to specialise in the field and become professional geologists will normally need to expand upon the knowledge gained from this unit and either complete an honours project or progress to postgraduate coursework in this field.

or

### ENVI3111

#### Environmental Law and Ethics

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** 12 credit points of intermediate units of study **Prohibitions:** ENVI3911 **Assessment:** Exam (40%) Essays (40%, 20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Shared Teaching Arrangements: This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). Environmental regulation and governance plays an important role in regulating human impacts on the environment. The law and governance part of this unit provides an introduction and overview to environmental regulation. We investigate key environmental issues through an examination of legal policies, legislation and case law at a variety of scales (international, national and state/local). This unit also highlights the ways in which environmental law and governance is increasingly interconnected to other areas of environmental studies. 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.

or

**ENVI3911****Environmental Law and Ethics (Advanced)**

**Credit points:** 6 **Teacher/Coordinator:** Dr Josephine Gillespie **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** Distinction average across 12 credit points of intermediate units of study **Prohibitions:** ENVI3111 **Assessment:** Fieldwork component (40%), essay (20%) and exam (40%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

Shared Teaching Arrangements: This unit of study is co-taught by the School of Geosciences (75%) and the Unit for the History and Philosophy of Science (25%). The unit is divided into two parts: (1) environmental law and governance (weeks 1-9) and (2) environmental ethics (weeks 10-13). This advanced unit of study will cover the same core lecture material as for ENVI3111, but students will be required to carry out more challenging practical assignments based on a fieldtrip activity. The fieldwork will take the form of a Land and Environment Court visit and students will be required to provide a report on environmental decision making as part of this assessment.

**ENVI3112****Environmental Assessment**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus **Session:** Semester 2 **Classes:** One 2-hour lecture per week and one 2-hour tutorial per week. **Prerequisites:** (GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units **Prohibitions:** ENVI3912, ENVI3004, ENVI3002 **Assessment:** Literature review, individual report, presentation (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study focuses on environmental impact assessment as part of environmental planning. It seeks to establish a critical understanding of environmental planning and the tools available to improve environmental outcomes. The unit of study addresses the theory and practice of environmental impact statements (EIS) and environmental impact assessment processes (EIA) from scientific, economic, social and cultural value perspectives. Emphasis is placed on gaining skills in group work and 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.

or

**ENVI3912****Environmental Assessment (Advanced)**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus **Session:** Semester 2 **Classes:** One 2-hour lecture per week and one 2-hour tutorial per week. **Prerequisites:** Distinction average in ((GEOS2121 or GEOS2921) and 6 additional credit points of intermediate units) **Prohibitions:** ENVI3112, ENVI3004, ENVI3002 **Assessment:** Essay, individual report, presentation (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This advanced unit of study will cover the same core lecture, tutorial and group practical material as for ENVI3112. The difference in the Advanced unit of study is that students will be required to write a 3000-word essay that is worth 40% of their semester marks, rather than writing a literature review. The essay will explore the more theoretical and conceptual debates within impact assessment.

**GEOS3520****Urban Citizenship & Sustainability**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus, Dr Kurt Iveson **Session:** Semester 1 **Classes:** 2 hour lecture and 1 hour tutorial per week, six 2 hours practical sessions. **Prerequisites:** 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOILS2002, LWSC2002 **Prohibitions:** GEOS3920 **Assessment:** One 2hr exam, one 2000w essay, one 2000w group-based prac report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Cities are now the predominant home for humanity. More than half of the world's population reside in cities. The contemporary growth of cities, however, is attached to profound political questions about what it means to be urban, and what 'being urban' means for the planet. This Unit of Study provides grounding to these crucial questions. In the first half of the semester, lectures address the question: are cities sustainable? Why or why not? And for whom? This focus addresses

utopian visions for cities, urban history, ecological footprint analysis, bioregionalism, transport options, urban form and urban policy, with reference to sustainable futures and the role of custodianship. During the second half of the semester, lectures address the question: what does it mean to be a 'citizen', and what has this got to do with cities and different approaches to urban sustainability? This includes consideration of historical and contemporary configurations of citizenship. Case studies illustrate ways in which new forms of citizenship are produced through struggles over rights to the city and the urban environment. Through the semester a practicals program enables students to develop urban-based research projects.

or

**GEOS3920****Urban Citizenship & Sustainability (Adv)**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Phil McManus, Dr Kurt Iveson **Session:** Semester 1 **Classes:** 2 hour lecture and 2 hour tutorial per week **Prerequisites:** Distinction average in 24 credit points of Intermediate units of study including 6 credit points from one of the following units: GEOS2112, GEOS2912, GEOS2123, GEOS2923, GEOS2115, GEOS2915, GEOS2121, GEOS2921, SOIL2002, LWSC2002 **Prohibitions:** GEOS3520 **Assessment:** One 2hr exam, one 2000w essay, one 2000w group-based prac report. **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3920 has the same thematic content as GEOS3520 however with elements taught at an Advanced level

**GEOS3524****Global Development and Livelihoods**

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson, Dr Yayoi Lagerqvist **Session:** Semester 1 **Classes:** 2 lectures, 1 tutorial per week **Prerequisites:** 24 credit points of Intermediate units of study including 6 credit points of Intermediate Geoscience **Prohibitions:** GEOS2112, GEOS3924, GEOS2912 **Assessment:** One 2hr exam, one practical report, one 2000w essay, tutorial papers (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides students with grounding in core theories and frameworks used in Geography to account for the social, spatial and environmental unevenness in global development. During the first half of the semester, we focus on questions relating to who are the winners and losers from contemporary patterns of global economic change. This includes the analysis of relevant conceptual approaches to these questions (including comparative advantage, global value chain theory, regionalism, economic governance, development and post-development), plus 'hands-on' examination of the key institutions (such as the WTO and World Bank) and policy approaches that drive these changes. Then, in the second half of the semester, we adopt a livelihoods approach to assess these processes. In general, issues are tailored to themes being played out in Asia-Pacific countries. Students are expected to participate in a variety of practical class exercises throughout the semester. This unit provides a feeder-unit into the Asia-Pacific Field School.

or

**GEOS3924****Global Development and Livelihoods (Adv)**

**Credit points:** 6 **Teacher/Coordinator:** Dr Jeff Neilson **Session:** Semester 1 **Classes:** 2 lectures, 1 tutorial per week **Prerequisites:** 24 credit points of Intermediate units of study including a distinction in 6 credit points of Intermediate Geoscience **Prohibitions:** GEOS2912, GEOS2112, GEOS3524 **Assessment:** One 2hr exam, one practical report, one 2000w essay, tutorial papers (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

GEOS3924 has the same thematic content as GEOS3524 however with elements taught at an Advanced level.

**GEOS3009****Coastal Environments and Processes**

**Credit points:** 6 **Teacher/Coordinator:** Dr Jody Webster, Dr Ana Vila-Concejo **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 2 hour practical per week; weekend excursion. **Prerequisites:** (6 credit points of Intermediate Geoscience units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics or Mathematics or Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906)) **Prohibitions:** MARS3003, MARS3105, GEOS3909 **Assessment:** One 2 hour

exam, research reports and an online quiz (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of this course is to introduce students to a variety of Coastal Environments and the major physical and chemical processes which control the morphodynamic evolution of these systems. The course offers a unique opportunity of learning the full spectrum of marine sedimentary environments from siliciclastic, temperate, highly urbanised and impacted estuarine ecosystems to carbonate, tropical, pristine and undeveloped/protected coastal and continental margin environments. The course may include field work in temperate environments and at One Tree Island on the Great Barrier Reef (GBR). The two parts of the course comprise physical processes in siliciclastic (temperate) and carbonate-dominated (tropical) coastal and continental margin environments. The first part of the course covers basic coastal environments and processes in estuarine and open coast environments and focuses on the morphodynamics of those environments, a fieldtrip to an open beach within Sydney is envisaged where students will learn basic skills for beach monitoring. The second part of the course covers the basic morphodynamics and processes impacting carbonate-dominated coastal and continental margin environments. The focus is on carbonate reefal and margin systems and their geologic and biologic responses to past, present and future environmental changes. These systems may also be studied in the field at The University of Sydney One Tree Island Research Station in the GBR and in some practicals. Students who are unable to participate in the GBR field trip will be given an alternative assignment.

**Textbooks**

Recommended:  
Short, A D (ed) Beach and Shoreface Morphodynamics. John Wiley & Sons, Chichester. 1999.  
Course notes will be available from the Photocopy Centre and/or online.

or

**GEOS3909 Coastal Environments and Processes (Adv)**

**Credit points:** 6 **Teacher/Coordinator:** Dr Ana Vila Concejo **Session:** Semester 1 **Classes:** Three 1 hour lectures, two 3 hour practicals per week, fieldwork. **Prerequisites:** Distinction average in ((6 credit points of Intermediate Geoscience\* units) and (6 further credit points of Intermediate Geoscience or 6 credit points of Physics, Mathematics, Information Technology or Engineering units) or ((MARS2005 or MARS2905) and (MARS2006 or MARS2906))) **Prohibitions:** MARS3105, GEOS3009, MARS3003 **Assessment:** One 2 hour exam, two 1500 word reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: A distinction average in prior Geography or Geology units is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.*

Advanced students will complete the same core lecture material as for GEOS3009 but will carry out more challenging projects, practicals, assignments and tutorials.

**GEOS3014 GIS in Coastal Management**

**Credit points:** 6 **Teacher/Coordinator:** Dr Eleanor Bruce **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour practical per week. **Prerequisites:** Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. **Prohibitions:** MARS3104, GEOS3914 **Assessment:** One 2 hour exam, two project reports, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Coastal Management is about how scientific knowledge is used to support policy formulation and planning decisions in coastal environments. The course links coastal science to policy and practice in management of estuaries, beaches and the coastal ocean. The principles are exemplified through specific issues, such as coastal erosion, pollution, and impacts of climate-change. The issues are dealt with in terms of how things work in nature, and how the issues are handled through administrative mechanisms. These mechanisms involve planning strategies like Marine Protected Areas and setback limits on civil development in the coastal zone. The coastal environments and processes that are more relevant to coastal management including: rocky coasts; beaches, barriers and dunes;

and coral reefs will also be introduced. At a practical level, the link between science and coastal management is given substance through development and use of 'decision-support models'. These models involve geocomputing methods that entail application of simulation models, remotely sensed information, and Geographic Information Systems (GIS). The course therefore includes both principles and experience in use of these methods to address coastal-management issues. (It thus also involves extensive use of computers.) Although the focus is on the coast, the principles and methods have broader relevance to environmental management in particular, and to problem-solving in general. That is, the course has vocational relevance in examining how science can be exploited to the benefit of society and nature conservation.

or

**GEOS3914 GIS in Coastal Management (Advanced)**

**Credit points:** 6 **Teacher/Coordinator:** Dr Eleanor Bruce, Dr Ana Vila Concejo **Session:** Semester 2 **Classes:** Two hours of lectures, one 3 hour practical per week comprising one 1 hour practical demonstration and one 2 hour practical **Prerequisites:** Distinction average in either 12 credit points of Intermediate Geoscience units or [(GEOS2115 or GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. **Prohibitions:** GEOS3014, MARS3104 **Assessment:** One 2 hour exam, project work, two practical-based project reports, fortnightly progress quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment. Note: A distinction average in prior Geography, Geology or Marine Science units of study is normally required for admission. This requirement may be varied and students should consult the unit of study coordinator.*

Advanced students will complete the same core lecture material as for GEOS3014 but will carry out more challenging projects, practicals, assignments and tutorials.

Different pathways are available for this major. See the Faculty of Science handbook [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

**Geology and Geophysics**

**Junior (Level 1) units and Level 2 units**

Some junior elective and intermediate GEOS units may be required to meet the prerequisites of Level 3 units listed for this major

**Level 3 units**

Four units (24 credit points) of Senior Geology and Geophysics units of study, including:

**GEOS3008 Field Geology**

**Credit points:** 6 **Teacher/Coordinator:** Prof Geoffrey Clarke **Session:** Semester 2a **Classes:** (Weeks 1-7): 14 days of field work **Prerequisites:** GEOS2124 or GEOS2924 **Prohibitions:** GEOS3908 **Assessment:** The field work will be assessed by written reports (up to 10 pages in total), field exercises and practical tests (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is considered an essential component all Geology and Geophysics majors. All students will undertake a range of exercises, but concentrate on aspects that emphasise their chosen major: (1) field mapping and the analysis of geological objects in the field, in weakly to complexly deformed sedimentary and volcanic sequences; and (2) field investigations of mineral deposits and their relationships to host rocks. The field course complements other subject areas in Geology & Geophysics and will give students experience in the field identification of rocks and minerals, regional geology, stratigraphy, structure and rock relationships. Students will be required to pay the cost of hostel-style accommodation during field work, which may involve camping.

**GEOS3908 Field Geology (Adv)**

**Credit points:** 6 **Teacher/Coordinator:** Prof Geoffrey Clarke **Session:** Semester 2a **Classes:** 14 days of fieldwork. **Prerequisites:** GEOS2124 or GEOS2924 with a mark of 65% or greater **Prohibitions:** GEOS3008 **Assessment:** Written reports and field exercises (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

This unit has the same objectives as GEOS3008 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week prior to the field camp which is usually in the break between semester 1 and 2. This unit of study may be taken as part of the BSc (Advanced).

### GEOS3101

#### Earth's Structure and Evolution

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Patrice Rey, Prof Geoff Clarke  
**Session:** Semester 1 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week, and a 3-day excursion. **Prerequisites:** (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units of study and GEOS1003 or GEOS1903 with permission of the Head of School **Prohibitions:** GEOS3903, GEOS3904, GEOS3006, GEOS3017, GEOS3906, GEOS3917, GEOS3004, GEOS3801, GEOS3003 **Assumed knowledge:** GEOS2114, GEOS2124 **Assessment:** One 2 hour exam, practical and field reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The Earth's crust and upper mantle, or lithosphere, are a consequence of dynamic and thermal processes operating since the beginning of the Archaean. This unit focuses on information and techniques that enable an understanding of these processes. The main topics presented in this unit include: the formation and evolution of oceanic and continental lithosphere; tectonic deformation, magmatism and metamorphism at plate boundaries; and the mesoscopic and microscopic analysis of igneous and metamorphic rocks. Practical classes and field exercises are designed to enable students to competently and independently identify the common crystalline rocks in hand-specimen; and to gather and interpret the structural field data which enables the determination of the structural style and deformational history presented in particular tectonic settings. The concepts and content presented in this unit are generally considered to be essential knowledge for geologists and geophysicists and provide a conceptual framework for their professional practice. Students wishing to specialise in the field and become professional geologists will normally need to expand upon the knowledge gained from this unit and either complete an honours project or progress to postgraduate coursework in this field.

### GEOS3801

#### Earth's Structure and Evolutions (Adv)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Patrice Rey, Prof Geoff Clarke, Dr Nicolas Flament **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week. **Prerequisites:** Distinctions in (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School **Prohibitions:** GEOS3904, GEOS3917, GEOS3906, GEOS3006, GEOS3101, GEOS3017, GEOS3004, GEOS3003, GEOS3903 **Assumed knowledge:** GEOS2114, GEOS2124 **Assessment:** One 2 hour exam, practical and field reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit has the same objectives as GEOS3101 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

and at least two of:

### GEOS3102

#### Global Energy and Resources

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Derek Wyman, Prof Dietmar Müller **Session:** Semester 1 **Classes:** Two 1-hour lectures and one 2-hour tutorial/practicals per week. **Prerequisites:** (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); or 24 credit points of Intermediate Science units

of study and GEOS1003 and GEOS1903 with permission of the Head of School **Prohibitions:** GEOS3003, GEOS3904, GEOS3006, GEOS3017, GEOS3917, GEOS3004, GEOS3906, GEOS3802, GEOS3903 **Assumed knowledge:** GEOS2114 and GEOS2124 **Assessment:** One 2-hour exam, practical and reports (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the processes that form energy and mineral resources, outlines the characteristics of major fossil fuel and metal ore deposits and introduces the principles that underpin exploration strategies used to discover and develop geological resources. The unit will focus on a variety of topics including: coal; petroleum formation and migration, hydrocarbon traps and maturation; precious metal, base metal and gemstone deposit types; and exploration strategies. An integrated approach will relate tectonic processes through time to the formation of fossil fuel and mineral provinces. Practical exercises will introduce students to the techniques used to identify economically viable geological resources using a variety of exercises based on actual examples of resource exploration drawn from both the petroleum and minerals industry.

### GEOS3802

#### Global Energy and Resources (Adv)

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Derek Wyman, Prof Dietmar Müller **Session:** Semester 1 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week **Prerequisites:** Distinction in (GEOS2114 or GEOS2914) and (GEOS2124 or GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School. **Prohibitions:** GEOS3917, GEOS3906, GEOS3006, GEOS3903, GEOS3904, GEOS3017, GEOS3004, GEOS3102, GEOS3003 **Assessment:** One 2 hour exam, practical and field reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit has the same objectives as GEOS3102 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

### GEOS3103

#### Environmental and Sedimentary Geology

**Credit points:** 6 **Teacher/Coordinator:** Dr Dan Penny (Coordinator), Dr. Adriana Dutkiewicz **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week **Prerequisites:** (GEOS2124 or GEOS2924) and (GEOS2111 or (GEOS2911) or (GEOS2114 or GEOS2914) or (GEOS2113 or GEOS2913); or (GEOS1003 or GEOS1903) and 24 credit points of Intermediate Science units of study with permission of the Head of School. **Prohibitions:** GEOS3803 **Assumed knowledge:** GEOS1003, GEOS2124 **Assessment:** One 2 hour exam, practical reports and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Sediments and sedimentary rocks cover most of the Earth's surface, record much of the Earth's geological and climatic history and host important resources such as petroleum, coal, water and mineral ores. The aim of this unit is to provide students with the skills required to examine, describe and interpret sediments and sedimentary rocks for a variety of different purposes. Specific foci of the unit will be the identification of the recent or ancient environment in which sedimentary materials were deposited, the environmental controls which produce sedimentary structures, and the processes that control the production, movement and storage of sediment bodies. On completion of this unit students will be familiar with the natural processes that produce and modify sediments across a range of environments at the Earth's surface, including fluvial, aeolian, lacustrine, marginal marine and deep marine environments. The various controls on the sedimentary record such as climate and sea-level change, as well as diagenesis and geochemical cycles will also be discussed. Practical exercises will require students to examine global datasets, and determine the properties and significance of sediments and sedimentary rocks. The course is relevant to students interested in petroleum or mineral exploration, environmental and engineering geology as well as marine geoscience.

*Textbooks*



Course notes will be available from the Copy Centre and an appropriate set of reference texts will be placed on special reserve in the library.

### GEOS3014

#### GIS in Coastal Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Eleanor Bruce **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour practical per week. **Prerequisites:** Either 12 credit points of Intermediate Geoscience units or [(GEOS2115, GEOS2915) and (BIOL2018 or BIOL2918 or BIOL2024 or BIOL2924 or BIOL2028 or BIOL2928)]. **Prohibitions:** MARS3104, GEOS3914 **Assessment:** One 2 hour exam, two project reports, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Coastal Management is about how scientific knowledge is used to support policy formulation and planning decisions in coastal environments. The course links coastal science to policy and practice in management of estuaries, beaches and the coastal ocean. The principles are exemplified through specific issues, such as coastal erosion, pollution, and impacts of climate-change. The issues are dealt with in terms of how things work in nature, and how the issues are handled through administrative mechanisms. These mechanisms involve planning strategies like Marine Protected Areas and setback limits on civil development in the coastal zone. The coastal environments and processes that are more relevant to coastal management including: rocky coasts; beaches, barriers and dunes; and coral reefs will also be introduced. At a practical level, the link between science and coastal management is given substance through development and use of 'decision-support models'. These models involve geocomputing methods that entail application of simulation models, remotely sensed information, and Geographic Information Systems (GIS). The course therefore includes both principles and experience in use of these methods to address coastal-management issues. (It thus also involves extensive use of computers.) Although the focus is on the coast, the principles and methods have broader relevance to environmental management in particular, and to problem-solving in general. That is, the course has vocational relevance in examining how science can be exploited to the benefit of society and nature conservation.

### GEOS3803

#### Environmental & Sedimentary Geology(Adv)

**Credit points:** 6 **Teacher/Coordinator:** Dr Dan Penny (Coordinator), Dr. Adriana Dutkiewicz **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour tutorial/practical class per week. **Prerequisites:** Distinctions in (GEOS2114 or (GEOS2914) and (GEOS2124 or (GEOS2924); Students who have a credit average for all Geoscience units may enrol in this unit with permission of the Head of School. **Prohibitions:** GEOS3103 **Assumed knowledge:** GEOS1003, GEOS2124 **Assessment:** One 2 hour exam, practical, field reports and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit has the same objectives as GEOS3103 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

#### Textbooks

Course notes will be available from the Copy Centre and appropriate set of reference texts will be placed on special reserve in the library.

### GEOS3804

#### Geophysical Methods (Advanced)

**Credit points:** 6 **Teacher/Coordinator:** Prof Dietmar Müller (co-ordinator), A/Prof Patrice Rey, Dr Nicolas Flament **Session:** Semester 2 **Classes:** Two 1 hour lectures and one 3 hour practical class per week. **Prerequisites:** Distinction in GEOS2114 or GEOS2914 and GEOS2124 or GEOS2924; Students who have a credit average for all Geoscience units may enrol in this unit with the permission of the Head of School **Prohibitions:** GEOS3006, GEOS3104, GEOS3016, GEOS3917, GEOS3903, GEOS3017, GEOS3916, GEOS3003, GEOS3906 **Assessment:** One 2 hour exam, practical work (100%) **Practical field work:** Geophysical Field Prac (details to be announced) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit has the same objectives as GEOS3104 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance at the time of enrolment. Students who elect to take this unit will participate in alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 of semester.

See the Faculty of Science handbook [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

## Government and International Relations

### Junior (Level 1) units

Two level 1000 Government (GOVT) units

### Level 2 and 3 units

At least 36 credit points of Level 2000 and Level 3000 GOVT units of study with at least 6 credit points of Level 3000 GOVT units of study. See the Faculty of Arts and Social Sciences handbook [sydney.edu.au/handbooks/arts](http://sydney.edu.au/handbooks/arts) Note. Students may also complete a maximum of 12 credit points in cross-listed non-'GOVT' senior units of study as electives for this major. For details of all non-'GOVT' units of study that may be cross listed with this major, see the Faculty of Arts and Social Sciences website

## Mathematics

### Junior (Level 1) units

#### MATH1001

##### Differential Calculus

**Credit points:** 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 or MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 **Assessment:**

One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

MATH1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various techniques of integration are considered, such as integration by parts. The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

*Textbooks*

As set out in the Junior Mathematics Handbook

#### MATH1004

##### Discrete Mathematics

**Credit points:** 3 **Session:** Semester 2, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH2011, MATH1904 **Assumed knowledge:** HSC Mathematics or MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

MATH1004 is designed to provide a thorough preparation for further study in Mathematics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science.

This unit provides an introduction to fundamental aspects of discrete mathematics, which deals with 'things that come in chunks that can be counted'. It focuses on the enumeration of a set of numbers, viz. Catalan numbers. Topics include sets and functions, counting principles, Boolean expressions, mathematical induction, generating functions and linear recurrence relations, graphs and trees.

*Textbooks*

As set out in the Junior Mathematics Handbook

#### MATH1005

##### Statistics

**Credit points:** 3 **Session:** Semester 2, Summer Main, Winter Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

Or parallel advanced units.

#### Level 2 and 3 units

Two of:

#### MATH2061

##### Linear Mathematics and Vector Calculus

**Credit points:** 6 **Session:** Semester 1, Summer Main **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) and (MATH1003 or MATH1903 or MATH1907) **Prohibitions:** MATH2961, MATH2067, MATH2901, MATH2902, MATH2001, MATH2002 **Assessment:** One 2 hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit starts with an investigation of linearity: linear functions, general principles relating to the solution sets of homogeneous and inhomogeneous linear equations (including differential equations), linear independence and the dimension of a linear space. The study of eigenvalues and eigenvectors, begun in junior level linear algebra, is extended and developed. The unit then moves on to topics from

vector calculus, including vector-valued functions (parametrised curves and surfaces; vector fields; div, grad and curl; gradient fields and potential functions), line integrals (arc length; work; path-independent integrals and conservative fields; flux across a curve), iterated integrals (double and triple integrals; polar, cylindrical and spherical coordinates; areas, volumes and mass; Green's Theorem), flux integrals (flow through a surface; flux integrals through a surface defined by a function of two variables, though cylinders, spheres and parametrised surfaces), Gauss' Divergence Theorem and Stokes' Theorem.

or

#### MATH2961

##### Linear Mathematics & Vector Calculus Adv

**Credit points:** 6 **Session:** Semester 1 **Classes:** Four 1 hour lectures and one 1 hour tutorial per week. **Prerequisites:** (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) and (MATH1903 or MATH1907 or Credit in MATH1003) **Prohibitions:** MATH2901, MATH2002, MATH2001, MATH2902, MATH2067, MATH2061 **Assessment:** 2 hour exam, quizzes, assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is an advanced version of MATH2061, with more emphasis on the underlying concepts and on mathematical rigour. Topics from linear algebra focus on the theory of vector spaces and linear transformations.

The connection between matrices and linear transformations is studied in detail. Determinants, introduced in first year, are revised and investigated further, as are eigenvalues and eigenvectors. The calculus component of the unit includes local maxima and minima, the inverse function theorem and Jacobians.

There is an informal treatment of multiple integrals: double integrals, change of variables, triple integrals, line and surface integrals, Green's theorem and Stokes' theorem.

#### MATH2065

##### Partial Differential Equations (Intro)

**Credit points:** 6 **Session:** Semester 2, Summer Main **Classes:** Three 1 hour lectures, one 1 hour tutorial, one 1 hour example class per week. **Prerequisites:** (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) and (MATH1003 or MATH1903 or MATH1907) **Prohibitions:** MATH2965, MATH2005, MATH2905, MATH2067 **Assessment:** 2 hour exam, mid-semester test, assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is an introductory course in the analytical solutions of PDEs (partial differential equations) and boundary value problems. The techniques covered include separation of variables, Fourier series, Fourier transforms and Laplace transforms.

or

#### MATH2965

##### Partial Differential Equations Intro Adv

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** MATH2961 or Credit in MATH2061 **Prohibitions:** MATH2065, MATH2905, MATH2005, MATH2067 **Assessment:** 2 hour exam, assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is essentially an Advanced version of MATH2065, the emphasis being on solutions of differential equations in applied mathematics. The theory of ordinary differential equations is developed for second order linear equations, including series solutions, special functions and Laplace transforms, and boundary-value problems including separation of variables, Fourier series and Fourier transforms.

#### MATH2068

##### Number Theory and Cryptography

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. **Prerequisites:** 6 credit points of Junior level Mathematics **Prohibitions:** MATH3009, MATH3024, MATH2988 **Assumed knowledge:** MATH1014 or MATH1002 or MATH1902 **Assessment:** 2 hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Cryptography is the branch of mathematics that provides the techniques for confidential exchange of information sent via possibly insecure channels. This unit introduces the tools from elementary number theory that are needed to understand the mathematics underlying the most commonly used modern public key cryptosystems. Topics include the Euclidean Algorithm, Fermat's Little Theorem, the Chinese Remainder Theorem, Möbius Inversion, the RSA Cryptosystem, the Elgamal Cryptosystem and the Diffie-Hellman Protocol. Issues of computational complexity are also discussed.

or

### MATH2968 Algebra (Advanced)

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** 9 credit points of Junior Mathematics (advanced level or Credit at normal level) including (MATH1902 or Credit in MATH1002) **Prohibitions:** MATH2918, MATH2008, MATH2908 **Assessment:** 2 hour examination, quizzes, assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to modern abstract algebra, via linear algebra and group theory. It extends the linear algebra covered in Junior Mathematics and in MATH2961, and proceeds to a classification of linear operators on finite dimensional spaces. Permutation groups are used to introduce and motivate the study of abstract group theory. Topics covered include actions of groups on sets, subgroups, homomorphisms, quotient groups and the classification of finite abelian groups.

### MATH2069 Discrete Mathematics and Graph Theory

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** 6 credit points of Junior level Mathematics **Prohibitions:** MATH2011, MATH2009, MATH2969 **Assessment:** One 2 hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit introduces students to several related areas of discrete mathematics, which serve their interests for further study in pure and applied mathematics, computer science and engineering. Topics to be covered in the first part of the unit include recursion and induction, generating functions and recurrences, combinatorics. Topics covered in the second part of the unit include Eulerian and Hamiltonian graphs, the theory of trees (used in the study of data structures), planar graphs, the study of chromatic polynomials (important in scheduling problems).

or

### MATH2969 Discrete Mathematics & Graph Theory Adv

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** 9 credit points of Junior Mathematics (advanced level or Credit at the normal level) **Prohibitions:** MATH2069, MATH2009, MATH2011 **Assessment:** One 2-hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will cover the same material as MATH2069 with some extensions and additional topics.

### MATH2070 Optimisation and Financial Mathematics

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. **Prerequisites:** (MATH1011 or MATH1001 or MATH1901 or MATH1906) and (MATH1014 or MATH1002 or MATH1902) **Prohibitions:** MATH2933, MATH2970, MATH2033, ECMT3510, MATH2010 **Assumed knowledge:** MATH1003 or MATH1903 or MATH1907 **Assessment:** One 2 hour exam, assignments, quiz, project (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Students may enrol in both MATH2070 and MATH3075 in the same semester*

Problems in industry and commerce often involve maximising profits or minimising costs subject to constraints arising from resource limitations. The first part of this unit looks at programming problems and their solution using the simplex algorithm; nonlinear optimisation & the Kuhn Tucker conditions.

The second part of the unit deals with utility theory and modern portfolio theory. Topics covered include: pricing under the principles of expected return and expected utility; mean-variance Markowitz portfolio theory, the Capital Asset Pricing Model, log-optimal portfolios and the Kelly criterion; dynamical programming. Some understanding of probability theory including distributions and expectations is required in this part.

Theory developed in lectures will be complemented by computer laboratory sessions using MATLAB. Minimal computing experience will be required.

or

### MATH2970 Optimisation & Financial Mathematics Adv

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week (lectures given in common with MATH2070). **Prerequisites:** (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) **Prohibitions:** MATH2033, MATH2933, MATH2070, ECMT3510, MATH2010 **Assumed knowledge:** MATH1903 or MATH1907 or Credit in MATH1003 **Assessment:** One 2 hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Students may enrol in both MATH2970 and MATH3975 in the same semester*

The content of this unit of study parallels that of MATH2070, but students enrolled at Advanced level will undertake more advanced problem solving and assessment tasks, and some additional topics may be included.

### MATH2962 Real and Complex Analysis (Advanced)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** (MATH1901 or MATH1906 or Credit in MATH1001) and (MATH1902 or Credit in MATH1002) and (MATH1903 or MATH1907 or Credit in MATH1003) **Prohibitions:** MATH2907, MATH2007 **Assessment:** 2 hour exam, assignments, quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Analysis is one of the fundamental topics underlying much of mathematics including differential equations, dynamical systems, differential geometry, topology and Fourier analysis. Starting off with an axiomatic description of the real number system, this first course in analysis concentrates on the limiting behaviour of infinite sequences and series on the real line and the complex plane. These concepts are then applied to sequences and series of functions, looking at point-wise and uniform convergence. Particular attention is given to power series leading into the theory of analytic functions and complex analysis. Topics in complex analysis include elementary functions on the complex plane, the Cauchy integral theorem, Cauchy integral formula, residues and related topics with applications to real integrals.

### MATH2968 Algebra (Advanced)

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour practice class per week. **Prerequisites:** 9 credit points of Junior Mathematics (advanced level or Credit at normal level) including (MATH1902 or Credit in MATH1002) **Prohibitions:** MATH2918, MATH2008, MATH2908 **Assessment:** 2 hour examination, quizzes, assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to modern abstract algebra, via linear algebra and group theory. It extends the linear algebra covered in Junior Mathematics and in MATH2961, and proceeds to a classification of linear operators on finite dimensional spaces. Permutation groups are used to introduce and motivate the study of abstract group theory. Topics covered include actions of groups on sets, subgroups, homomorphisms, quotient groups and the classification of finite abelian groups.

### MATH2916 Working Seminar A (SSP)

**Credit points:** 3 **Session:** Semester 1 **Classes:** One 1 hour seminar per week. **Prerequisites:** By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics **Assessment:** One 1 hour presentation, 15-20 page essay (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

The main aim of this unit is to develop the students' written and oral presentation skills. The material will consist of a series of connected topics relevant to modern mathematics and statistics. The topics are chosen to suit the students' background and interests, and are not covered by other mathematics or statistics units. The first session will be an introduction on the principles of written and oral presentation of mathematics. Under the supervision and advice of the lecturer(s) in charge, the students present the topics to the other students and the lecturer in a seminar series and a written essay in a manner that reflects the practice of research in mathematics and statistics.

### MATH2917

#### Working Seminar B (SSP)

**Credit points:** 3 **Session:** Semester 2 **Classes:** One 1 hour seminar per week. **Prerequisites:** By invitation, High Distinction average over 12 credit points of Advanced Junior Mathematics **Assessment:** One 1 hour presentation, 15-20 page essay (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Department permission required for enrolment.*

The main aim of this unit is to develop the students' written and oral presentation skills. The material will consist of a series of connected topics relevant to modern mathematics and statistics. The topics are chosen to suit the students' background and interests, and are not covered by other mathematics or statistics units. The first session will be an introduction on the principles of written and oral presentation of mathematics. Under the supervision and advice of the lecturer(s) in charge, the students present the topics to the other students and the lecturer in a seminar series and a written essay in a manner that reflects the practice of research in mathematics and statistics.

24 credits points from MATH3000 units See the Faculty of Science handbook [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)

## Soil Science

Departmental Permission is required to undertake this major.

### Junior (Level 1) and level 2 units

Some junior and intermediate AGCH, MICR, LWSC or SOIL elective units may be required to meet the prerequisites of Level 3 units listed for this major. Please check each unit of study for further details

### Level 3 units

#### ENVX3001

##### Environmental GIS

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** Three-day field trip, (2 lec & 2 prac/wk). **Prerequisites:** AGEN1002 or 6cp of Junior Geoscience or 6cp of Junior Biology **Assessment:** One 15 min presentation (10%), 3500w prac report (35%), 1500w report on trip excursion (15%), 2 hr exam (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to impart knowledge and skills in spatial analysis and geographical information science (GISc) for decision-making in an environmental context. The lecture material will present several themes: principles of GISc, geospatial data sources and acquisition methods, processing of geospatial data and spatial statistics. Practical exercises will focus on learning geographical information systems (GIS) and how to apply them to land resource assessment, including digital terrain modelling, land-cover assessment, sub-catchment modelling, ecological applications, and soil quality assessment for decisions regarding sustainable land use and management. A 3 day field excursion during the mid-semester break will involve a day of GPS fieldwork at Arthursleigh University farm and two days in Canberra visiting various government agencies which research and maintain GIS coverages for Australia. By the end of this UoS, students should be able to: differentiate between spatial data and spatial information; source geospatial data from government and private agencies; apply conceptual models of spatial phenomena for practical decision-making in an environmental context; apply critical analysis of situations to apply the concepts of spatial analysis to solving environmental and land resource problems; communicate effectively

results of GIS investigations through various means- oral, written and essay formats; and use a major GIS software package such as ArcGIS.

#### Textbooks

Burrough, P.A. and McDonnell, R.A. 1998. Principles of Geographic Information Systems. Oxford University Press: Oxford.

Clarke, K. C. 2003. Getting Started With Geographic Information Systems. 4th Edition. Prentice Hall: Upper Saddle River, New Jersey.

### SOIL3009

#### Contemporary Field and Lab Soil Science

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (Coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, A/Prof Budiman Minasny, Dr Damien Field **Session:** Semester 1 **Classes:** (2 lec, 2 prac or 1 lec, 3 prac )/wk, 6-day field excursion north-western NSW commencing 15 days prior to beginning of Semester 1 **Prerequisites:** SOIL2003 **Assessment:** 1 x viva voce exam (40%), soil physics written assessments (20%), soil chemistry written assessments (20%), soil judging (12%), pedology written assessments (8%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a theoretical and empirical unit providing specialised training in three important areas of contemporary soil science, namely pedology, soil chemistry and soil physics. The key concepts of these sub-disciplines will be outlined and strengthened by hands-on training in essential field and laboratory techniques. All of this is synthesized by placing it in the context of soil distribution and use in North-Western New South Wales. The unit is motivated by the teaching team's research in this locale. It builds on students' existing soil science knowledge gained in SOIL2003. After completion of the unit, students should be able to articulate the advantages and disadvantages of current field & laboratory techniques for gathering necessary soil information, and simultaneously recognise key concepts and principles that guide contemporary thought in soil science. Students will be able to synthesise soil information from a multiplicity of sources and have an appreciation of the cutting edge areas of soil management and research. By investigating the contemporary nature of key concepts, students will develop their skills in research and inquiry. Students will develop their communication skills through report writing and will also articulate an openness to new ways of thinking which augments intellectual autonomy. Teamwork and collaborative efforts are encouraged in this unit.

#### Textbooks

Textbooks: D. Hillel. 2004. Introduction to Environmental Soil Physics. Elsevier Science, San Diego, CA, USA, R. Schaetzl and S. Anderson 2005. Soils: Genesis and Geomorphology. Cambridge University Press, New York, NY, USA, D.L. Sparks 2003 Environmental Soil Chemistry (2nd edn). Academic Press, San Diego, CA, USA

### SOIL3010

#### The Soil at Work

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, Dr Damien Field, Prof David Guest, A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** Problem-based unit: each student completes 1 problem as part of a team, involving multiple team meetings; 4 x 4 hr soil biology workshops **Prerequisites:** SOIL2003 or SOIL2004 **Assessment:** Introduction to the problem group presentation (10%); Status of the problem group report (10%); How to tackle the problem seminar (20%) - team seminars, before fieldwork, analyses done; Results seminar (20%) - team seminars; Final group report (25%); Activities diary for group (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a problem-based applied soil science unit addressing the physical, chemical and biological components of soil function. It is designed to allow students to identify soil-related problems in the real-world and by working in a group and with an end-user, to suggest short and long-term solutions to problems such as fertility, resilience, carbon management, structural decline, acidification, salinisation and contamination. The soil biology workshops will allow student groups to incorporate relevant measurements of soil biota in their experiments. Students will gain some understanding of the concept of sustainability, and will be able to identify the causes of problems by reference to the literature, discussion with landusers and by the design and execution of key experiments and surveys. Students will gain a focused knowledge of the key soil drivers to environmental problems and will have some understanding on the constraints surrounding potential solutions. By designing and administering strategies to tackle real-world soil issues, students will develop their research and inquiry

skills and enhance their intellectual autonomy. By producing reports and seminars that enables understanding by an end-user, students will improve the breadth of their communication skills. This is a core unit for students majoring or specialising in soil science and an elective unit for those wishing to gain an understanding of environmental problem-solving. It utilises and reinforces soil-science knowledge gained in SOIL2003 and SOIL2004, as well as generic problem-solving skills gained during the degree program.

*Textbooks*

Reference book: I.W.Heathcote 1997. Environmental Problem Solving: A Case Study Approach. McGraw-Hill, New York, NY, USA.

and one of

**AGCH3033**

**Environmental Chemistry**

**Credit points:** 6 **Teacher/Coordinator:** Dr. Feike Dijkstra (Coordinator); Dr. Claudia Keitel; Dr. Malcolm Possell/Prof. Balwant Singh **Session:** Semester 2 **Classes:** 2 lec & 3hr prac/wk **Prerequisites:** 12 cp of Junior Chemistry **Prohibitions:** CHEM2404 **Assumed knowledge:** SOIL2003, LWSC2002 **Assessment:** Research Proposal (40%), Prac Report (40%), Presentation (15%), Class Participation (5%) **Practical field work:** Practical reports and essay writing. Preparation reading for practical or field trips, preparation for group presentation, exam preparation. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This course provides basic concepts in environmental chemistry underpinning many of the environmental problems humans are faced with, with a focus on agricultural and natural ecosystems.

AGCH3033 is a core unit for the BEnvSys degree and an elective unit suitable for the BScAgr, BResEc and BAnVetBioSc degrees, building on intermediate units in chemistry and biology.

Sources, reactions and fate of chemical species will be investigated in air, water, soil and biota. Case studies about human impacts on the environment will be integrated in the lectures, laboratory classes and field trip.

At the end students have an understanding of chemical concepts that are at the root of many environmental problems in agricultural and natural ecosystems. This unit will provide students with tools to identify and assess the chemistry behind environmental problems and will guide students in developing methods to manage these problems.

Students will enhance their skills in problem definition, assessing sources of information, team-work and effectively communicating environmental issues from a chemical perspective through laboratory reports and oral presentation.

*Textbooks*

Reference Books: Andrews et al. 2004. An Introduction to Environmental Chemistry.

Van Loon and Duffy, 2010. Environmental Chemistry: A Global Perspective.

Hanrahan. 2011. Key Concepts in Environmental Chemistry.

**LWSC3007**

**Advanced Hydrology and Modelling**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort (Coordinator), Dr Thomas Bishop, Dr Floris Van Ogtrop **Session:** Semester 1 **Classes:** 2 hr lectures/wk, 3 hr practical/wk **Prerequisites:** LWSC2002 **Assessment:** 4 x Practical assessments and reports (50%), take-home exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to allow students to examine advanced hydrological modeling and sampling designs focusing on catchment level responses and uncertainty. This unit builds on the theoretical knowledge gained in LWSC2002. Students will learn how to develop their own simulation model of catchment hydrological processes in R and using SWAT and review the possibilities and impossibilities of using simulation models for catchment management. Students will further investigate optimal sampling techniques for water quality data based on understanding the variability in hydrological responses. At the end of this unit, students will be calibrate and evaluate a catchment model, articulate advantages and disadvantages of using simulation models for catchment management, justify the choice of a simulation model for a particular catchment management problem, identify issues in relation to uncertainty in water quality and quantity, develop an optimal water quality sampling scheme. The students will gain research

and inquiry skills through research based group projects, information literacy and communication skills through on-line discussion postings, laboratory reports and a presentation and personal and intellectual autonomy through working in groups.

*Textbooks*

Textbooks (Recommended reading)

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

**PPAT4005**

**Soil Biology**

*This unit of study is not available in 2015*

**Credit points:** 6 **Teacher/Coordinator:** Prof David Guest **Session:** Semester 1 **Classes:** (2 tut, 3 hrs prac)/wk **Prerequisites:** MICR2024 or MICR2021 or MICR2921 or MICR2022 or MICR2922 **Assessment:** Tutorial papers (30%), project report (10%), peer review (10%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit investigates the diversity of organisms living in the soil, their biology, interactions and ecology, and their roles in maintaining and improving soil function. The unit is an elective for BScAgr, BHortSc and BSc students. It builds on the material introduced in MICR2024, PPAT3003 and BIOL3017. Undertaking this unit will develop skills in monitoring soil microbes, designing, conducting and analysing experiments. At the completion of this unit, students will be able to exercise problem-solving skills (developed through practical experiments, projects and tutorial discussions), think critically, and organise knowledge (from consideration of the lecture material and preparation of project reports), and expand from theoretical principles to practical explanations (through observing and reporting on project work). Students will consolidate their teamworking skills, develop self-directed study skills and plan effective work schedules, use statistical analysis in research, keep appropriate records of laboratory research, work safely in a research laboratory and operate a range of scientific equipment. Students will gain research and inquiry skills through group research projects, information literacy and communication skills through assessment tasks and personal and intellectual autonomy through working in groups.

*Textbooks*

Sylvia et al. 2005. Principles and Applications of Soil Microbiology 2nd ed. Pearson.

Schjonning PJ. 2001. Managing Soil Quality. CAB International.

Note. Some senior units for this major may have specific prerequisites for enrolment. Please check each unit of study for further detail

**Statistics**

**Junior (Level 1) units**

**MATH1001**

**Differential Calculus**

**Credit points:** 3 **Session:** Semester 1, Summer Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** MATH1111, MATH1901, MATH1906, MATH1011, ENVX1001 **Assumed knowledge:** HSC Mathematics Extension 1 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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 or MATH1111

**Assessment:** One 1.5 hour examination, assignments and quizzes (100%)  
**Mode of delivery:** Normal (lecture/lab/tutorial) day

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 1 or MATH1001 or MATH1011 or a credit or higher in MATH1111 **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

MATH1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various techniques of integration are considered, such as integration by parts. The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

*Textbooks*

As set out in the Junior Mathematics Handbook

### MATH1005

#### Statistics

**Credit points:** 3 **Session:** Semester 2, Summer Main, Winter Main **Classes:** Two 1 hour lectures and one 1 hour tutorial per week. **Prohibitions:** STAT1022, ECMT1010, MATH1015, ENVX1001, MATH1905, BUSS1020, STAT1021 **Assumed knowledge:** HSC Mathematics **Assessment:** One 1.5 hour examination, assignments and quizzes (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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

Or parallel advanced units.

## Level 2 and 3 units

### STAT2011

#### Statistical Models

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory week. **Prerequisites:** (MATH1001 or MATH1901 or MATH1906 or MATH1011) and (MATH1005 or MATH1905 or MATH1015 or STAT1021 or ECMT1010 or BUSS1020) **Prohibitions:** STAT2001, STAT2901, STAT2911 **Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to univariate techniques in data analysis and the most common statistical distributions that are used to model patterns of variability. Common discrete random models like the binomial, Poisson and geometric and continuous models including the normal and exponential will be studied. The method of moments and maximum likelihood techniques for fitting statistical distributions to data will be explored. The unit will have weekly computer classes where candidates will learn to use a statistical computing package to

perform simulations and carry out computer intensive estimation techniques like the bootstrap method.

or

### STAT2911

#### Probability and Statistical Models (Adv)

**Credit points:** 6 **Session:** Semester 1 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. **Prerequisites:** (MATH1903 or MATH1907 or Credit in MATH1003) and (MATH1905 or MATH1904 or Credit in MATH1005 or Credit in ECMT1010 or Credit in BUSS1020) **Prohibitions:** STAT2001, STAT2901, STAT2011 **Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is essentially an advanced version of STAT2011, with an emphasis being on the mathematical techniques used to manipulate random variables and probability models. Common random variables including the Poisson, normal, beta and gamma families are introduced. Probability generating functions and convolution methods are used to understand the behaviour of sums of random variables. The method of moments and maximum likelihood techniques for fitting statistical distributions to data will be explored. The unit will have weekly computer classes where candidates will learn to use a statistical computing package to perform simulations and carry out computer intensive estimation techniques like the bootstrap method.

### STAT2012

#### Statistical Tests

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. **Prerequisites:** MATH1005 or MATH1905 or MATH1015 or ECMT1010 or BUSS1020 **Prohibitions:** STAT2912, STAT2004 **Assessment:** One 2 hour exam, assignments and/or quizzes, and computer practical reports (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides an introduction to the standard methods of statistical analysis of data: Tests of hypotheses and confidence intervals, including t-tests, analysis of variance, regression - least squares and robust methods, power of tests, non-parametric tests, non-parametric smoothing, tests for count data, goodness of fit, contingency tables. Graphical methods and diagnostic methods are used throughout with all analyses discussed in the context of computation with real data using an interactive statistical package.

or

### STAT2912

#### Statistical Tests (Advanced)

**Credit points:** 6 **Session:** Semester 2 **Classes:** Three 1 hour lectures, one 1 hour tutorial and one 1 hour computer laboratory per week. **Prerequisites:** MATH1905 or Credit in MATH1005 or Credit in ECMT1010 or Credit in BUSS1020 **Prohibitions:** STAT2004, STAT2012 **Assumed knowledge:** STAT2911 **Assessment:** One 2-hour exam, assignments and/or quizzes, computer practical reports and one computer practical exam (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is essentially an advanced version of STAT2012 with an emphasis on both methods and the mathematical derivation of these methods: Tests of hypotheses and confidence intervals, including t-tests, analysis of variance, regression - least squares and robust methods, power of tests, non-parametric methods, non-parametric smoothing, tests for count data, goodness of fit, contingency tables. Graphical methods and diagnostic methods are used throughout with all analyses discussed in the context of computation with real data using an interactive statistical package.

And 24 credit points of STAT3000 units See the Faculty of Science handbook [sydney.edu.au/handbooks/science](http://sydney.edu.au/handbooks/science)



# Postgraduate coursework

Postgraduate studies are available towards a Master of Agriculture and Environment, Graduate Diploma in Agriculture and Environment and Graduate Certificate in Agriculture and Environment.

Admission to the **Master of Agriculture and Environment** and the **Graduate Diploma in Agriculture and Environment** requires a bachelor's degree in a related discipline, or an equivalent qualification, with at least a credit average for admission to the Masters degree.

Students who have completed relevant prior learning at an equivalent level may be given up to 24 credit points advanced standing.

Admission to the **Graduate Certificate in Agriculture and Environment** is available only through transfer from the Master of Agriculture and Environment or from the Graduate Diploma of Agriculture and Environment.

Many units are based on compulsory fieldwork carried out before the semester starts. This means that all coursework students should be available to participate in fieldwork excursions two weeks prior to the starting date of semester.

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 Diploma and the Master of Agriculture and Environment testamur will specify the area of specialisation:

- Agricultural and Environmental Economics
- Agricultural and Environmental Technologies
- Forest and Atmosphere Interactions
- Horticultural Technologies.

## Graduate Certificate in Agriculture and Environment

## Graduate Diploma in Agriculture and Environment

## Master of Agriculture and Environment

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

### Course resolutions

#### 1 Course codes

Code	Course title
GCAGRENV-01	Graduate Certificate in Agriculture and Environment
GNAGRENV-01	Graduate Diploma in Agriculture and Environment
GCAGRENV-01	Master of Agriculture and Environment

#### 2 Attendance pattern

The attendance pattern for these courses is full time or part time according to candidate choice.

#### 3 Master's type

The master's degree in these resolutions is an advanced learning master's course, as defined by the Coursework Rule.

#### 3 Embedded courses in this sequence

- (1) The embedded courses in this sequence are:
  - (a) the Graduate Certificate in Agriculture and Environment
  - (b) the Graduate Diploma in Agriculture and Environment
  - (c) the Master of Agriculture and Environment
- (2) Providing candidates satisfy the admission requirements for each stage, a candidate may progress to the award of any of the courses in this sequence. Only the longest award completed will be conferred. Admission to the Graduate Certificate in Agriculture and Environment is available only via transfer from the Master of Agriculture and Environment or from the Graduate Diploma of Agriculture and Environment, and with the approval of the Dean.

#### 4 Admission

- (1) Available places will be offered to qualified applicants in the order in which complete applications are received, according to the following admissions criteria. In exceptional circumstances the Dean may admit applicants without these qualifications who, in the opinion of the faculty, have qualifications and evidence of experience and achievement sufficient to successfully undertake the award.
- (2) Admission to candidature for the Graduate Certificate in Agriculture and Environment is available only via transfer from the Master of Agriculture and Environment and or from the Graduate Diploma of Agriculture and Environment with the approval of the Dean.
- (3) Admission to the Graduate Diploma in Agriculture and Environment requires:
  - (a) a bachelor's degree in Agriculture, Science or Economics or an equivalent qualification
- (4) Admission to the Master of Agriculture and Environment requires:
  - (a) a bachelor's degree with a credit average in Agriculture, Science or Economics, or an equivalent qualification; or
  - (b) completion of the requirements of an embedded graduate diploma in this discipline from the University of Sydney, or equivalent qualification.

#### 5 Requirements for award

- (1) The units of study that may be taken for the courses are set out in Table A.
- (2) To qualify for the award of the Graduate Certificate in Agriculture and Environment a candidate must complete 24 credit points.
- (3) To qualify for the award of the Graduate Diploma in Agriculture a candidate must complete 48 credit points, including at least 12 credit points from units of study listed in the table for the selected specialisation.
- (4) To qualify for the award of the Master of Agriculture and Environment a candidate must complete 72 credit points, including:
  - (a) 24 credit points of core units of study; and
  - (b) 24 credit points of elective units of study, including at least 12 credit points from units of study listed in the table for the selected specialisation; and
  - (c) 24 credit points of research capstone units of study.
 With permission, up to 12 credit points of the elective requirements may be taken from other courses outside the Faculty, including foundational units of study.

#### 6 Specialisations

- (1) Completion of a specialisation is a requirement of the Graduate Diploma of Agriculture and Environment and the Master of Agriculture and Environment, and requires the accumulation of 12 credit points chosen from units of study





listed in the table for that specialisation. The specialisations available are:

- (a) Agricultural and Environmental Economics
  - (b) Agricultural and Environmental Technologies
  - (c) Forest and Atmosphere Interactions
  - (d) Horticultural Technologies
- (2) Candidates for the Master of Agriculture and Environment will complete a research project as part of their research capstone units of study. The research area of this research project is expected to correlate to the chosen specialisation. However, the number of research projects in each specialisation varies from year to year, and may be limited.
- (3) Not every specialisation is available every year.

#### 7 Recognition of prior learning

Candidates offered admission to the Master of Agriculture and Environment may be eligible for a reduction in the volume of learning of up to 24 credit points where the candidate has completed a qualification at level 8 of the Australian Qualifications Framework in economics, soil science, environmental science, plant science, environmental chemistry, agricultural science or agronomy.

#### 8 Course transfer

A candidate for the master or graduate diploma may elect to discontinue study and graduate with a shorter award from this embedded sequence, with the approval of the Dean, and provided the requirements of the shorter award have been met.

#### 9 Transitional provisions

- (1) These resolutions apply to students who commenced their candidature after 1 January, 2015 and students who commenced their candidature prior to 1 January, 2015 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2015 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2020. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.

# Graduate Certificate in Agriculture and Environment

Candidates for the Graduate Certificate of Agriculture and Environment complete a total of:

- 24 credit points of core units of study (Table A).

Admission to the Graduate Certificate in Agriculture and Environment is available only through transfer from the Master of Agriculture and Environment or from the Graduate Diploma of Agriculture and Environment.

**Table A units of study**

<i>Unit of study</i>	<i>Credit points</i>	<i>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</i>	<i>Session</i>
<b>Table A units of study</b>			
<b>Core units</b>			
AFNR5511 Soil Processes, Assessment & Management	6		Semester 1
AGRO4003 Crop and Pasture Agronomy	6	P AGRO3004	Semester 1
AFNR5801 Climate Change: Process, History, Issues	6	A A basic understanding of climate change processes and issues. P Assumed knowledge: A basic understanding of climate change processes and issues.	Semester 2
ECOS3013 Environmental Economics	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>Capstone units</b>			
AFNR5905 Research Paper	6	P AFNR5901 and AFNR5904 C AFNR5906	Semester 1
AFNR5906 Research Communication	6	P AFNR5901 and AFNR5904 C AFNR5905	Semester 1
AFNR5901 Research Review	6	C AFNR5904 N AFNR5903, AFNR5902	Semester 1 Semester 2
AFNR5904 Research Proposal and Approach	6	C AFNR5901	Semester 1 Semester 2
<b>Specialisation electives</b>			
<b>Agricultural and Environmental Economics</b>			
AREC3004 Economics of Water and Bio-Resources	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1
ECOS3006 International Trade	6	P (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) N ECON3006	Semester 1
ECOS3005 Industrial Organisation	6	P ECOS2001 or ECON2001 or ECOS2901 or ECON2901 N ECOS2201, ECON3005	Semester 2
AREC3001 Production Modelling and Management	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3002 Agricultural Markets	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3005 Agricultural Finance and Risk	6	P AREC2001 or AGE2103 or AREC2002 or AGE2101 or ECOS2001 or ECOS2901	Semester 2
<b>Agricultural and Environmental Technologies</b>			
AGRO4004 Sustainable Farming Systems	6	P AGRO3004	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
AFNR5110 Crop Improvement	6	A Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
AFNR5502 Remote Sensing, GIS and Land Management	6		Semester 2
AFNR5510 The Soil at Work	6		Semester 2
AFNR5512 Water Management and Variable Climate	6	A UG Maths or Physics or Hydrology.	Semester 2



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Horticultural Technologies</b>			
AFNR5210 Sustainable Horticultural Cropping	6		Semester 1
AFNR5701 Plants and the Environment	6		Semester 1
AFNR5110 Crop Improvement	6	<b>A</b> Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
HORT4005 Research and Practice in Hort Science	6	<b>P</b> HORT3005	Semester 2
<b>Forest and Atmosphere Interactions</b>			
AFNR5701 Plants and the Environment	6		Semester 1
ENSY3002 Fire in Australian Ecosystems	6	<b>P</b> AGEN2005 or BIOL2023 or BIOL2923	Semester 1
AFNR5705 Australian Forest Systems	6		Semester 2
ENSY3003 Forest Ecosystem Science	6	<b>P</b> Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage.	Semester 2
<b>Other electives</b>			
AFNR5107 Principles of Biochemical Analysis	6	<b>N</b> AGCH4007	Semester 1
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
GOVT6135 Global Environmental Politics <i>This unit of study is not available in 2015</i>	6		Semester 1
PHYS5031 Ecological Econ & Sustainable Analysis	6		Semester 1
PHYS5034 Life Cycle Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 2
AREC3003 Econ of Minerals and Energy Industries	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ECOS3005 Industrial Organisation	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
ENVI5809 Environmental Simulation Modelling	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2a
GEOG5004 Environmental Mapping and Monitoring	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2
ECON5001 Microeconomic Theory	6	<b>N</b> ECON5003, ECON5000	Semester 1 Semester 2 Summer Main
PHYS5033 Environmental Footprints and IO Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 1 Semester 2
SUST5001 Introduction to Sustainability	6		Semester 1 Semester 2

# Graduate Diploma in Agriculture and Environment

Candidates for the Graduate Diploma of Agriculture and Environment complete a total of:

- 48 credit points, including
- at least 12 credit points for the selected specialisation (Table A).

Candidates do not normally complete a research project.

**Table A units of study**

<i>Unit of study</i>	<i>Credit points</i>	<i>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</i>	<i>Session</i>
<b>Table A units of study</b>			
<b>Core units</b>			
AFNR5511 Soil Processes, Assessment & Management	6		Semester 1
AGRO4003 Crop and Pasture Agronomy	6	P AGRO3004	Semester 1
AFNR5801 Climate Change: Process, History, Issues	6	A A basic understanding of climate change processes and issues. P Assumed knowledge: A basic understanding of climate change processes and issues.	Semester 2
ECOS3013 Environmental Economics	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>Capstone units</b>			
AFNR5905 Research Paper	6	P AFNR5901 and AFNR5904 C AFNR5906	Semester 1
AFNR5906 Research Communication	6	P AFNR5901 and AFNR5904 C AFNR5905	Semester 1
AFNR5901 Research Review	6	C AFNR5904 N AFNR5903, AFNR5902	Semester 1 Semester 2
AFNR5904 Research Proposal and Approach	6	C AFNR5901	Semester 1 Semester 2
<b>Specialisation electives</b>			
<b>Agricultural and Environmental Economics</b>			
AREC3004 Economics of Water and Bio-Resources	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1
ECOS3006 International Trade	6	P (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) N ECON3006	Semester 1
ECOS3005 Industrial Organisation	6	P ECOS2001 or ECON2001 or ECOS2901 or ECON2901 N ECOS2201, ECON3005	Semester 2
AREC3001 Production Modelling and Management	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3002 Agricultural Markets	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3005 Agricultural Finance and Risk	6	P AREC2001 or AGE2103 or AREC2002 or AGE2101 or ECOS2001 or ECOS2901	Semester 2
<b>Agricultural and Environmental Technologies</b>			
AGRO4004 Sustainable Farming Systems	6	P AGRO3004	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
AFNR5110 Crop Improvement	6	A Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
AFNR5502 Remote Sensing, GIS and Land Management	6		Semester 2
AFNR5510 The Soil at Work	6		Semester 2
AFNR5512 Water Management and Variable Climate	6	A UG Maths or Physics or Hydrology.	Semester 2



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Horticultural Technologies</b>			
AFNR5210 Sustainable Horticultural Cropping	6		Semester 1
AFNR5701 Plants and the Environment	6		Semester 1
AFNR5110 Crop Improvement	6	<b>A</b> Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
HORT4005 Research and Practice in Hort Science	6	<b>P</b> HORT3005	Semester 2
<b>Forest and Atmosphere Interactions</b>			
AFNR5701 Plants and the Environment	6		Semester 1
ENSY3002 Fire in Australian Ecosystems	6	<b>P</b> AGEN2005 or BIOL2023 or BIOL2923	Semester 1
AFNR5705 Australian Forest Systems	6		Semester 2
ENSY3003 Forest Ecosystem Science	6	<b>P</b> Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage.	Semester 2
<b>Other electives</b>			
AFNR5107 Principles of Biochemical Analysis	6	<b>N</b> AGCH4007	Semester 1
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
GOVT6135 Global Environmental Politics <i>This unit of study is not available in 2015</i>	6		Semester 1
PHYS5031 Ecological Econ & Sustainable Analysis	6		Semester 1
PHYS5034 Life Cycle Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 2
AREC3003 Econ of Minerals and Energy Industries	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ECOS3005 Industrial Organisation	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
ENVI5809 Environmental Simulation Modelling	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2a
GEOG5004 Environmental Mapping and Monitoring	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2
ECON5001 Microeconomic Theory	6	<b>N</b> ECON5003, ECON5000	Semester 1 Semester 2 Summer Main
PHYS5033 Environmental Footprints and IO Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 1 Semester 2
SUST5001 Introduction to Sustainability	6		Semester 1 Semester 2

# Master of Agriculture and Environment

Candidates for the Master of Agriculture and Environment complete a total of 72 credit points made up of:

- 24 credit points of core units of study (Table A)
- 24 credit points of elective units of study including at least 12 credit points for the selected specialisation (Table A) and
- 24 credit points of capstone units of study (Table A).

Students who have completed relevant prior learning at an equivalent level may be given up to 24 credit points advanced standing.

**Table A units of study**

<i>Unit of study</i>	<i>Credit points</i>	<i>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</i>	<i>Session</i>
<b>Table A units of study</b>			
<b>Core units</b>			
AFNR5511 Soil Processes, Assessment & Management	6		Semester 1
AGRO4003 Crop and Pasture Agronomy	6	P AGRO3004	Semester 1
AFNR5801 Climate Change: Process, History, Issues	6	A A basic understanding of climate change processes and issues. P Assumed knowledge: A basic understanding of climate change processes and issues.	Semester 2
ECOS3013 Environmental Economics	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
<b>Capstone units</b>			
AFNR5905 Research Paper	6	P AFNR5901 and AFNR5904 C AFNR5906	Semester 1
AFNR5906 Research Communication	6	P AFNR5901 and AFNR5904 C AFNR5905	Semester 1
AFNR5901 Research Review	6	C AFNR5904 N AFNR5903, AFNR5902	Semester 1 Semester 2
AFNR5904 Research Proposal and Approach	6	C AFNR5901	Semester 1 Semester 2
<b>Specialisation electives</b>			
<b>Agricultural and Environmental Economics</b>			
AREC3004 Economics of Water and Bio-Resources	6	P AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 1
ECOS3006 International Trade	6	P (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) N ECON3006	Semester 1
ECOS3005 Industrial Organisation	6	P ECOS2001 or ECON2001 or ECOS2901 or ECON2901 N ECOS2201, ECON3005	Semester 2
AREC3001 Production Modelling and Management	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3002 Agricultural Markets	6	P AREC2001 or AGE2103 or ECOS2001 or ECOS2901	Semester 2
AREC3005 Agricultural Finance and Risk	6	P AREC2001 or AGE2103 or AREC2002 or AGE2101 or ECOS2001 or ECOS2901	Semester 2
<b>Agricultural and Environmental Technologies</b>			
AGRO4004 Sustainable Farming Systems	6	P AGRO3004	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
AFNR5110 Crop Improvement	6	A Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
AFNR5502 Remote Sensing, GIS and Land Management	6		Semester 2
AFNR5510 The Soil at Work	6		Semester 2
AFNR5512 Water Management and Variable Climate	6	A UG Maths or Physics or Hydrology.	Semester 2



<b>Unit of study</b>	<b>Credit points</b>	<b>A: Assumed knowledge P: Prerequisites C: Corequisites N: Prohibition</b>	<b>Session</b>
<b>Horticultural Technologies</b>			
AFNR5210 Sustainable Horticultural Cropping	6		Semester 1
AFNR5701 Plants and the Environment	6		Semester 1
AFNR5110 Crop Improvement	6	<b>A</b> Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013.	Semester 2
HORT4005 Research and Practice in Hort Science	6	<b>P</b> HORT3005	Semester 2
<b>Forest and Atmosphere Interactions</b>			
AFNR5701 Plants and the Environment	6		Semester 1
ENSY3002 Fire in Australian Ecosystems	6	<b>P</b> AGEN2005 or BIOL2023 or BIOL2923	Semester 1
AFNR5705 Australian Forest Systems	6		Semester 2
ENSY3003 Forest Ecosystem Science	6	<b>P</b> Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage.	Semester 2
<b>Other electives</b>			
AFNR5107 Principles of Biochemical Analysis	6	<b>N</b> AGCH4007	Semester 1
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ENVI5708 Introduction to Environmental Chemistry	6		Semester 1
GOVT6135 Global Environmental Politics <i>This unit of study is not available in 2015</i>	6		Semester 1
PHYS5031 Ecological Econ & Sustainable Analysis	6		Semester 1
PHYS5034 Life Cycle Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 2
AREC3003 Econ of Minerals and Energy Industries	6	<b>P</b> AREC2003 or RSEC2031 or ECOS2001 or ECOS2901	Semester 2
ECOS3002 Development Economics	6	<b>P</b> One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) <b>N</b> ECON3002	Semester 1
ECOS3005 Industrial Organisation	6	<b>P</b> ECOS2001 or ECON2001 or ECOS2901 or ECON2901 <b>N</b> ECOS2201, ECON3005	Semester 2
ENVI5809 Environmental Simulation Modelling	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2a
GEOG5004 Environmental Mapping and Monitoring	6	<b>A</b> This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. <b>P</b> Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics.	Semester 2
ECON5001 Microeconomic Theory	6	<b>N</b> ECON5003, ECON5000	Semester 1 Semester 2 Summer Main
PHYS5033 Environmental Footprints and IO Analysis	6	<i>Minimum class size of 5 students.</i>	Semester 1 Semester 2
SUST5001 Introduction to Sustainability	6		Semester 1 Semester 2

# Units of study descriptions

## Table A units of study

### Core units

#### AFNR5511

##### Soil Processes, Assessment & Management

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 1 Lec, 2 tutorials/wk, case study & oral presentations. **Assessment:** Essay (30%), Group discussions (20%), Case study report (30%), Group presentation (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Soils support agricultural and natural ecosystems and regulate environmental interactions between the hydrosphere and atmosphere. It is the quality of our soils that affect productivity, the environment, health and ultimately sustainability. However, challenges such as those presented by lack of plant nutrient supply, soil acidification, physical degradation, soil contamination, and loss of soil biodiversity are problems at a global scale that threaten the sustainability of the environment and society. As well as the threats the importance of maintaining a quality soil that regulates environmental interactions will be explored, such as soil as a sink for carbon affecting climate interactions or understanding how a rich soil biodiversity can contribute to food production affecting food security. To do this, this unit of study is concerned with exploring the key pedology, soil chemistry, soil physical and soil biological processes that drive these challenges to soil quality. Time will be spent investigating how the quality of the soil can be assessed, using the indicators of the mentioned soil processes, and how the resulting data can be aggregated and communicated in a meaningful way. Working with case studies, the students will identify problems that are assessed using soil quality or function analysis with the aim of identifying management options. The management options will be evaluated to determine their adoptability and implement ability. By investigating the case studies using soil quality or function analysis students will develop their research and enquiry skills. Assessing and developing adoptable management strategies the students will develop their skills in synthesising material from multiple sources and enhance their intellectual autonomy. By producing reports and presenting seminars the students will develop their communication skills.

##### Textbooks

Textbooks: D. Hillel, 2004. Introduction to Environmental Soil Physics, Elsevier Science, San Diego, CA USA.

#### AGRO4003

##### Crop and Pasture Agronomy

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan(Coordinator), A/Prof Brett Whelan, Dr Rosalind Deaker, Dr Lachlan Ingram **Session:** Semester 1 **Classes:** 12x2 h lectures/weeks 1-13; 4x2 h practicals/weeks 8, 11-13; Field excursions: week preceding start of semester and 6 (subject to weather) **Prerequisites:** AGRO3004 **Assessment:** 2 Data Analysis Projects (2x50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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. The unit also covers precision agriculture, legume science, rangeland science and crop protection. This unit includes a one-week excursion to cotton growing areas in northern NSW and Qld, specialist intensive instruction provided by the Cotton RDC, a three day excursion to the Cooma rangelands and a series of workshops, tutorials that provides analysis and synthesis of the major farming systems in this industry. Pasture production is also considered in the context of farming systems.

#### AFNR5801

##### Climate Change: Process, History, Issues

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Peter Franks, Dr Dan Penny **Session:** Semester 2 **Classes:** 18 hrs lecture/tutorial, 12 hrs practical/field classes, 9 hrs field trip preparation **Prerequisites:** Assumed knowledge: A basic understanding of climate change processes and issues. **Assumed knowledge:** A basic understanding of climate change processes and issues. **Assessment:** 2hr exam (40%), tutorials (20%), practical report from field exercise (manuscript format) (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit provides students with an overview of current debates and approaches to understanding and quantifying interactions between the biosphere, oceans and atmosphere, as used around the world, and the consequences of those interactions for climate. The unit considers climate change on a variety of timescales. This unit will include a weekend field trip to Snowy Mountains field sites managed by the University of Sydney where students will be introduced to cutting edge, ongoing climate change research.

##### Textbooks

A reading list will be provided consisting of selected book chapters, journal articles and other publications

#### ECOS3013

##### Environmental Economics

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/week **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x1500wd Essay (25%), 1hr Mid-semester test (25%), 1x2hr Final exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The natural environment is invariably affected by production and consumption in our modern economy. In particular, environmental outcomes are important in the presence of market failures (externalities and public goods). This unit focuses on developing a student's detailed understanding of the economic techniques used by policymakers to address environmental issues. These techniques include: Pigovian taxes and subsidies; regulation with asymmetric information; marketable permits; pricing contributions for public goods; optimal damages; and the allocation of property-rights and market failures.

### Capstone units

#### AFNR5905

##### Research Paper

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 2 Lectures in semester + regular meetings with Supervisor **Prerequisites:** AFNR5901 and AFNR5904 **Corequisites:** AFNR5906 **Assessment:** Research Paper (100%) **Mode of delivery:** Supervision

This unit of study builds on the major research project proposed in AFNR5904. Working with their academic advisor students will execute their research strategy that provides data and subsequent data analysis towards solving the research question. The results and analysis will be presented in a format suitable for submission as a research paper to a relevant journal. Students will build their research skills, develop a strong analytical capacity, demonstrate a sound grasp of the topic, and ability to interpret results in a broad framework. Students will demonstrate their ability to draw reliable conclusions and identify future areas of research. Students will continue to develop their skills in solving research problems and enhance their intellectual and personal autonomy by means of managing a research program. Students will improve their communication skills through presentation of the research paper.





**AFNR5906****Research Communication**

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1 **Classes:** 1 workshop per week plus regular meetings with Supervisor **Prerequisites:** AFNR5901 and AFNR5904 **Corequisites:** AFNR5905 **Assessment:** Popular Article (20%), Poster (40%), Oral Presentation (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study provides the students with the opportunity to present the research findings of their major research project using several communication media appropriate for different audiences, for example, external stakeholders and /or popular media. Using poster and oral presentations students will communicate their research to the academic community in a professional conference environment. Students will also be required to attend the Faculty's seminar program that is relevant to their research topic. Students will build on their skills to use several modes of communication to demonstrate their ability to produce high quality results, draw reliable conclusions and identify future areas of research.

**AFNR5901****Research Review**

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1, Semester 2 **Classes:** 2 Lectures in semester + regular meetings with Supervisor **Corequisites:** AFNR5904 **Prohibitions:** AFNR5903, AFNR5902 **Assessment:** Research Review (100%) **Mode of delivery:** Supervision

This aims to develop a student's ability to review the literature with the view of developing a major research project in an area of specialization. The student will work with an academic advisor on a mutually agreed topic for research to be undertaken and the subsequent writing of a literature review. The literature review will advance the student's ability to identify existing knowledge, define research problems, demonstrate a sound grasp for presenting a research question, and begin to define a research strategy. Students will develop their research and inquiry skills through sourcing a wide range of literature and improve their written communication skills.

**AFNR5904****Research Proposal and Approach**

**Credit points:** 6 **Teacher/Coordinator:** Dr Damien Field **Session:** Semester 1, Semester 2 **Classes:** 1 workshop per week + regular meetings with Supervisor **Corequisites:** AFNR5901 **Assessment:** Written Research Proposal (60%); Oral Presentation (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study aims to develop a student's ability to write a detailed research proposal and develop a strategy combined with the appropriate methodology to execute their research. Working with their academic advisor students will prepare a proposal describing; the background and aims, its significance and innovation, the justification of the methodology, the national benefit, and considerations of the required budget and project timeline. This unit will enable students to develop their ability to define a research project to be managed within a suitable research framework. Students will develop their skills in solving research problems and enhance their intellectual and personal autonomy through managing a research program.

**Specialisation electives****Agricultural and Environmental Economics****AREC3004****Economics of Water and Bio-Resources**

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester Test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit develops knowledge and skills in natural resource economics built on previously gained economics training. The economics of dynamic natural systems is studied through application of advanced modelling approaches. Particular emphasis is given to the economic mechanisms for managing water and biological resources including property rights, water allocation and water markets. Key policy

instruments (taxes, quotas, standards) are analysed. Institutional and policy aspects will also be considered via analysis of water policy reform in Australia and elsewhere.

**ECOS3006****International Trade**

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** (ECOS2001 or ECON2001) or (ECOS2901 or ECON2901) **Prohibitions:** ECON3006 **Assessment:** problem sets (5%), Mid-semester test (35%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

**ECOS3005****Industrial Organisation**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

**AREC3001****Production Modelling and Management**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (60%), 1x50min Mid-semester Test (15%), 1x1500wd Assignment (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on the principles of biological production economics and introduces optimisation methods to solve decision making problems encountered by agribusiness and natural resource firms and managers in public agencies. The principle focus is on the application of linear programming techniques, and students learn to consider solving decision making problems where the outcomes are not known with certainty, and where the timing of decisions is of essence.

**AREC3002****Agricultural Markets**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGEC2103 or ECOS2001 or ECOS2901 **Assessment:** 1x1000wd Problem Sets (30%), 1x2hr Final Exam (40%), 1x1500wd Essay (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to provide an understanding of the underlying forces driving agricultural markets. It addresses price analysis and efficiency, including aspects of form, time and space in agricultural marketing; information and contracts; changing consumer concerns (food safety, ethical production); futures market and other risk sharing devices. Building on the application of microeconomic theory to both production and consumption in agricultural markets, its content is analytical.

**AREC3005****Agricultural Finance and Risk**

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2001 or AGE2103 or AREC2002 or AGE2101 or ECOS2001 or ECOS2901 **Assessment:** 1x2hr Final Exam (70%), 2x1500wd Assignments (30%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Agricultural production is typically risky, adding complexity to decision analysis and increasing need of risk consideration in agricultural policy design. This unit explores this theme, and has two related components: risk and risk management in agriculture, and issues of agricultural producer finance. These two components cover a broad range of topics that incorporate production risk and other sources of risk in agriculture.

**Agricultural and Environmental Technologies****AGRO4004****Sustainable Farming Systems**

**Credit points:** 6 **Teacher/Coordinator:** Dr Daniel Tan **Session:** Semester 1 **Classes:** Negotiated practicals and workshops (63h) **Prerequisites:** AGRO3004 **Assessment:** Final Exam (50%), 3 Assignments (3x10%), Data Analysis Project (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit is designed to provide students with training in the professional skills required to practice agronomy. The unit principally builds on theoretical and applied knowledge gained in third year agronomy (AGRO3004). In this unit students will integrate their knowledge of plant physiology, soil science, experimental design, and biometry to address applied problems in agronomy, namely the issue of sustainability. Students will develop their ability to establish conclusions towards making recommendations for long term sustainability of crop and pasture systems. By implementing and managing a major field and/or glasshouse experiment(s) students will develop their research and inquiry skills. Team work is strongly encouraged in this unit and the integration and reporting of research findings will facilitate critical thinking and development of written communication skills. After completing this unit, students should be able to confidently design and manage a glasshouse/field experiment, and interpret and communicate their findings, by integrating knowledge from across disciplinary boundaries.

**ENVI5708****Introduction to Environmental Chemistry**

**Credit points:** 6 **Teacher/Coordinator:** Dr Feike Dijkstra **Session:** Semester 1 **Classes:** 1x 2-hour lecture and 1x practical per week; 1x field trip (weekend) **Assessment:** Presentation (15%), Laboratory Report (40%), Assignment (40%), Class Participation (5%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of the course is to introduce students to the major physical and chemical processes that control the concentration and dispersion of chemical pollutants in natural and impacted environments. The course will demonstrate how to use contaminant data effectively and how to judge the quality of chemical data. This knowledge will be used to design and to assess environmental projects, and to judge the magnitude of impact by human activity on environments and the risk posed by contaminants to ecosystem functioning. The course aims to provide present and future managers employed in environmental professions with the skills to use data with confidence and to make management decisions knowing the risks inherent in variable data quality. A field trip will be undertaken early in the semester.

**AFNR5110****Crop Improvement**

**Credit points:** 6 **Teacher/Coordinator:** Professor R Trethowan/Professor P Sharp **Session:** Semester 2 **Classes:** The equivalent of 3 lectures and 3hrs practical work per week **Assumed knowledge:** Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013. **Assessment:** One 2hr exam (50%), essay/assignment (20%), practical reports (20%), presentation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Lectures, practical work and field trip(s) covering advanced aspects of the theory, philosophy and practice of plant breeding. Included are extended discussions of screening techniques (in the field, glasshouse

and laboratory), conservation and exploitation of diversity, disease resistance, tissue culture, plant cytogenetics of relevance to pre-breeding and breeding. Also considered are the role of biotechnology processes and products in plant breeding; genetic engineering and the use of molecular marker technologies. This course will use examples from the full range of crops; broad-acre cereals and legumes, pastures, turf and horticultural crops, both perennial and annual. The main base of the course may vary between the ATP and Camden campuses. Field trips (mainly to the IA Watson Grains Research Centre, Narrabri) will be used especially to examine trial procedures and field-based operations, and to interact with commercial plant breeding.

**AFNR5502****Remote Sensing, GIS and Land Management**

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Inakwu Odeh **Session:** Semester 2 **Classes:** 3x1-hr lectures/week weeks 1-6, 1x1 project weeks 7-11, 1x1-2 hour presentation scheduled for weeks 12 and 13, 1x3-hr practical weeks 1-6 **Assessment:** 1x 30 min presentation (10%), laboratory work reports (40%), Group discussion online (10%), 1x3500w project report (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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**

Textbook: Jesen J. R. 2006. Remote sensing of the environment: an earth resource perspective. 2nd ed. Pearson Prentice Hall Upper Saddle, New Jersey. Reference Textbook: Rees W.G. 2001. Physical principles of remote sensing. 2nd ed. Cambridge University Press, Cambridge, United Kingdom.

**AFNR5510****The Soil at Work**

**Credit points:** 6 **Teacher/Coordinator:** Prof Alex McBratney (Coordinator), A/Prof Balwant Singh, A/Prof. Stephen Cattle, Dr Damien Field, Prof David Guest, A/Prof Michael Kertesz **Session:** Semester 2 **Classes:** Problem-based unit: each student completes 1 problem as part of a team, involving multiple team meetings; 4 x 4 hr soil biology workshops **Assessment:** Introduction to the problem group presentation (10%); Status of the problem group report (10%); How to tackle the problem seminar (20%) - team seminars, before fieldwork, analyses done; Results seminar (20%) - team seminars; Final group report (25%); Activities diary for group (15%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This is a problem-based applied soil science unit addressing the physical, chemical and biological components of soil function. It is designed to allow students to identify soil-related problems in the real-world and by working in a group and with an end-user, to suggest short and long-term solutions to problems such as fertility, resilience,

carbon management, structural decline, acidification, salinisation and contamination. The soil biology workshops will allow student groups to incorporate relevant measurements of soil biota in their experiments. Students will gain some understanding of the concept of sustainability, and will be able to identify the causes of problems by reference to the literature, discussion with landusers and by the design and execution of key experiments and surveys. Students will gain a focused knowledge of the key soil drivers to environmental problems and will have some understanding on the constraints surrounding potential solutions. By designing and administering strategies to tackle real-world soil issues, students will develop their research and inquiry skills and enhance their intellectual autonomy. By producing reports and seminars that enables understanding by an end-user, students will improve the breadth of their communication skills. This is a core unit for students majoring or specialising in soil science and an elective unit for those wishing to gain an understanding of environmental problem-solving. It utilises and reinforces soil-science knowledge gained in SOIL2003 and SOIL2004, as well as generic problem-solving skills gained during the degree program.

#### Textbooks

Reference book: I.W.Heathcote 1997. Environmental Problem Solving: A Case Study Approach. McGraw-Hill, New York, NY, USA.

### AFNR5512

#### Water Management and Variable Climate

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Willem Vervoort **Session:** Semester 2 **Classes:** 3 hr workshop/week, practical work, project work **Assumed knowledge:** UG Maths or Physics or Hydrology. **Assessment:** Assignments (30%), project report (20%), 2 hr exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on knowledge gained in undergraduate soil science and crop science units to develop an understanding of catchment water management. Particular focus will be on the effect of climate variability and change on water management decisions on output and externalities (Salinity, landscape losses). At the completion of this unit student would be able to: Identify which climate variables will be most affected by climate change and variability; Evaluate which field and farm scale outputs will be most affected by climate change and variability; Develop scenarios based on distributions of climate variability; and Calculate the likely impacts of climate variability and change on streamflow, water availability and irrigation water demand using Monte Carlo techniques.

The open source software package SWAT will be used for most analysis and other open source software will be used if needed.

#### Textbooks

Rees W.G. 2001. Physical principles of remote sensing. 2nd ed. Cambridge University Press, Cambridge, United Kingdom.

### Horticultural Technologies

### AFNR5210

#### Sustainable Horticultural Cropping

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Robyn McConchie **Session:** Semester 1 **Classes:** 1hr Lecture/week, 2hr tutorial/excursions for case study, and on-line discussions **Assessment:** On-line discussions (10%), Group presentation (10%), Project report (30%), 2 hr exam (50%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit builds on knowledge gained in undergraduate plant and crop science units to develop an understanding of horticultural cropping systems management. Particular focus will be on intensive production systems and will provide them with a broad overview of current issues affecting the horticultural industries. Emphasis is on minimising the environmental impact of horticultural enterprises and introduces students to current themes and thinking in sustainable practices in horticultural science, such as efficient water management, sustainable use of fertilizers, salinity, integrated pest management and organic practices. Students also select an industry based case study analysis of a horticultural production system, designed to provide them with skills in data analysis and interpretation, problem identification and problem solving.

### AFNR5701

#### Plants and the Environment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Margaret Barbour **Session:** Semester 1 **Classes:** 24 hrs lectures and in-class discussion, 36 hours practical **Assessment:** One 2hr exam (40%), in-class discussion (10%), research manuscript (25%), either research proposal or research manuscript (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The focus of this unit is the response of plants to the environment, drawing examples from both managed and natural ecosystems. Students will develop advanced-level understanding of plant-environment interaction at scales from leaves to whole ecosystems through presentation and discussion of current research papers. Practical sessions will provide students with hands-on experience of state-of-the-art measurement techniques. Understanding of basic biophysical processes will be applied to inform discussion about the effects of climate change on terrestrial ecosystem services, including crop productivity.

#### Textbooks

Copies of research papers for each lecture/discussion will be provided, as will review papers where appropriate.

### AFNR5110

#### Crop Improvement

**Credit points:** 6 **Teacher/Coordinator:** Professor R Trethowan/Professor P Sharp **Session:** Semester 2 **Classes:** The equivalent of 3 lectures and 3hrs practical work per week **Assumed knowledge:** Basic knowledge of plant genetics and breeding, similar to that covered by GENE4012 and GENE4013. **Assessment:** One 2hr exam (50%), essay/assignment (20%), practical reports (20%), presentation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

Lectures, practical work and field trip(s) covering advanced aspects of the theory, philosophy and practice of plant breeding. Included are extended discussions of screening techniques (in the field, glasshouse and laboratory), conservation and exploitation of diversity, disease resistance, tissue culture, plant cytogenetics of relevance to pre-breeding and breeding. Also considered are the role of biotechnology processes and products in plant breeding; genetic engineering and the use of molecular marker technologies. This course will use examples from the full range of crops; broad-acre cereals and legumes, pastures, turf and horticultural crops, both perennial and annual. The main base of the course may vary between the ATP and Camden campuses. Field trips (mainly to the IA Watson Grains Research Centre, Narrabri) will be used especially to examine trial procedures and field-based operations, and to interact with commercial plant breeding.

### HORT4005

#### Research and Practice in Hort Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Brian Jones (Coordinator), Dr Kim-Yen Phan-Thein **Session:** Semester 2 **Classes:** 1x2h tut/wk; one 1-week excursion **Prerequisites:** HORT3005 **Assessment:** Pre-Field trip industry report (10%); Field trip industry report (15%); 2 x Practical reports (2 x 25%) 50%; End of semester exam 25%. **Mode of delivery:** Normal (lecture/lab/tutorial) day

This Unit of Study provides students with a scientific grounding in the sustainable production of safe and nutritious fruit, vegetables and nuts. The unit encompasses the fundamentals of produce and nursery production, including an analysis of production system options, agro-ecosystem/resource management, and industry best production and management practices. The unit will use case studies exemplifying important developments in horticultural production, supply and marketing chains. Students will examine multiple real world examples of horticulture, and use a supply chain framework to develop skills in integrative system evaluation, problem identification, data analysis and interpretation, and systematic problem-solving. Combining relevant industry knowledge, critical analytical skills, and a systems perspective will enable students to make valid, scientifically-informed decisions in horticulture and beyond. The unit is comprised of the key learning activities: lecture/tutorials, practicals in production and post-harvest horticulture techniques, and site visits to horticultural producers, research sites and peak industry bodies. The site visit program includes a week-long field trip to major horticultural production regions to view operations and Q&A with owner/operators.

## Forest and Atmosphere Interactions

### AFNR5701

#### Plants and the Environment

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Margaret Barbour **Session:** Semester 1 **Classes:** 24 hrs lectures and in-class discussion, 36 hours practical **Assessment:** One 2hr exam (40%), in-class discussion (10%), research manuscript (25%), either research proposal or research manuscript (25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The focus of this unit is the response of plants to the environment, drawing examples from both managed and natural ecosystems. Students will develop advanced-level understanding of plant-environment interaction at scales from leaves to whole ecosystems through presentation and discussion of current research papers. Practical sessions will provide students with hands-on experience of state-of-the-art measurement techniques. Understanding of basic biophysical processes will be applied to inform discussion about the effects of climate change on terrestrial ecosystem services, including crop productivity.

#### Textbooks

Copies of research papers for each lecture/discussion will be provided, as will review papers where appropriate.

### ENSY3002

#### Fire in Australian Ecosystems

**Credit points:** 6 **Teacher/Coordinator:** Dr Tina Bell **Session:** Semester 1 **Classes:** 2x1hr lectures, 1x3hr practical/wk **Prerequisites:** AGEN2005 or BIOL2023 or BIOL2923 **Assessment:** 1x 2h exam (40%), 1x 2000-2500w essay (20%), 3x practical reports (40%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is intended to describe fundamental scientific knowledge relating to fire behaviour and ecological and social effects of bushfire in Australian ecosystems. The student will gain a greater understanding of how fire has shaped the landscape and the people. It is an elective unit that builds on basic knowledge gained in junior-level biology and chemistry and intermediate-level plant biology and soil science subjects. Firstly, fire behaviour including the elements of weather, fuel and landscape will be explained and examined in relation to predictive modelling and climate change. Secondly, the fire response of flora, fauna, fungi and microorganisms will be described at a range of different scales and analysed against a background of current land management practices in Australia. Social aspects of bushfire will be discussed and analysed according to contemporary policies and practices. At the end of this unit, students will be able to apply fire behaviour and ecological principles for planning purposes and to integrate scientific information from a range of sources to assess fire impacts on the environment and human communities. The students will gain research, literacy and communication skills through field-based data collection, essay and report writing and oral presentations.

#### Textbooks

A reading list will be provided consisting of selected book chapters, journal articles and other publications

### AFNR5705

#### Australian Forest Systems

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant **Session:** Semester 2 **Classes:** 28.5 hrs lecture/tutorial, 30 hrs fieldwork **Assessment:** One 2hr exam (20%), two reports (2x25%), two oral presentations (2x10%) and one field report (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to enable students to participate in and improve the management of Australian forest ecosystems. Beginning with an introduction to the unique chemical, physical and ecological characteristics of Australian forests, this unit focuses on policy development and management prescriptions driven by fundamental processes of ecosystem function. Topics will encompass both tropical and temperate ecosystems with students given the opportunity to gain first hand observation of subtropical forest management practices by participating in a 4 day field exercise. At the end of this unit, students will be able to articulate strengths, weaknesses and improvements to the management of Australian forests for the purposes of production, conservation and climate change adaptation. Students will gain

first-hand experience of land management practices as they pertain to Australian forest systems and communicate with industry and governmental groups.

#### Textbooks

Reading material will be drawn upon from current literature in the field

### ENSY3003

#### Forest Ecosystem Science

**Credit points:** 6 **Teacher/Coordinator:** Dr Andrew Merchant **Session:** Semester 2 **Classes:** 2 lectures/week, 1 tut/fortnight, 1 field excursion (2 days) in week 6 of semester **Prerequisites:** Students require a basic understanding of plant biology. Understanding principles of plant taxonomy and ecology will also be an advantage. **Assessment:** One 2hr exam (50%), one 2000w essay (40%), one oral presentation (10%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study enables students to understand the management and conservation of trees and forests in a changing climate. It is an elective unit for students enrolled in advanced topics for the Bachelor of Environmental Systems course program. Beginning with an introduction to the unique chemical, physical and ecological characteristics of trees, this unit then focuses on policy development and management prescriptions driven by fundamental processes of ecosystem function. At the end of this unit students will be able to articulate critical evaluations of scientific and policy based documents in relation to research and management of trees in the Australian landscape. Students will be given the opportunity to gain firsthand knowledge of Australian forest management by participating in a 2 day field excursion (in week 6 of semester) combined with industry, government, research and conservation groups. At the end of this unit, students will be able to articulate strengths, weaknesses and improvements to the management of Australian forests for the purposes of production, conservation and climate change adaptation. Students will gain an intricate knowledge of tree function and be able to relate this understanding to the management of trees and forests in a changing environment. Students will develop skills to enable effective communication with industry, conservation and governmental groups.

## Other electives

### AFNR5107

#### Principles of Biochemical Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Rosalind Deaker (Coordinator), Prof Les Copeland, Dr Thomas Roberts, A/Prof Michael Kertesz, Dr Feike Dijkstra, Dr Claudia Keitel, Dr Neil Wilson **Session:** Semester 1 **Classes:** 18 hrs of lectures and 36 hrs of laboratory during the semester **Prohibitions:** AGCH4007 **Assessment:** Assessment includes attendance and participation in lectures and practical classes. Each module will comprise 25% of the final assessment mark and satisfactory progress in all modules is required for the successful completion of this unit. (4x25%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study is designed to expose students to the principles and practice of a diverse range of analytical methods used in agricultural and environmental science. The unit of study will be presented in four modules including: materials and sampling techniques; separation techniques (chromatographic and electrophoretic); instrumentation and measurement techniques (spectral analyses); and microbiological and molecular biology techniques. Each module will be a combination of lectures and practical classes that will analyse common agricultural or biochemical samples to illustrate the practical aspects of the theory. Students will also gain skills in data analysis relevant to the respective techniques.

At the completion of these modules, students will be familiar with the operation of a number of laboratory instruments, the theory that underpins their operation, be confident in the analysis of data, and be able to choose the most appropriate sampling strategy and analytical technique to perform high quality research.

### ECOS3002

#### Development Economics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or

ECON2902) **Prohibitions:** ECON3002 **Assessment:** 2x in-class tests (30%) and 2.5hr Final exam (70%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### ENVI5708

#### Introduction to Environmental Chemistry

**Credit points:** 6 **Teacher/Coordinator:** Dr Feike Dijkstra **Session:** Semester 1 **Classes:** 1x 2-hour lecture and 1x practical per week; 1x field trip (weekend) **Assessment:** Presentation (15%), Laboratory Report (40%), Assignment (40%), Class Participation (5%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

The aim of the course is to introduce students to the major physical and chemical processes that control the concentration and dispersion of chemical pollutants in natural and impacted environments. The course will demonstrate how to use contaminant data effectively and how to judge the quality of chemical data. This knowledge will be used to design and to assess environmental projects, and to judge the magnitude of impact by human activity on environments and the risk posed by contaminants to ecosystem functioning. The course aims to provide present and future managers employed in environmental professions with the skills to use data with confidence and to make management decisions knowing the risks inherent in variable data quality. A field trip will be undertaken early in the semester.

### GOVT6135

#### Global Environmental Politics

*This unit of study is not available in 2015*

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr seminar/week **Assessment:** 1x2000wd Essay (30%), 1x4000wd Essay (50%), Seminar participation (20%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit examines the environment as a political and policy issue. Although relatively recent, the environment has become a full-fledged public policy issue exerting influence in local, national and international arenas. The unit will first focus on the specific features of the policy that influences the capability of contemporary societies to enhance the management of environmental resources and of public goods in general. Second, it discusses the development of environmental policy in Western countries, with a particular emphasis on the European Union. Third, a grid for the analysis of environmental policy will be presented, with a discussion of the main actors (political, institutional and socio-economic) involved in it and of the factors (interests and ideas) influencing their positions. Fourth, the unit briefly discusses environmental conflicts and consensual approaches used for tackling them.

### PHYS5031

#### Ecological Econ & Sustainable Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Christopher Dey **Session:** Semester 1 **Classes:** 2-hour lecture and 1-hour tutorial per week. **Assessment:** Major essay, tutorial summary, and course compilation diary (100%). **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit will introduce selected recent topics from Ecological Economics, such as concepts of sustainability (definitions); comparisons with environmental economics, intergenerational discounting; time and equity in the climate change debate; valuing the environment; links between theories of well-being, consumerism and environmental impact; and cost benefit analysis. The unit sets the scene for the more detailed and specific units PHYS 5032, PHYS 5033, and PHYS 5034.

### PHYS5034

#### Life Cycle Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Christopher Dey **Session:** Semester 2 **Classes:** 2-hour lecture and 1-hour tutorial per week **Assessment:** Major essay, seminar presentation and course diary compilation (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Minimum class size of 5 students.*

This unit of study will cover the areas of the philosophy, techniques, applications and standards of Life-Cycle Assessment (LCA). It will include Process Analysis, Input-Output Analysis and Hybrid Analysis. Current LCA tools will be discussed. Case studies and business applications as well as global standards such as the GHG Protocol for accounting for scopes 1,2 and 3 emissions and ISO standards will provide a context. Students will also benefit from also enrolling in PHYS5033 for a sound understanding of input-output based Hybrid LCA methods.

### AREC3003

#### Econ of Minerals and Energy Industries

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** AREC2003 or RSEC2031 or ECOS2001 or ECOS2901 **Assessment:** 1x50min Mid-semester test (35%), 1x2hr Final Exam (50%), 3x500wd Tutorial Reports (15%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit builds on previously acquired economics training and develops advanced understanding of the economics of minerals exploration, extraction and marketing and the economics of energy generation, distribution and use. The implications of mineral extraction and energy generation activities for natural resources and the environment are explored. The unit will foster in-depth knowledge of the markets for minerals and energy, their industry structure and business environment, including the role of markets for derivatives on minerals and energy commodities.

### ECOS3002

#### Development Economics

**Credit points:** 6 **Session:** Semester 1 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** One of (ECOS2001 or ECON2001) or (ECOS2002 or ECON2002) or (ECOS2901 or ECON2901) or (ECOS2902 or ECON2902) **Prohibitions:** ECON3002 **Assessment:** 2x in-class tests (30%) and 2.5hr Final exam (70%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

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.

### ECOS3005

#### Industrial Organisation

**Credit points:** 6 **Session:** Semester 2 **Classes:** 1x2hr lecture/week, 1x1hr tutorial/fortnight **Prerequisites:** ECOS2001 or ECON2001 or ECOS2901 or ECON2901 **Prohibitions:** ECOS2201, ECON3005 **Assessment:** Mid-semester test (35%), problem sets (5%) and 2hr Final exam (60%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This 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.

### ENVI5809

#### Environmental Simulation Modelling

**Credit points:** 6 **Teacher/Coordinator:** Dr David Chapman **Session:** Semester 2a **Classes:** Six all day sessions **Prerequisites:** Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level

mathematics and understanding of basic statistics. **Assumed knowledge:** This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. **Assessment:** Project plus report (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study introduces participants to the power of simulation modelling in understanding and predicting behaviour of natural systems. It covers fundamental concepts, logic, and techniques (including sensitivity analysis), and develops skills in application to environmental problems such as catchment management and population dynamics.

### GEOG5004

#### Environmental Mapping and Monitoring

**Credit points:** 6 **Teacher/Coordinator:** A/Prof Peter Cowell **Session:** Semester 2 **Classes:** 2 hours of lectures and one three hour practical per week. **Prerequisites:** Assumed knowledge: This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. **Assumed knowledge:** This unit assumes a sound understanding of scientific principles, HSC level mathematics and understanding of basic statistics. **Assessment:** Assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

The unit introduces methods associated with acquiring data in the field and examines issues associated with application of spatial data to environmental monitoring, terrain mapping and geocomputing. Students will learn both theoretically and practically how environmental data is collected using different remote sensing techniques, (pre)processing methods of integrating data in a GIS environment and the role of spatial data in understanding landscape processes and quantifying environmental change.

### ECON5001

#### Microeconomic Theory

**Credit points:** 6 **Session:** Semester 1, Semester 2, Summer Main **Classes:** 1x3hr seminar/week, 1x1hr non-compulsory tutorial/week **Prohibitions:** ECON5003, ECON5000 **Assessment:** Online quizzes equivalent to 1000wd (10%), 1x1.5hr Mid-semester test (35%), 1x2hr Final exam (55%), **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit presumes no prior exposure to economics and aims, by the end of the unit, to bring a proficiency equivalent to that of students with an intermediate level microeconomics unit in an Honours degree program. Many economic principles developed in this unit are routinely used in several other units in the program. Microeconomics studies how economic agents make choices in a variety of environments. The unit covers theory and applications of the principles of consumer choice, of firm behaviour, and of strategic interaction among economic agents. Equipped with these theories of decision making, students can address a range of interesting and important questions. Examples are: What market strategy should a firm adopt with its competitors? How might one create a market to deal with externalities such as pollution? What are the implications of different kinds of taxes? What compensation scheme will provide the right incentives to work?

### PHYS5033

#### Environmental Footprints and IO Analysis

**Credit points:** 6 **Teacher/Coordinator:** Dr Arne Geschke and Prof Manfred Lenzen **Session:** Semester 1, Semester 2 **Classes:** 2-hour lecture interspersed with hands-on exercises per week **Assessment:** Comprehensive diary/notes from lectures, including a quantitative example (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

*Note: Minimum class size of 5 students.*

This unit of study will provide an introduction to economic input-output theory and input-output analysis, with a focus on environmental applications such as carbon footprints and life-cycle analysis. The unit first explores national and global economic and environmental accounting systems and their relationships to organisational accounting. Second, it will present variants of the basic accounts, such as global multi-regional input-output systems and social accounting systems. Third, it will introduce the basic input-output calculus conceived by Nobel Prize Laureate Wassily Leontief, and provide concrete examples for how to apply this calculus to data published by statistical offices. The unit will then show how to integrate economic and environmental accounts, and generate boundary-free

environmental footprint assessments. Students will walk away from this unit equipped with all skills needed to calculate footprints, and prepare sustainability reports for any organisation, city, region, or nation, using organisational data, economic input-output tables and environmental accounts.

### SUST5001

#### Introduction to Sustainability

**Credit points:** 6 **Teacher/Coordinator:** Associate Professor Tony Masters **Session:** Semester 1, Semester 2 **Classes:** One 2 to 2.5 hour interactive lecture per week presented in an intensive format with up to four hours per week spent on a combination of additional (e.g. on-line) learning tasks, small group sessions and consultation with lecturers. **Assessment:** Essays, oral presentations, short written assignments (100%) **Mode of delivery:** Normal (lecture/lab/tutorial) day

This unit of study will introduce students to the concepts and multidisciplinary nature of sustainability, starting with the physical basis of climate change and its impact on the environment and human development. This will be followed by several case studies covering Energy, Health, Development and Environment. The case studies will be presented by industry professionals and will illustrate sustainability issues currently before Australia- their origins, impacts and industry responses. The unit of study will provide students with a holistic systems lens through which to view their learning throughout the Masters program. This will underpin understanding of the integrated nature of sustainability and facilitate the challenging of silo-based assumptions- their own and those of others. The intention is to ground understanding of complex systems in the real world through the use of case studies that will demonstrate organisational change and problem solving in a world with competing values and conflicting views of what it means to live sustainably. Students completing the unit of study will have a "sustainability tool kit" to apply to sustainability issues in their professional and community activities.



---

# Doctor of Philosophy

The degree of Doctor of Philosophy is a University degree governed by Resolutions set down by the Academic Board. Candidates should be familiar with the Academic Board documents Degree of Doctor of Philosophy and University of Sydney (Higher Degree by Research) Rule 2011.

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 with research 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 four semesters for candidates holding a master's degree or equivalent, or six semesters in the case of candidates holding a bachelor's degree with first-class or second-class honours; the maximum period of candidature is normally eight semesters. The first full year 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 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 usually will not be less than the equivalent of six semesters.







# Master of Philosophy

## Master of Philosophy

*These resolutions must be read in conjunction with applicable University By-laws, Rules and policies including (but not limited to) the University of Sydney (Higher Degree by Research) Rule 2011 (the 'HDR Rule'), the Academic Board resolutions relating to the Degree of Doctor of Philosophy and the University of Sydney (Student Appeals against Academic Decisions) Rule 2006 (as amended).*

### Course resolutions

#### Part 1: Preliminary

##### 1 Course codes

Code	Course and stream title
RMPHLAGR-01	Master of Philosophy

#### Part 2: Admission requirements

##### 2 Eligibility for admission to candidature

- (1) To be eligible to be admitted to candidature by the Dean or Associate Dean, an applicant must:
  - (a) hold or have completed the requirements for a bachelor's degree from the Faculty of Agriculture and Environment of the University of Sydney, with:
    - (i) first or second class honours; or
    - (ii) at least a Credit grade average in the fourth year in the field in which the applicant wishes to proceed.
  - (2) The Dean or Associate Dean may admit to candidature an applicant who does not meet the requirements of sub-clause (1), provided that the applicant holds a qualification or qualifications that, in the opinion of the Faculty Board of Postgraduate Studies, are equivalent to those prescribed in sub-clause (1).

##### 3 Application for admission to candidature

- (1) An applicant for admission to candidature must submit to the Faculty:
  - (a) satisfactory evidence of the applicant's eligibility for admission;
  - (b) a proposed course of research and advanced study, approved by the Head of the Department in which the work is to be undertaken;
  - (c) a statement certifying the applicant's understanding that, subject to the HDR Rule, if the candidature is successful, his or her thesis will be lodged with the University Librarian and made available for immediate public use;
  - (d) evidence of minimum English language requirements, where not demonstrated by academic qualifications; and
- (2) In addition, an applicant for admission to part-time candidature must submit a statement that he or she will have sufficient time available to complete the requirements of the degree in accordance with these resolutions.

##### 4 Credit transfer

The HDR Rule specifies the conditions for the granting of credit for previous studies, including the effect on completion times.

#### Part 3: Candidature

##### 5 Appointment of supervisor

The Head of Department will appoint a supervisor and associate supervisor for each candidate in accordance with the HDR Rule and Academic Board policies for postgraduate research higher degree supervision.

##### 6 Control of candidature

The HDR Rule specifies the conditions for the control of candidature by the University.

##### 7 Location of candidature and attendance

The HDR Rule specifies the conditions for the location of candidature and attendance by candidates at the University.

#### Part 4: Requirements

##### 8 Degree requirements

- (1) To satisfy the requirements of the degree candidates must:
  - (a) complete any specified probationary requirements;
  - (b) complete any prescribed units of study;
  - (c) conduct research on the approved topic; and
  - (d) write a thesis embodying the results of the research.

##### 9 Specialisations

- (1) The degree may be awarded without a specialisation or is offered in one of the following specialisations:
  - (a) Agricultural Economics
  - (b) Agricultural Science
  - (c) Forest Science
  - (d) Resource Economics
  - (e) Sustainable Horticulture
- (2) The testamur will include the specialisation completed.

##### 10 The thesis

A candidate shall produce a thesis that meets the requirements specified in the HDR Rule.

#### Part 5: Enrolment and progression

##### 11 Probation

- (1) A candidate is normally accepted for candidature on a probationary basis for a period not exceeding one year according to the provisions of the HDR Rule.
- (2) In the probationary period each candidate must:
  - (a) complete any specified unit of study; and
  - (b) develop and present a refined research proposal to the satisfaction of the supervisor and Head of Department.

##### 12 Time limits, earliest and latest submission dates

The HDR Rule specifies the allowable completion times and submission dates available for full- and part-time candidates in this course.

##### 13 Mode of attendance

The attendance pattern for this course is full-time or part-time according to candidate choice. Visa requirements commonly restrict international students to full-time study only.

##### 14 Discontinuation of candidature

A candidate may discontinue enrolment in a unit of study or the degree subject to the conditions specified by the HDR Rule.

##### 15 Suspension of candidature

A candidate may suspend enrolment from the degree subject to the conditions specified by the HDR Rule.

##### 16 Leave of absence

A candidate may take leave of absence from the degree subject to the conditions specified by the HDR Rule.

##### 17 Progress

A candidate is required to maintain satisfactory progress towards the timely completion of the degree. Progress will be reviewed annually according to the provisions of the HDR Rule.

#### Part 6: Examination

##### 18 Examination of the thesis

- (1) Examination of the thesis will be conducted in general accordance with standards prescribed by Academic Board for the Doctor of Philosophy, except that:



- (a) three copies of the thesis shall be submitted by the candidate;
- (b) two examiners will be appointed by the Faculty, at least one of whom shall be external to the University; and
- (c) the Faculty Board of Postgraduate Studies will act in place of the PhD Award Sub-Committee.

#### 19 Award of the degree

The degree is awarded at the Pass level only.

### Part 7: Other

#### 20 Transitional provisions

- (1) These course resolutions apply to students who commenced their candidature after 1 January, 2012 and students who commenced their candidature prior to 1 January, 2012 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2012 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed within the time limits specified in those resolutions. The Dean or Associate Dean may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.

# Agricultural Economics and Science in Agriculture

## 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.





# Resolutions of the Senate

## Resolutions of the Senate

### 1 Degrees, diplomas and certificates of the Faculty of Agriculture and Environment.

- (1) With the exception of the Doctor of Agricultural Economics, the Doctor of Science in Agriculture and the Doctor of Philosophy, the Senate, by authority of the University of Sydney Act 1989 (as amended), provides and confers the following degrees, diplomas and certificates, according to the rules specified by the Faculty of Agriculture and Environment. The Doctor of Agricultural Economics, the Doctor of Science in Agriculture and the Doctor of Philosophy are provided and conferred according to the rules specified by the Senate and the Academic Board.
- (2) This list is amended with effect from 1 January, 2011. Degrees, diplomas and certificates no longer open for admission will be conferred by the Senate according to the rules previously specified by the Faculty.

### 2 Degrees

Code	Course title	Abbreviation	Credit points
RHAGRECO-01	Doctor of Agricultural Economics	DAgrEc	Published Work
RHSCAGRI-01	Doctor of Science in Agriculture	DScAgr	Published Work
RPPHDAGR-01	Doctor of Philosophy	PhD	Research
RMPHLAGR-01	Master of Philosophy	MPhil	Research
MAAGRENV-01	Master of Agriculture and Environment	MAgrEnv	72
BUAGRECO-01	Bachelor of Agricultural Economics ( <i>no new admissions from 2015</i> ) <sup>^</sup>	BAgrEc	192
BUFDAGBU-01	Bachelor of Food and Agribusiness <sup>^</sup>	BFoodAgrib	192
BPENVSYS-01	Bachelor of Environmental Systems <sup>*</sup>	BEnvSys	144
BURESECN-01	Bachelor of Resource Economics ( <i>no new admissions from 2015</i> ) <sup>^</sup>	BResEc	192
BUSCAGRI-01	Bachelor of Science in Agriculture <sup>^</sup>	BScAgr	192

<sup>^</sup>may be awarded with honours in an integrated program.

<sup>\*</sup>may be awarded with honours following a further year of study.

### 3 Graduate diplomas

Code	Course title	Abbreviation	Credit points
GNAGRENV-01	Graduate Diploma in Agriculture and Environment	GradDipAgr	48

### 4 Graduate certificates

Code	Course title	Abbreviation	Credit points
GCAGRENV-01	Graduate Certificate in Agriculture and Environment	GradCertAgrEnv	24





# Resolutions of the Faculty

## Resolutions of the Faculty of Agriculture and Environment for coursework awards

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

### Part 1: Course enrolment

#### 1 Enrolment restrictions

The Coursework Rule limits the maximum number of credit points students may take in any given semester. The Faculty does not encourage full time students to exceed the recommended enrolment patterns for its courses.

#### 2 Time limits

The Coursework Rule limits the time students may take to complete their course; part time students should ensure their enrolment pattern allows completion within the maximum time. The Rule also defines how time limits are affected by periods of suspension or absence, and the time limits for recognition of credit for previous study.

#### 3 Suspension, discontinuation and lapse of candidature

The Coursework Rule specifies the conditions for suspending or discontinuing candidature, and return to candidature after these events. The Rule also defines the circumstances when candidature is deemed to have lapsed. Students should pay careful attention to the significant dates in these processes and their effect on results and financial liability.

#### 4 Credit for previous study

- (1) For undergraduate degrees: the Dean may approve a maximum of 96 credit points of credit towards the requirements. A maximum of 36 unspecified credit points for units of study not comparable to units listed in table units for each degree may be granted as part of the 96 credit point maximum credit transfer permitted.
- (2) For postgraduate courses: a maximum of six credit points may be granted to graduate certificates, and 12 credit points to graduate diplomas and master's, except that full credit will be awarded for students moving through an embedded sequence.

### Part 2: Unit of study enrolment

#### 5 Cross-institutional study

- (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 the student's course requirements provided that:
  - (a) the unit of study content is material not taught in any corresponding unit of study in the University; or
  - (b) the student is unable for good reason to attend a corresponding unit of study at the University.
- (2) Cross institutional study is regarded as another form of credit and will be counted as such when considering eligibility.

#### 6 International Options

- (1) Exchange: The faculty encourages students with a minimum credit average, to participate in international exchange programs. For more information refer to the International Services.
- (2) Specialisation: To qualify for the award of international specialisation, a candidate must complete a minimum of 48 credit points in approved units of study for two semesters at an approved university. Once a student has applied for and been accepted for International Exchange, the student may then apply for the International Specialisation. For detailed information on the application procedure, requirements and approved universities, please see the Faculty website: [http://sydney.edu.au/agriculture/current\\_students](http://sydney.edu.au/agriculture/current_students)

### Part 3: Studying and Assessment

#### 7 Attendance

- (1) Students are required to be in attendance at the correct time and place of any formal or informal examinations. Non attendance on any grounds insufficient to claim special consideration will result in the forfeiture of marks associated with the assessment. Participation in a minimum number of assessment items may be included in the requirements specified for a unit of study.
- (2) Students are expected to attend a minimum of 90 percent of timetabled activities for a unit of study, unless granted exemption by the Dean. A student who has not met the minimum attendance requirements in a unit may be deemed to have failed to complete the requirements and may be excluded by the Dean from admission to examinations in that unit.

#### 8 Late submission policy

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

#### 9 Special consideration for illness, injury or misadventure

Special consideration is a process that affords equal opportunity to students who have experienced circumstances that adversely impact their ability to adequately complete an assessment task in a unit of study. The Coursework Rule provides full details of the University policy. The procedures for applying for special consideration are described in each unit of study outline.

#### 10 Concessional pass

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





## 11 Re-assessment

- (1) In this Faculty re-assessment is offered to students whose performance is in the prescribed range and circumstances.
- (2) Students whose final mark for their unit of study is within the range 45-49 may be offered the chance to complete re-assessment. Re-assessment will normally be offered within 3 weeks at the end of the formal examination period and it is the student's responsibility to be available to attend during this time. The maximum mark awarded for a unit of study in these circumstances will be 50 - Pass.

## Part 4: Progression, Results and Graduation

### 12 Satisfactory progress

- (1) The Faculty will monitor students for satisfactory progress towards the completion of their award course. In addition to the common triggers used to identify students not meeting academic progression requirements (as defined by the Progression requirements of the Coursework Rule), students must pass any unit of study identified in the course resolutions as being critical to progression through the course.
- (2) An undergraduate student must obtain the written permission of the Associate Dean (Teaching and Learning) 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.

### 13 Award of the degree of bachelor with honours

Honours is available to meritorious students as either integrated honours or appended honours. Admission to candidature and requirements for the honours courses are in accordance with the relevant course resolutions.

### 14 University medal

A student with a Year 4 WAM (or HWAM) of at least 85 and a Year 2/3 WAM of at least 80, may be awarded a university medal. The medal is awarded at the discretion of the faculty to the highest achieving students who in the opinion of the Faculty have an outstanding academic record, in accordance with Coursework Rule.

### 15 Weighted average mark (WAM)

The University has a formula for calculating a Weighted Average Mark and this is defined in the University Glossary. WAMs are used by the University as one indicator of performance. For example, WAMs can be used in assessing admission to and award of honours, eligibility for prizes and scholarships, or assessing progression through a course.

## Part 5: Other

### 16 Transitional provisions

- (1) These resolutions apply to students who commenced their candidature after 1 January, 2011 and students who commenced their candidature prior to 1 January, 2011 who elect to proceed under these resolutions.
- (2) Candidates who commenced prior to 1 January, 2011 may complete the requirements in accordance with the resolutions in force at the time of their commencement, provided that requirements are completed by 1 January, 2016. The Faculty may specify a later date for completion or specify alternative requirements for completion of candidatures that extend beyond this time.

# Index by alpha code

## A

- ACCT1006 Accounting and Financial Management, **26, 34, 65, 66, 79, 84**
- ACCT2011 Financial Accounting A, **26, 35, 67, 85**
- ACCT2012 Management Accounting A, **26, 35, 67, 85**
- ACCT3011 Financial Accounting B, **67, 85**
- ACCT3012 Management Accounting B, **67, 85**
- ACCT3013 Financial Statement Analysis, **26, 35, 67, 85**
- ACCT3014 Auditing and Assurance, **67, 86**
- ACCT3031 International Corporate Governance, **67, 86**
- ACCT3032 Current Issues in Management Accounting, **67, 86**
- AFNR3001 Agro-ecosystems in Developing Countries, **8, 17, 40, 47**
- AFNR4001 Professional Development, **40, 51, 63, 75, 106, 117**
- AFNR4101 Research Project A, **5, 9, 21, 26, 33, 40, 51**
- AFNR4102 Research Project B, **5, 9, 21, 26, 33, 40, 52**
- AFNR5107 Principles of Biochemical Analysis, **41, 52, 144, 146, 148, 153**
- AFNR5110 Crop Improvement, **143, 144, 145, 146, 147, 148, 151, 152**
- AFNR5210 Sustainable Horticultural Cropping, **144, 146, 148, 152**
- AFNR5502 Remote Sensing, GIS and Land Management, **143, 145, 147, 151**
- AFNR5510 The Soil at Work, **143, 145, 147, 151**
- AFNR5511 Soil Processes, Assessment & Management, **143, 145, 147, 149**
- AFNR5512 Water Management and Variable Climate, **143, 145, 147, 152**
- AFNR5701 Plants and the Environment, **144, 146, 148, 152, 153**
- AFNR5705 Australian Forest Systems, **144, 146, 148, 153**
- AFNR5801 Climate Change: Process, History, Issues, **143, 145, 147, 149**
- AFNR5901 Research Review, **143, 145, 147, 150**
- AFNR5904 Research Proposal and Approach, **143, 145, 147, 150**
- AFNR5905 Research Paper, **143, 145, 147, 149**
- AFNR5906 Research Communication, **143, 145, 147, 150**
- AGCH3025 Chemistry and Biochemistry of Foods, **26, 32, 39, 46**
- AGCH3026 Food Biotechnology, **26, 35, 41, 55**
- AGCH3033 Environmental Chemistry, **8, 17, 40, 41, 49, 52, 113, 138**
- AGEC1006 Economic Environment of Agriculture, **7, 12, 25, 30, 39, 44**
- AGEC1102 Agricultural and Resource Economics, **66, 83, 108, 123**
- AGEC2101 Market and Price Analysis, **63, 66, 73, 83, 105, 115**
- AGEC2102 Agribusiness Marketing, **25, 31, 40, 48, 65, 66, 67, 68, 81, 83, 86, 89**
- AGEC2103 Production Economics, **63, 66, 73, 83, 105, 108, 115, 124**
- AGEC2105 Applied Econometric Modelling 1, **63, 73, 105, 115**
- AGEC3101 Agribusiness Management, **63, 66, 74, 84**
- AGEC3102 Agricultural and Resource Policy, **40, 49, 63, 66, 74, 84, 105, 116**
- AGEC3103 Applied Optimisation, **63, 66, 74, 84, 105, 108, 116, 125**
- AGEC3104 Research Methods, **63, 75, 105, 117**
- AGEC4101 Agricultural Marketing Analysis, **64, 67, 68, 78, 87, 89**
- AGEC4102 Agricultural Development Economics, **64, 77, 106, 119**
- AGEC4103 International Agricultural Trade, **64, 76, 106, 118**
- AGEC4104 Industrial Organization of Agribusiness, **64, 67, 68, 77, 86, 88, 89, 106, 118**
- AGEC4107 Special Topics, **64, 68, 76, 88, 106, 118, 119**
- AGEC4108 Quantitative Planning Methods, **64, 68, 76, 88, 106, 118**
- AGEC4109 Agricultural Finance and Risk, **64, 67, 68, 78, 87, 88**
- AGEC4112 Research Project A, **63, 75**
- AGEC4113 Research Project B, **64, 75**
- AGEC4121 Research Exercises A, **64, 75, 106, 117, 118**
- AGEC4122 Research Exercises B, **64, 75, 106, 117, 118**
- AGEN1001 Shaping our Landscapes, **7, 11, 39, 43, 66, 83**
- AGEN1002 Sustaining our Landscapes, **7, 12, 39, 44**
- AGEN1004 Applied Biology for Ag and Environment, **7, 12, 25, 30, 39, 44**
- AGEN1006 Biological Chemistry, **7, 13, 25, 30, 39, 45**
- AGEN2001 Plant Function, **7, 13, 25, 31, 39, 45**
- AGEN2002 Fresh Produce Management, **25, 31**
- AGEN2003 Innovation in Food Supply Chains, **25, 31**
- AGEN2005 Plant Systems Biology, **7, 13, 39, 46**
- AGEN2006 Animal Production and Management, **25, 32, 39, 46**
- AGEN3001 Food Product Development, **26, 32**
- AGEN3003 Global Food Security, **26, 33**
- AGEN3004 Food Processing and Value Adding, **26, 33**
- AGEN5001 Agricultural and Environmental Extension, **42, 58**
- AGRO3004 Managing Agro-Ecosystems, **8, 15, 40, 47**
- AGRO4003 Crop and Pasture Agronomy, **8, 17, 41, 53, 143, 145, 147, 149**
- AGRO4004 Sustainable Farming Systems, **8, 17, 41, 53, 143, 145, 147, 151**
- AGRO4005 Livestock Production Systems, **41, 53**
- AGRO4006 New and Emerging Tech in Animal Science, **41, 54**
- ANSC3101 Animal Nutrition 3, **40, 49**
- ANSC3102 Animal Reproduction, **40, 48**
- ANSC3103 Animal Structure and Function A, **40, 48**
- ANSC3104 Animal Structure and Function B, **40, 50**
- ANSC3107 Animal Genetics 3, **42, 59**
- AREC2001 Econ of Biological Production Systems, **7, 14, 40, 48, 63, 66, 73, 84, 105, 108, 115, 124**



- AREC2002 Commodity Market and Price Analysis, **7, 15, 40, 50, 63, 66, 74, 83, 105, 116**
- AREC2003 Concepts in Enviro and Resource Economics, **8, 16, 40, 48, 105, 108, 116, 125**
- AREC2004 Benefit-Cost Analysis, **8, 18, 40, 50, 64, 76**
- AREC3001 Production Modelling and Management, **27, 35, 40, 41, 50, 53, 63, 66, 74, 84, 105, 108, 117, 125, 143, 145, 147, 150**
- AREC3002 Agricultural Markets, **27, 35, 41, 53, 64, 67, 68, 78, 87, 89, 143, 145, 147, 150**
- AREC3003 Econ of Minerals and Energy Industries, **42, 59, 64, 77, 106, 119, 144, 146, 148, 154**
- AREC3004 Economics of Water and Bio-Resources, **8, 19, 65, 79, 106, 120, 143, 145, 147, 150**
- AREC3005 Agricultural Finance and Risk, **64, 67, 68, 78, 87, 88, 143, 145, 147, 151**
- AVBS1002 Concepts of Animal Management, **50**
- AVBS4002 Dairy Production and Technology, **27, 35, 42, 59**
- AVBS4004 Food Safety Assessment and Management, **27, 35**
- AVBS4008 Intensive Animal Industries, **27, 35, 42, 59**
- AVBS4009 Aquaculture, **42, 58**
- AVBS4012 Extensive Animal Industries, **27, 35, 42, 58**
- B**
- BIOL1001 Concepts in Biology, **7, 11, 25, 29, 39, 43, 65, 79, 106, 120, 123**
- BIOL1002 Living Systems, **65, 79, 107, 120, 123**
- BIOL1902 Living Systems (Advanced), **107, 120, 123**
- BIOL1911 Concepts in Biology (Advanced), **7, 11, 25, 29, 39, 43**
- BIOL2024 Ecology and Conservation, **8, 15**
- BIOL3007 Ecology, **8, 20**
- BIOL3009 Terrestrial Field Ecology, **9, 20**
- BIOL3018 Gene Technology and Genomics, **40, 48**
- BIOL3918 Gene Technology and Genomics Advanced, **40, 49**
- BIOM4003 Matrix Algebra and Linear Models, **41, 54**
- BIOM4004 Advanced Statistical Methods, **41, 55**
- BIOM4005 Biometrical Methods, **41, 55**
- BUSS1001 Understanding Business, **25, 29**
- BUSS1002 The Business Environment, **25, 31**
- BUSS1030 Accounting, Business and Society, **25, 30, 34, 65, 67, 79, 84**
- BUSS2220 Small Business Structures and Taxation, **27, 35**
- BUSS3500 Integrated Business Applications, **27, 35**
- C**
- CHEM1001 Fundamentals of Chemistry 1A, **7, 11, 25, 29, 39, 43, 107, 120, 123**
- CHEM1002 Fundamentals of Chemistry 1B, **107, 121, 123**
- CHEM1101 Chemistry 1A, **7, 11, 25, 29, 39, 43, 107, 121, 123**
- CHEM1102 Chemistry 1B, **107, 121, 123**
- CHEM1901 Chemistry 1A (Advanced), **7, 12, 25, 29, 39, 44, 107, 121, 123**
- CHEM1902 Chemistry 1B (Advanced), **107, 121, 123**
- CLAW1001 Foundations of Business Law, **26, 34, 65, 68, 79, 90, 107, 109, 121, 123, 126**
- CLAW2201 Corporations Law, **27, 36, 67, 86**
- E**
- ECMT1010 Introduction to Economic Statistics, **67, 68, 69, 85, 90, 91, 92, 107, 108, 109, 110, 121, 123, 124, 126, 128**
- ECMT1020 Introduction to Econometrics, **68, 69, 90, 91, 108, 109, 110, 124, 126, 128**
- ECMT2130 Financial Econometrics, **69, 90, 109, 127**
- ECMT3120 Applied Econometrics, **69, 91, 109, 127**
- ECMT3130 Forecasting for Economics and Business, **69, 91, 109, 127**
- ECMT3150 The Econometrics of Financial Markets, **69, 91, 109, 127**
- ECMT3170 Computational Econometrics, **69, 91, 109, 127**
- ECON1001 Introductory Microeconomics, **69, 91, 92, 110, 128, 129**
- ECON1002 Introductory Macroeconomics, **69, 92, 110, 128, 129**
- ECON5001 Microeconomic Theory, **144, 146, 148, 155**
- ECOS2001 Intermediate Microeconomics, **63, 69, 73, 92, 105, 110, 115, 128**
- ECOS2002 Intermediate Macroeconomics, **63, 69, 74, 92, 105, 110, 116, 128**
- ECOS3002 Development Economics, **64, 77, 106, 119, 144, 146, 148, 153, 154**
- ECOS3005 Industrial Organisation, **64, 67, 68, 77, 87, 88, 89, 106, 118, 143, 144, 145, 146, 147, 148, 150, 154**
- ECOS3006 International Trade, **64, 76, 106, 118, 143, 145, 147, 150**
- ECOS3013 Environmental Economics, **64, 78, 143, 145, 147, 149**
- ENSY3001 Biosphere-Atmosphere Interactions, **8, 16**
- ENSY3002 Fire in Australian Ecosystems, **8, 19, 41, 56, 144, 146, 148, 153**
- ENSY3003 Forest Ecosystem Science, **9, 20, 41, 56, 144, 146, 148, 153**
- ENSY4001 Scientific Method and Communication, **5, 9, 21**
- ENTO2001 Introductory Entomology, **8, 15, 39, 46**
- ENTO4003 Integrated Pest Management, **8, 18, 41, 54**
- ENTO4004 Insect Taxonomy and Systematics, **41, 54**
- ENVI3111 Environmental Law and Ethics, **8, 17, 19, 70, 94, 105, 111, 117, 130**
- ENVI3112 Environmental Assessment, **9, 20, 70, 94, 111, 131**
- ENVI3911 Environmental Law and Ethics (Advanced), **70, 94, 111, 131**
- ENVI3912 Environmental Assessment (Advanced), **70, 94, 111, 131**
- ENVI5708 Introduction to Environmental Chemistry, **143, 144, 145, 146, 147, 148, 151, 154**
- ENVI5809 Environmental Simulation Modelling, **144, 146, 148, 154**
- ENVX1002 Introduction to Statistical Methods, **7, 12, 25, 30, 39, 44**
- ENVX2001 Applied Statistical Methods, **7, 13, 39, 45**
- ENVX3001 Environmental GIS, **7, 14, 40, 42, 50, 57, 65, 82, 113, 137**
- ENVX3002 Statistics in the Natural Sciences, **8, 18, 20, 40, 49**
- ENVX4001 GIS, Remote Sensing and Land Management, **8, 18, 41, 55**
- F**
- FINC2011 Corporate Finance I, **26, 32, 34, 67, 69, 87, 92, 93, 110, 129**
- FINC2012 Corporate Finance II, **26, 34, 67, 69, 87, 93, 110, 129**
- FINC3011 International Financial Management, **27, 36**
- FINC3015 Financial Valuation: Case Study Approach, **27, 36**
- FINC3017 Investments and Portfolio Management, **69, 93, 110, 129**

FINC3020 Financial Risk Management, **27, 36**

## G

GENE2002 Veterinary and Agricultural Genetics 2, **7, 14, 39, 45**

GENE4012 Plant Breeding, **41, 53**

GENE4015 Cytogenetics, **41, 53**

GEOG5004 Environmental Mapping and Monitoring, **144, 146, 148, 155**

GEOS1001 Earth, Environment and Society, **7, 14, 65, 80, 107, 122, 123**

GEOS1002 Introductory Geography, **65, 80, 107, 122, 123**

GEOS1003 Introduction to Geology, **107, 122, 123**

GEOS3008 Field Geology, **112, 132**

GEOS3009 Coastal Environments and Processes, **70, 95, 111, 131**

GEOS3014 GIS in Coastal Management, **70, 95, 111, 112, 132, 134**

GEOS3053 Southeast Asia Field School, **70, 93, 111, 130**

GEOS3101 Earth's Structure and Evolution, **71, 96, 111, 112, 130, 133**

GEOS3102 Global Energy and Resources, **112, 133**

GEOS3103 Environmental and Sedimentary Geology, **112, 133**

GEOS3333 Geographical Concepts, Skills & Methods, **70, 93, 110, 129**

GEOS3520 Urban Citizenship & Sustainability, **70, 94, 111, 131**

GEOS3524 Global Development and Livelihoods, **70, 95, 111, 131**

GEOS3801 Earth's Structure and Evolutions (Adv), **112, 133**

GEOS3802 Global Energy and Resources (Adv), **112, 133**

GEOS3803 Environmental & Sedimentary Geology(Adv), **112, 134**

GEOS3804 Geophysical Methods (Advanced), **112, 134**

GEOS3908 Field Geology (Adv), **112, 132**

GEOS3909 Coastal Environments and Processes (Adv), **70, 95, 111, 132**

GEOS3914 GIS in Coastal Management (Advanced), **71, 95, 111, 132**

GEOS3920 Urban Citizenship & Sustainability (Adv), **70, 94, 111, 131**

GEOS3924 Global Development and Livelihoods (Adv), **70, 95, 111, 131**

GEOS3933 Geog. Concepts, Skills & Methods (Adv), **70, 93, 110, 130**

GEOS3953 Southeast Asia Field School (Adv), **70, 93, 111, 130**

GOVT1101 Australian Politics, **65, 80, 107, 122, 123**

GOVT1104 Introduction to Political Science, **65, 80**

GOVT1105 Geopolitics, **65, 80**

GOVT1202 World Politics, **65, 80, 107, 122, 123**

GOVT6135 Global Environmental Politics, **144, 146, 148, 154**

## H

HORT3005 Production Horticulture, **40, 41, 49, 56**

HORT4005 Research and Practice in Hort Science, **41, 55, 56, 144, 146, 148, 152**

## I

IBUS2101 International Business Strategy, **27, 36**

IBUS2102 Cross-Cultural Management, **71, 96**

IBUS3107 Business Negotiations, **71, 97**

INFS1000 Digital Business Innovation, **26, 34, 65, 80**

## L

LWSC2002 Introductory Hydrology, **7, 14, 40, 51, 65, 82**

LWSC3007 Advanced Hydrology and Modelling, **8, 16, 42, 56, 113, 138**

## M

MATH1001 Differential Calculus, **108, 109, 112, 114, 123, 125, 134, 138**

MATH1002 Linear Algebra, **108, 109, 112, 114, 124, 125, 134, 138**

MATH1003 Integral Calculus and Modelling, **108, 109, 112, 114, 124, 125, 134, 139**

MATH1004 Discrete Mathematics, **112, 135**

MATH1005 Statistics, **108, 109, 112, 114, 124, 126, 135, 139**

MATH1011 Applications of Calculus, **65, 81**

MATH1013 Mathematical Modelling, **65, 81**

MATH2061 Linear Mathematics and Vector Calculus, **113, 135**

MATH2065 Partial Differential Equations (Intro), **113, 135**

MATH2068 Number Theory and Cryptography, **113, 135**

MATH2069 Discrete Mathematics and Graph Theory, **113, 136**

MATH2070 Optimisation and Financial Mathematics, **113, 136**

MATH2916 Working Seminar A (SSP), **113, 136**

MATH2917 Working Seminar B (SSP), **113, 137**

MATH2961 Linear Mathematics & Vector Calculus Adv, **113, 135**

MATH2962 Real and Complex Analysis (Advanced), **113, 136**

MATH2965 Partial Differential Equations Intro Adv, **113, 135**

MATH2968 Algebra (Advanced), **113, 136**

MATH2969 Discrete Mathematics & Graph Theory Adv, **113, 136**

MATH2970 Optimisation & Financial Mathematics Adv, **113, 136**

MICR2024 Microbes in the Environment, **8, 15, 25, 32, 39, 46**

MKTG1001 Marketing Principles, **65, 68, 71, 81, 88, 98**

MKTG2112 Consumer Behaviour, **26, 34, 68, 72, 89, 98**

MKTG2113 Marketing Research, **27, 36, 72, 98**

MKTG3118 Marketing Strategy and Planning, **68, 72, 89, 98**

## P

PHYS5031 Ecological Econ & Sustainable Analysis, **27, 36, 144, 146, 148, 154**

PHYS5033 Environmental Footprints and IO Analysis, **27, 36, 144, 146, 148, 155**

PHYS5034 Life Cycle Analysis, **27, 36, 144, 146, 148, 154**

PLNT3001 Plant, Cell and Environment, **8, 9, 19, 21, 40, 51**

PPAT3003 Plant Disease, **40, 47**

PPAT4005 Soil Biology, **113, 138**

PSYC1001 Psychology 1001, **65, 72, 81, 99, 107, 122, 123**

PSYC1002 Psychology 1002, **65, 72, 81, 99, 107, 122, 123**

PSYC2011 Brain and Behaviour, **72, 99**

PSYC2012 Statistics & Research Methods for Psych, **72, 99**

PSYC2013 Cognitive and Social Psychology, **72, 99**

PSYC2014 Personality and Intelligence 1, **72, 99**  
PSYC3011 Learning and Behaviour, **72, 100**  
PSYC3012 Cognition, Language and Thought, **72, 101**  
PSYC3013 Perceptual Systems, **72, 101**  
PSYC3014 Behavioural and Cognitive Neuroscience, **72, 101**  
PSYC3015 Personality and Intelligence 2, **72, 100**  
PSYC3016 Developmental Psychology, **72, 100**  
PSYC3017 Social Psychology, **72, 100**  
PSYC3018 Abnormal Psychology, **72, 100**  
PSYC3020 Applications of Psychological Science, **72, 100**

## **Q**

QBUS2350 Project Planning and Management, **71, 97**

## **R**

RSEC2031 Resource Economics, **105, 108, 116, 125**  
RSEC4131 Benefit-Cost Analysis, **64, 76**  
RSEC4132 Environmental Economics, **64, 77**  
RSEC4133 Economics of Mineral & Energy Industries, **64, 76, 106, 119**  
RSEC4134 Economics of Water & Bio-resources, **64, 78, 106, 119**  
RSEC4141 Resource Economics Project A, **106, 118**  
RSEC4142 Resource Economics Project B, **106, 118**

## **S**

SOIL2003 Soil Properties and Processes, **7, 13, 39, 45, 65, 82**  
SOIL2004 The Soil Resource, **8, 16, 40, 47**  
SOIL3009 Contemporary Field and Lab Soil Science, **8, 16, 42, 57, 113, 137**  
SOIL3010 The Soil at Work, **8, 18, 42, 57, 113, 137**  
STAT2011 Statistical Models, **114, 139**  
STAT2012 Statistical Tests, **114, 139**  
STAT2911 Probability and Statistical Models (Adv), **114, 139**  
STAT2912 Statistical Tests (Advanced), **114, 139**  
SUJST5001 Introduction to Sustainability, **144, 146, 148, 155**

## **V**

VIRO3001 Virology, **42, 58**

## **W**

WORK1003 Foundations of Work and Employment, **26, 34, 65, 81**  
WORK2201 Foundations of Management, **71, 96**  
WORK2205 Human Resource Processes, **27, 36**  
WORK2209 Managing Organisational Change, **27, 36, 71, 97**  
WORK2210 Strategic Management, **27, 36, 71, 96**  
WORK2211 Human Resource Strategies, **27, 36, 71, 97**  
WORK2217 International Human Resource Management, **71, 97**  
WORK2218 Managing Organisational Behaviour, **27, 36, 71, 96**  
WORK2219 Managing Organisational Sustainability, **71, 97**  
WORK2221 Organisational Communication, **71, 97**  
WORK2222 Leadership in Organisations, **71, 98**  
WORK2227 Regulation at Work, **71, 98**  
WORK3922 Organisational Research Methods, **71, 98**

# Index by name

## A

Abnormal Psychology PSYC3018, **72, 100**  
 Accounting, Business and Society BUSS1030, **25, 30, 34, 65, 67, 79, 84**  
 Accounting and Financial Management ACCT1006, **26, 34, 65, 66, 79, 84**  
 Advanced Hydrology and Modelling LWSC3007, **8, 16, 42, 56, 113, 138**  
 Advanced Statistical Methods BIOM4004, **41, 55**  
 Agribusiness Management AGE3101, **63, 66, 74, 84**  
 Agribusiness Marketing AGE2102, **25, 31, 40, 48, 65, 66, 67, 68, 81, 83, 86, 89**  
 Agricultural and Environmental Extension AGEN5001, **42, 58**  
 Agricultural and Resource Economics AGE1102, **66, 83, 108, 123**  
 Agricultural and Resource Policy AGE3102, **40, 49, 63, 66, 74, 84, 105, 116**  
 Agricultural Development Economics AGE4102, **64, 77, 106, 119**  
 Agricultural Finance and Risk AGE4109, **64, 67, 68, 78, 87, 88**  
 Agricultural Finance and Risk AREC3005, **64, 67, 68, 78, 87, 88, 143, 145, 147, 151**  
 Agricultural Marketing Analysis AGE4101, **64, 67, 68, 78, 87, 89**  
 Agricultural Markets AREC3002, **27, 35, 41, 53, 64, 67, 68, 78, 87, 89, 143, 145, 147, 150**  
 Agro-ecosystems in Developing Countries AFNR3001, **8, 17, 40, 47**  
 Algebra (Advanced) MATH2968, **113, 136**  
 Animal Genetics 3 ANSC3107, **42, 59**  
 Animal Nutrition 3 ANSC3101, **40, 49**  
 Animal Production and Management AGEN2006, **25, 32, 39, 46**  
 Animal Reproduction ANSC3102, **40, 48**  
 Animal Structure and Function A ANSC3103, **40, 48**  
 Animal Structure and Function B ANSC3104, **40, 50**  
 Applications of Calculus MATH1011, **65, 81**  
 Applications of Psychological Science PSYC3020, **72, 100**  
 Applied Biology for Ag and Environment AGEN1004, **7, 12, 25, 30, 39, 44**  
 Applied Econometric Modelling 1 AGE2105, **63, 73, 105, 115**  
 Applied Econometrics ECMT3120, **69, 91, 109, 127**  
 Applied Optimisation AGE3103, **63, 66, 74, 84, 105, 108, 116, 125**  
 Applied Statistical Methods ENVX2001, **7, 13, 39, 45**  
 Aquaculture AVBS4009, **42, 58**  
 Auditing and Assurance ACCT3014, **67, 86**  
 Australian Forest Systems AFNR5705, **144, 146, 148, 153**  
 Australian Politics GOVT1101, **65, 80, 107, 122, 123**

## B

Behavioural and Cognitive Neuroscience PSYC3014, **72, 101**  
 Benefit-Cost Analysis AREC2004, **8, 18, 40, 50, 64, 76**

Benefit-Cost Analysis RSEC4131, **64, 76**  
 Biological Chemistry AGEN1006, **7, 13, 25, 30, 39, 45**  
 Biometrical Methods BIOM4005, **41, 55**  
 Biosphere-Atmosphere Interactions ENSY3001, **8, 16**  
 Brain and Behaviour PSYC2011, **72, 99**  
 Business Negotiations IBUS3107, **71, 97**

## C

Chemistry 1A (Advanced) CHEM1901, **7, 12, 25, 29, 39, 44, 107, 121, 123**  
 Chemistry 1A CHEM1101, **7, 11, 25, 29, 39, 43, 107, 121, 123**  
 Chemistry 1B (Advanced) CHEM1902, **107, 121, 123**  
 Chemistry 1B CHEM1102, **107, 121, 123**  
 Chemistry and Biochemistry of Foods AGCH3025, **26, 32, 39, 46**  
 Climate Change: Process, History, Issues AFNR5801, **143, 145, 147, 149**  
 Coastal Environments and Processes (Adv) GEOS3909, **70, 95, 111, 132**  
 Coastal Environments and Processes GEOS3009, **70, 95, 111, 131**  
 Cognition, Language and Thought PSYC3012, **72, 101**  
 Cognitive and Social Psychology PSYC2013, **72, 99**  
 Commodity Market and Price Analysis AREC2002, **7, 15, 40, 50, 63, 66, 74, 83, 105, 116**  
 Computational Econometrics ECMT3170, **69, 91, 109, 127**  
 Concepts in Biology (Advanced) BIOL1911, **7, 11, 25, 29, 39, 43**  
 Concepts in Biology BIOL1001, **7, 11, 25, 29, 39, 43, 65, 79, 106, 120, 123**  
 Concepts in Enviro and Resource Economics AREC2003, **8, 16, 40, 48, 105, 108, 116, 125**  
 Concepts of Animal Management AVBS1002, **50**  
 Consumer Behaviour MKTG2112, **26, 34, 68, 72, 89, 98**  
 Contemporary Field and Lab Soil Science SOIL3009, **8, 16, 42, 57, 113, 137**  
 Corporate Finance I FINC2011, **26, 32, 34, 67, 69, 87, 92, 93, 110, 129**  
 Corporate Finance II FINC2012, **26, 34, 67, 69, 87, 93, 110, 129**  
 Corporations Law CLAW2201, **27, 36, 67, 86**  
 Crop and Pasture Agronomy AGRO4003, **8, 17, 41, 53, 143, 145, 147, 149**  
 Crop Improvement AFNR5110, **143, 144, 145, 146, 147, 148, 151, 152**  
 Cross-Cultural Management IBUS2102, **71, 96**  
 Current Issues in Management Accounting ACCT3032, **67, 86**  
 Cytogenetics GENE4015, **41, 53**

## D

Dairy Production and Technology AVBS4002, **27, 35, 42, 59**  
 Developmental Psychology PSYC3016, **72, 100**  
 Development Economics ECOS3002, **64, 77, 106, 119, 144, 146, 148, 153, 154**  
 Differential Calculus MATH1001, **108, 109, 112, 114, 123, 125, 134, 138**



- Digital Business Innovation INFS1000, **26, 34, 65, 80**  
Discrete Mathematics & Graph Theory Adv MATH2969, **113, 136**  
Discrete Mathematics and Graph Theory MATH2069, **113, 136**  
Discrete Mathematics MATH1004, **112, 135**
- E**
- Earth's Structure and Evolution GEOS3101, **71, 96, 111, 112, 130, 133**  
Earth's Structure and Evolutions (Adv) GEOS3801, **112, 133**  
Earth, Environment and Society GEOS1001, **7, 14, 65, 80, 107, 122, 123**  
Ecological Econ & Sustainable Analysis PHYS5031, **27, 36, 144, 146, 148, 154**  
Ecology and Conservation BIOL2024, **8, 15**  
Ecology BIOL3007, **8, 20**  
Econ of Biological Production Systems AREC2001, **7, 14, 40, 48, 63, 66, 73, 84, 105, 108, 115, 124**  
Econ of Minerals and Energy Industries AREC3003, **42, 59, 64, 77, 106, 119, 144, 146, 148, 154**  
Economic Environment of Agriculture AGE1006, **7, 12, 25, 30, 39, 44**  
Economics of Mineral & Energy Industries RSEC4133, **64, 76, 106, 119**  
Economics of Water & Bio-resources RSEC4134, **64, 78, 106, 119**  
Economics of Water and Bio-Resources AREC3004, **8, 19, 65, 79, 106, 120, 143, 145, 147, 150**  
Environmental & Sedimentary Geology(Adv) GEOS3803, **112, 134**  
Environmental and Sedimentary Geology GEOS3103, **112, 133**  
Environmental Assessment (Advanced) ENVI3912, **70, 94, 111, 131**  
Environmental Assessment ENVI3112, **9, 20, 70, 94, 111, 131**  
Environmental Chemistry AGCH3033, **8, 17, 40, 41, 49, 52, 113, 138**  
Environmental Economics ECOS3013, **64, 78, 143, 145, 147, 149**  
Environmental Economics RSEC4132, **64, 77**  
Environmental Footprints and IO Analysis PHYS5033, **27, 36, 144, 146, 148, 155**  
Environmental GIS ENVX3001, **7, 14, 40, 42, 50, 57, 65, 82, 113, 137**  
Environmental Law and Ethics (Advanced) ENVI3911, **70, 94, 111, 131**  
Environmental Law and Ethics ENVI3111, **8, 17, 19, 70, 94, 105, 111, 117, 130**  
Environmental Mapping and Monitoring GEOG5004, **144, 146, 148, 155**  
Environmental Simulation Modelling ENVI5809, **144, 146, 148, 154**  
Extensive Animal Industries AVBS4012, **27, 35, 42, 58**
- F**
- Field Geology (Adv) GEOS3908, **112, 132**  
Field Geology GEOS3008, **112, 132**  
Financial Accounting A ACCT2011, **26, 35, 67, 85**  
Financial Accounting B ACCT3011, **67, 85**  
Financial Econometrics ECMT2130, **69, 90, 109, 127**  
Financial Risk Management FINC3020, **27, 36**  
Financial Statement Analysis ACCT3013, **26, 35, 67, 85**  
Financial Valuation: Case Study Approach FINC3015, **27, 36**  
Fire in Australian Ecosystems ENSY3002, **8, 19, 41, 56, 144, 146, 148, 153**
- Food Biotechnology AGCH3026, **26, 35, 41, 55**  
Food Processing and Value Adding AGEN3004, **26, 33**  
Food Product Development AGEN3001, **26, 32**  
Food Safety Assessment and Management AVBS4004, **27, 35**  
Forecasting for Economics and Business ECMT3130, **69, 91, 109, 127**  
Forest Ecosystem Science ENSY3003, **9, 20, 41, 56, 144, 146, 148, 153**  
Foundations of Business Law CLAW1001, **26, 34, 65, 68, 79, 90, 107, 109, 121, 123, 126**  
Foundations of Management WORK2201, **71, 96**  
Foundations of Work and Employment WORK1003, **26, 34, 65, 81**  
Fresh Produce Management AGEN2002, **25, 31**  
Fundamentals of Chemistry 1A CHEM1001, **7, 11, 25, 29, 39, 43, 107, 120, 123**  
Fundamentals of Chemistry 1B CHEM1002, **107, 121, 123**
- G**
- Gene Technology and Genomics Advanced BIOL3918, **40, 49**  
Gene Technology and Genomics BIOL3018, **40, 48**  
Geog. Concepts, Skills & Methods (Adv) GEOS3933, **70, 93, 110, 130**  
Geographical Concepts, Skills & Methods GEOS3333, **70, 93, 110, 129**  
Geophysical Methods (Advanced) GEOS3804, **112, 134**  
Geopolitics GOVT1105, **65, 80**  
GIS, Remote Sensing and Land Management ENVX4001, **8, 18, 41, 55**  
GIS in Coastal Management (Advanced) GEOS3914, **71, 95, 111, 132**  
GIS in Coastal Management GEOS3014, **70, 95, 111, 112, 132, 134**  
Global Development and Livelihoods (Adv) GEOS3924, **70, 95, 111, 131**  
Global Development and Livelihoods GEOS3524, **70, 95, 111, 131**  
Global Energy and Resources (Adv) GEOS3802, **112, 133**  
Global Energy and Resources GEOS3102, **112, 133**  
Global Environmental Politics GOVT6135, **144, 146, 148, 154**  
Global Food Security AGEN3003, **26, 33**
- H**
- Human Resource Processes WORK2205, **27, 36**  
Human Resource Strategies WORK2211, **27, 36, 71, 97**
- I**
- Industrial Organisation ECOS3005, **64, 67, 68, 77, 87, 88, 89, 106, 118, 143, 144, 145, 146, 147, 148, 150, 154**  
Industrial Organization of Agribusiness AGE104, **64, 67, 68, 77, 86, 88, 89, 106, 118**  
Innovation in Food Supply Chains AGEN2003, **25, 31**  
Insect Taxonomy and Systematics ENTO4004, **41, 54**  
Integral Calculus and Modelling MATH1003, **108, 109, 112, 114, 124, 125, 134, 139**  
Integrated Business Applications BUSS3500, **27, 35**  
Integrated Pest Management ENTO4003, **8, 18, 41, 54**  
Intensive Animal Industries AVBS4008, **27, 35, 42, 59**  
Intermediate Macroeconomics ECOS2002, **63, 69, 74, 92, 105, 110, 116, 128**  
Intermediate Microeconomics ECOS2001, **63, 69, 73, 92, 105, 110, 115, 128**

- International Agricultural Trade AGEC4103, **64, 76, 106, 118**
- International Business Strategy IBUS2101, **27, 36**
- International Corporate Governance ACCT3031, **67, 86**
- International Financial Management FINC3011, **27, 36**
- International Human Resource Management WORK2217, **71, 97**
- International Trade ECOS3006, **64, 76, 106, 118, 143, 145, 147, 150**
- Introduction to Econometrics ECMT1020, **68, 69, 90, 91, 108, 109, 110, 124, 126, 128**
- Introduction to Economic Statistics ECMT1010, **67, 68, 69, 85, 90, 91, 92, 107, 108, 109, 110, 121, 123, 124, 126, 128**
- Introduction to Environmental Chemistry ENVI5708, **143, 144, 145, 146, 147, 148, 151, 154**
- Introduction to Geology GEOS1003, **107, 122, 123**
- Introduction to Political Science GOVT1104, **65, 80**
- Introduction to Statistical Methods ENVX1002, **7, 12, 25, 30, 39, 44**
- Introduction to Sustainability SUST5001, **144, 146, 148, 155**
- Introductory Entomology ENTO2001, **8, 15, 39, 46**
- Introductory Geography GEOS1002, **65, 80, 107, 122, 123**
- Introductory Hydrology LWSC2002, **7, 14, 40, 51, 65, 82**
- Introductory Macroeconomics ECON1002, **69, 92, 110, 128, 129**
- Introductory Microeconomics ECON1001, **69, 91, 92, 110, 128, 129**
- Investments and Portfolio Management FINC3017, **69, 93, 110, 129**
- L**
- Leadership in Organisations WORK2222, **71, 98**
- Learning and Behaviour PSYC3011, **72, 100**
- Life Cycle Analysis PHYS5034, **27, 36, 144, 146, 148, 154**
- Linear Algebra MATH1002, **108, 109, 112, 114, 124, 125, 134, 138**
- Linear Mathematics & Vector Calculus Adv MATH2961, **113, 135**
- Linear Mathematics and Vector Calculus MATH2061, **113, 135**
- Livestock Production Systems AGRO4005, **41, 53**
- Living Systems (Advanced) BIOL1902, **107, 120, 123**
- Living Systems BIOL1002, **65, 79, 107, 120, 123**
- M**
- Management Accounting A ACCT2012, **26, 35, 67, 85**
- Management Accounting B ACCT3012, **67, 85**
- Managing Agro-Ecosystems AGRO3004, **8, 15, 40, 47**
- Managing Organisational Behaviour WORK2218, **27, 36, 71, 96**
- Managing Organisational Change WORK2209, **27, 36, 71, 97**
- Managing Organisational Sustainability WORK2219, **71, 97**
- Market and Price Analysis AGEC2101, **63, 66, 73, 83, 105, 115**
- Marketing Principles MKTG1001, **65, 68, 71, 81, 88, 98**
- Marketing Research MKTG2113, **27, 36, 72, 98**
- Marketing Strategy and Planning MKTG3118, **68, 72, 89, 98**
- Mathematical Modelling MATH1013, **65, 81**
- Matrix Algebra and Linear Models BIOM4003, **41, 54**
- Microbes in the Environment MICR2024, **8, 15, 25, 32, 39, 46**
- Microeconomic Theory ECON5001, **144, 146, 148, 155**
- N**
- New and Emerging Tech in Animal Science AGRO4006, **41, 54**
- Number Theory and Cryptography MATH2068, **113, 135**
- O**
- Optimisation & Financial Mathematics Adv MATH2970, **113, 136**
- Optimisation and Financial Mathematics MATH2070, **113, 136**
- Organisational Communication WORK2221, **71, 97**
- Organisational Research Methods WORK3922, **71, 98**
- P**
- Partial Differential Equations (Intro) MATH2065, **113, 135**
- Partial Differential Equations Intro Adv MATH2965, **113, 135**
- Perceptual Systems PSYC3013, **72, 101**
- Personality and Intelligence 1 PSYC2014, **72, 99**
- Personality and Intelligence 2 PSYC3015, **72, 100**
- Plant, Cell and Environment PLNT3001, **8, 9, 19, 21, 40, 51**
- Plant Breeding GENE4012, **41, 53**
- Plant Disease PPAT3003, **40, 47**
- Plant Function AGEN2001, **7, 13, 25, 31, 39, 45**
- Plants and the Environment AFNR5701, **144, 146, 148, 152, 153**
- Plant Systems Biology AGEN2005, **7, 13, 39, 46**
- Principles of Biochemical Analysis AFNR5107, **41, 52, 144, 146, 148, 153**
- Probability and Statistical Models (Adv) STAT2911, **114, 139**
- Production Economics AGEC2103, **63, 66, 73, 83, 105, 108, 115, 124**
- Production Horticulture HORT3005, **40, 41, 49, 56**
- Production Modelling and Management AREC3001, **27, 35, 40, 41, 50, 53, 63, 66, 74, 84, 105, 108, 117, 125, 143, 145, 147, 150**
- Professional Development AFNR4001, **40, 51, 63, 75, 106, 117**
- Project Planning and Management QBUS2350, **71, 97**
- Psychology 1001 PSYC1001, **65, 72, 81, 99, 107, 122, 123**
- Psychology 1002 PSYC1002, **65, 72, 81, 99, 107, 122, 123**
- Q**
- Quantitative Planning Methods AGEC4108, **64, 68, 76, 88, 106, 118**
- R**
- Real and Complex Analysis (Advanced) MATH2962, **113, 136**
- Regulation at Work WORK2227, **71, 98**
- Remote Sensing, GIS and Land Management AFNR5502, **143, 145, 147, 151**
- Research and Practice in Hort Science HORT4005, **41, 55, 56, 144, 146, 148, 152**
- Research Communication AFNR5906, **143, 145, 147, 150**
- Research Exercises A AGEC4121, **64, 75, 106, 117, 118**
- Research Exercises B AGEC4122, **64, 75, 106, 117, 118**
- Research Methods AGEC3104, **63, 75, 105, 117**
- Research Paper AFNR5905, **143, 145, 147, 149**
- Research Project A AFNR4101, **5, 9, 21, 26, 33, 40, 51**



Research Project A AGE4112, **63, 75**

Research Project B AFNR4102, **5, 9, 21, 26, 33, 40, 52**

Research Project B AGE4113, **64, 75**

Research Proposal and Approach AFNR5904, **143, 145, 147, 150**

Research Review AFNR5901, **143, 145, 147, 150**

Resource Economics Project A RSEC4141, **106, 118**

Resource Economics Project B RSEC4142, **106, 118**

Resource Economics RSEC2031, **105, 108, 116, 125**

## **S**

Scientific Method and Communication ENSY4001, **5, 9, 21**

Shaping our Landscapes AGEN1001, **7, 11, 39, 43, 66, 83**

Small Business Structures and Taxation BUSS2220, **27, 35**

Social Psychology PSYC3017, **72, 100**

Soil Biology PPAT4005, **113, 138**

Soil Processes, Assessment & Management AFNR5511, **143, 145, 147, 149**

Soil Properties and Processes SOIL2003, **7, 13, 39, 45, 65, 82**

Southeast Asia Field School (Adv) GEOS3953, **70, 93, 111, 130**

Southeast Asia Field School GEOS3053, **70, 93, 111, 130**

Special Topics AGE4107, **64, 68, 76, 88, 106, 118, 119**

Statistical Models STAT2011, **114, 139**

Statistical Tests (Advanced) STAT2912, **114, 139**

Statistical Tests STAT2012, **114, 139**

Statistics & Research Methods for Psych PSYC2012, **72, 99**

Statistics in the Natural Sciences ENVX3002, **8, 18, 20, 40, 49**

Statistics MATH1005, **108, 109, 112, 114, 124, 126, 135, 139**

Strategic Management WORK2210, **27, 36, 71, 96**

Sustainable Farming Systems AGRO4004, **8, 17, 41, 53, 143, 145, 147, 151**

Sustainable Horticultural Cropping AFNR5210, **144, 146, 148, 152**

Sustaining our Landscapes AGEN1002, **7, 12, 39, 44**

## **T**

Terrestrial Field Ecology BIOL3009, **9, 20**

The Business Environment BUSS1002, **25, 31**

The Econometrics of Financial Markets ECMT3150, **69, 91, 109, 127**

The Soil at Work AFNR5510, **143, 145, 147, 151**

The Soil at Work SOIL3010, **8, 18, 42, 57, 113, 137**

The Soil Resource SOIL2004, **8, 16, 40, 47**

## **U**

Understanding Business BUSS1001, **25, 29**

Urban Citizenship & Sustainability (Adv) GEOS3920, **70, 94, 111, 131**

Urban Citizenship & Sustainability GEOS3520, **70, 94, 111, 131**

## **V**

Veterinary and Agricultural Genetics 2 GENE2002, **7, 14, 39, 45**

Virology VIRO3001, **42, 58**

## **W**

Water Management and Variable Climate AFNR5512, **143, 145, 147, 152**

Working Seminar A (SSP) MATH2916, **113, 136**

Working Seminar B (SSP) MATH2917, **113, 137**

World Politics GOVT1202, **65, 80, 107, 122, 123**