The University of Sydney

Faculty of Agriculture, Food and Natural Resources Handbook 2006

University dates

University semester and vacation dates 2006

Summer School	
Lectures begin	Tuesday 3 January
Lectures end	Friday 3 March
Semester One	
Lectures begin	Monday 6 March
AVCC common week/non-teaching Easter period	Friday 14 April to Friday 21 April
Last day of lectures	Friday 9 June
Study vacation: one week beginning	Monday 12 June to Friday 16 June
Examination period	Monday 19 June to Saturday 1 July
Semester ends	Saturday 1 July
AVCC common week/non-teaching period	Monday 3 July to Friday 7 July
Semester Two	
Lectures begin	Monday 24 July
AVCC common week/non-teaching period	Monday 25 September to Friday 29 September
Last day of lectures	Friday 27 October
Study vacation	Monday 30 October to Friday 3 November
Examination period	Monday 6 November to Saturday 18 November
Semester ends	Saturday 18 November

Last dates for withdrawal or discontinuation 2006

Semester One units of study	
Last day to add a unit	Friday 17 March
Last day for withdrawal	Friday 31 March
Last day to discontinue without failure (DNF)	Friday 28 April
Last day to discontinue (Discontinued - Fail)	Friday 9 June
Semester Two units of study	
Last day to add a unit	Friday 4 August
Last day for withdrawal	Thursday 31 August
Last day to discontinue without failure (DNF)	Friday 8 September
Last day to discontinue (Discontinued - Fail)	Friday 27 October
Last day to withdraw from a non standard unit of study	By the census date of the non standard unit of study which must not be earlier than 20 per cent of the way through the period of time during which the unit is undertaken.

Details are in the session calendar on the timetabling website
http://web.timetable.usyd.edu.au

These dates (and any updates) are also available at:
www.usyd.edu.au/fstudent/undergrad/apply/scm/dates.shtml

The University of Sydney
NSW 2006
Phone: +612 93512222
Web: www.usyd.edu.au

Faculty of Agriculture, Food and Natural Resources
Phone: +612 9351 6926
Fax: +612 93512945
Web: www.agric.usyd.edu.au
Email: ug@agric.usyd.edu.au

This book (and other handbooks) can also be found at:
www.usyd.edu.au/handbooks

The University of Sydney

Faculty of Agriculture, Food and Natural Resources 2006.

ISSN: 1034-2575.
CRICOS Provider Code 00026A.

The information in this handbook is subject to approval and/or change by the appropriate faculty of the University. Students should always check the accuracy of the information with faculty staff.

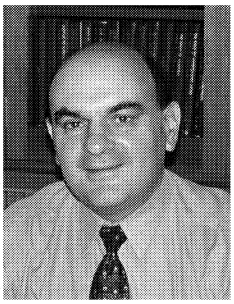
Produced by the Publications Office, The University of Sydney.

Contents

Faculty of Agriculture, Food and Natural Resources Handbook

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit "http://www.usyd.edu.au/handbooks/".

Welcome from the Dean



Welcome to the Faculty of Agriculture, Food and Natural Resources. Our vision is: *To grow and excel in teaching, research and community service in the food, fibre and natural resource industries.*

The Faculty has been a leading provider of agricultural education for over 95 years and offers students many distinctive advantages. The Faculty's core academic activities are at the important interface between applied science and applied economics. It has a strong research culture aligned to areas of strategic national and international importance, extensive engagement with industry and professions, and is part of a comprehensive University in one of the world's most attractive metropolitan areas. Teaching and research are conducted mainly on the Camperdown Campus of the University near Sydney's central business district, and also at Cobbitty about 65 kilometres south west of Sydney and at rural research stations and on farms owned by the University. The teaching programs recognise the diverse destinations of graduates, who enjoy high employment rates and express a high degree of career satisfaction.

All of the undergraduate degrees aim to give students an appreciation of the scientific and socioeconomic framework of the agricultural and natural resources sectors, while affording students the opportunity to specialise in subject areas of their choosing. In Year 4, students complete a research project which, as employers frequently comment, provides valuable experience in planning, researching and communicating a major piece of work, and equips graduates for the professional workplace. All students participate in at least one extended rural field trip and complete a program professional experience, which puts the teaching into a practical context and allows the development of networks for future careers. Excursions and field-based teaching help students to get to know each other well, establish an esprit de corps in the Faculty, and build a good rapport between students and staff.

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

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

Professor Les Copeland

Dean of Agriculture, Food and Natural Resources

1. Guide to the Faculty

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Faculty Executive

Current as at 1 January 2006

Phone: +612 93512935
Fax: +612 93512945
Email: dean@agric.usyd.edu.au
Web: www.agric.usyd.edu.au

Dean
Les Copeland, BSc PhD, FRACI CChem

Pro Dean
Alexander B McBratney, DSc PhD *Aberd*

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

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

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

Finance Officer
Arnold Lai, MBus *UTS*

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

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

Student Services Officer
Pamela J Stern, BA *UNSW*

Administrative Assistants
Fortunée Cantrell
Nancy Cheng

Staff in teaching and research areas

Agricultural and Resource Economics Discipline

Phone: +612 93512574
Fax: +612 93514953
Email: agec.agric@agec.usyd.edu.au
Web: www.usyd.edu.au/su/agec/

Discipline Leader
Fredoun Z Ahmadi-Esfahani, BS *Oregon* MA *San Francisco State* PhD *Manit*

Professor
T Gordon MacAulay, MAgrSc *Melb* PhD *Guelph.* Appointed 1992

Associate Professors
Fredoun Z Ahmadi-Esfahani, BS *Oregon* MA *San Francisco State* PhD *Manit*
Ross G Drynan, BAgrSc *Qld* PhD *NE*

Senior Lecturers
Michael Harris, BEc *ANU* PhD *Melbourne*
Carolyn Tanner, BScAgr

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

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

Honorary Appointments
Adjunct Professor
Brian S Fisher, BScAgr PhD

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

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

Sciences Discipline

Phone: +612 93512529
Fax: +612 93512945

Discipline Leader
Lester W Burgess, BScAgr PhD DipEd, FAPPS FAPS. Appointed 2000 *(Applied Mycology)*

Professors
Alexander B McBratney, DSc PhD *Aberd.* Appointed 1995 *(Soil Science)*
Ivan R Kennedy, PhD DSc(Agric) *WAust*, FRACI CChem. Appointed 1996 *(Agricultural and Environmental Chemistry)*
Lester W Burgess, BScAgr PhD DipEd, FAPPS FAPS. Appointed 2000 *(Applied Mycology)*
Les Copeland, BSc PhD, FRACI CChem. Appointed 2001 *(Agriculture)*
David Guest, BScAgr PhD. Appointed 2004 *(Horticulture)*

Associate Professors
Michael E O'Neill, BA PhD
Balwant Singh, BSc(Agr) MSc(SoilSc) *Hisar* PhD *WAust*
Bruce G Sutton, BScAgr *Qld* PhD *ANU*

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

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

Lecturers
Sarah Mansfield, BSc MSc *University of Auckland* PhD *California*
Daniel Tan, BApplSc PhD *Qld*

Associate Lecturers
Kathryn Bartimote, BScAgr GradCertEdStu (Higher Education)
Meredith Wilkes, BSc PhD

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

Principal Research Fellow
Gordon S Rogers, BAppSc *Qld* DipEd *UTS* PhD *UWS*

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

Research Associates - Postdoctoral Fellows
Rosalie Daniel, BScAgr *Melb* PhD *Deakin*
Rosalind J Deaker, MScAgr DipEd *Macq* PhD
Markus Grafe, **BSc MSc** *Virginia Polytechnic Institute & State University* **PhD** *Delaware*
Mihaly L Kecskes, PhD *Hungary*
Craig M Stewart, BScAgr PhD
James A Taylor BScAgr

Honorary Appointments
Adjunct Professors
Greg Constable, MScAgr PhD *ANU*
Gary Fitt, BSc PhD
Brett Summerall, BScAgr PhD

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

Honorary Professor
GD Batten, PhD *ANU*

Honorary Associate Professor
FJD McDonald, BSc MSc *Tasmania* PhD *Alberta*
Harley Rose, BAgrSc MAgrSc *Qld* PhD *Cornell*
MJ Knight, BSc PhD *Mel*

Honorary Senior Lecturer
E Lees, BSc PhD *Lond*

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

Plant Breeding Institute

Phone: +61 2 9351 8800 or +61 2 4655 0800
Fax: +612 93518875
Email: t.lamonica@camden.usyd.edu.au

Plant Breeding Institute - Cobbitty

Director and Professor of Molecular Plant Breeding
Peter J Sharp, BAgSc PhD *Adel.* Appointed 2003

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

Associate Professors
Akram Khan MSc (Agric) PhD *Wales*
Neil Howes, BSc(Hons) PhD *Qld*

Senior Lecturer
Norman L Darvey, PhD *UNSW BSc*

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

Research Fellows
Matthew Turner, BScAgr PhD

Postdoctoral Fellows
Chongmei Dong, MSc *Fudan* PhD *ANU*
Xiaochun Zhao, BAgSc *Yau* PhD
Nizam Ahmed, BScAgr *BanglAU* MScAgr PhD

Honorary Appointments
Emeritus Professor
Donald R Marshall, PhD *Calif BScAgr*

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

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

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

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

Honorary Research Associates
John D Oates OAM, BScAgr
S Rahman, BA *Camb* PhD *Lond*

Plant Breeding Institute - Narrabri

Phone: +61 2 6799 2200
Fax: +61 2 6799 2239
Email: lsmith@staff.usyd.edu.au

Wheat Breeder
Meiqin Lu, MAgSc *Zhejiang* PhD

Officer in Charge
Stephen G Moore, BSc *NE* MAgr

Honorary Research Associate
Lindsay O'Brien, MScDipEd *Melb* PhD *Manit*

Veterinary Science

Animal Science - relevant teaching staff

Phone: +61293512716
Fax: +612 93512114
Email: chrism@vetsci.usyd.edu.au
Web: www.usyd.edu.au/vetfac/

Sydney

Professors
David Ross Fraser, PhD *Camb* BVSc. Appointed 1986
Gareth Evans, BA *Oxf PhD.* Appointed 2002
Chis Maxwell, BScAgr PhD. Appointed 2002
Christopher Moran, **PhD** *ANU* ***BSc*** *(Sub Dean Agriculture Teaching)*
Frank W Nicholas, PhD *Edin* BScAgr. Appointed 2002

Associate Professors
David L Evans, BVSc PhD
Rosanne M Taylor, BVSc PhD

Senior Lecturers
Michelle L Hyde, BScAgr PhD
Paul McGreevy, BVSc PhD *Brist*

Lecturers
Melanie Collier, BSc PhD *Leeds*
Susan Hemsley, MVSc PhD

Research Fellows
Yizhou Chen, BScAgr *Hebei Ag U* MScAgr *BAU* PhD *Hohenheim*
Bengt Eriksson, BVSc PhD *Uppsala*
Lindsay Gillan, BMedSc PhD
Justine O'Brien, BScAgr PhD

Camden

Professor
William Fulkerson, BScAgr PhD *WAust.* Appointed 2001

Associate Professors
Peter Windsor, BVSc PhD
Peter C Wynn, MRurSc DipEd *NE* PhD

Senior Lecturer
David McNeill, BRurSc PhD *WAust*

Lecturers
Jeff Downing, BScAgr PhD
Wendy Muir, BScAgr PhD

Research Fellows
Imke Tammen, BVSc PhD *Hannover*
Sham Nair, BSc Macq PhD *UTS*
Kyall Zenger, BAppSc MSc *UWS* PhD *Macq*

Administrative Assistant
Elizabeth Thomas

Molecular and Microbial Biosciences

Microbiology - relevant teaching staff

Phone: +612 93516050
Fax: +612 93514726
Email: hod.micro@mmb.usyd.edu.au
Web: www.mmb.usyd.edu.au

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

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

Senior Lecturers
Deidre A Carter, BSc *Otago* PhD *Lond*
Andy Holmes, BSc PhD *Qld*
Peter B New, BAgrSc *Tas* PhD *Adel,* MASM

Lecturer
Helen M Agus, MSc *UNSW* MASM

2. Undergraduate degrees

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Brief introduction to degree courses

Teaching in the undergraduate units of study in the Faculty develops skills and graduate attributes. A Statement of Generic Graduate Attributes can be found in this Handbook at Section 7 (Other Faculty Information).

Bachelor of Agricultural Economics

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

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

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

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

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

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

Bachelor of Horticultural Science

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

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

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

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

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

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

Bachelor of Land and Water Science

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

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

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

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

Professional recognition: Graduates are eligible for membership of professional societies including the Australian Institute of Agricultural Science.

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

Bachelor of Resource Economics

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

Assumed knowledge: Extension 1 Mathematics and Chemistry.

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

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

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

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

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

Bachelor of Science in Agriculture

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

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

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

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

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

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

Progress through the years

Under normal circumstances, the degree requirements may be satisfied in four years. If you fail to achieve a satisfactory standard in a unit of study at the first attempt, you may repeat the unit. Should you not achieve a satisfactory standard at the second attempt, you must provide compelling evidence as to why you should be re-admitted to that unit of study and/or degree (see "satisfactory progress" in chapter 8). Students repeating units of study which belong to the first, second or third year groups of units of study may, with the permission of the Faculty, enrol in one or more units of study prescribed for the next higher year. The Faculty will normally grant permission for you to undertake units from the next year when:

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

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

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

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

Bachelor of Agricultural Economics

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
All students complete an Agricultural Economics major and one non-Agricultural Economics major. Details of majors can be found in Tables 3 and 4.				
Year1				
Year 1 will have a minimum of 48 credit points comprised of:				
AGEC **1101**	Agricultural and Resource Systems	6	A HSC Mathematics N AGEC 1001	Semester 1
ECON 1001	Introductory Microeconomics	6	A Mathematics	Semester 1, Summer
ECMT 1010	Business and Economic Statistics A	6	N ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021	Semester 1, Semester 2

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGEC **1102**	Agricultural Economics 1	6	A HSC Mathematics P AGEC 1101 N AGEC 1002	Semester 2
ECON 1002	Introductory Macroeconomics	6	A Mathematics	Summer, Semester 2
ECMT **1020**	Business and Economic Statistics B	6	C ECMT1010 N ECMT1021, ECMT1022 and ECMT1023 NB: Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.	Semester 2
and units from Table 1 (minimum of 12 credit points), with a view to completing a Table 4 non-AGEC major.				
Year 2				
AGEC **2101**	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC **2105**	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
or				
ECMT **2110**	Regression Modelling	6	PECMT1010 NECMT2010	Semester 1
ECOS 2001	Intermediate Microeconomics	6	P ECONlOOl C ECMT1010 N ECON2001, ECOS2901 (or ECON2901) NB: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.	
or				
ECOS 2901	Intermediate Microeconomics Honours	6	P ECONlOOl and ECON1002 with a Credit average or better in the two units combined C ECOS2903 andECMTlOlO NECON2901,ECOS2001 (orECON2001) NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.	Semester 1
AGEC **2103**	Production Economics	6	P ECONlOOl or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
ECOS **2002**	Intermediate Macroeconomics	6	P ECON1002. C ECMT1020 N ECON2002, ECOS2902 (or ECON2902) NB: Certain combinations of Maths/Stats may substitute for Econometrics -- consult the Chair of the Discipline of Economics.	Semester 1, Semester 2
or				
ECOS 2902	Intermediate Macroeconomics Honours	6	PECOS2901 CECMT1020 N ECON2902, ECOS2002 (or ECON2002) NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.	Semester 2
and units from Tables 1 and 2 (minimum 18 credit]points)i, with a view to completing a Table 4 non-AGEC major.				
Year 3				
Year 3 will have a minimum of 48 credit points comprised of:				
AGEC **3104**	Research Methods	6	P AGEC 2105 or ECMT 2010 or AGEC2005 N AGEC3004	Semester 1
AGEC **3103**	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
or				
AGEC **3101**	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC **3102**	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
and units from Table 2 (minimum 30 credit points), such that an Economics major or other Table 4 non-AGEC major is completed.				
Notes: 1) AGEC 3001 and AGEC 3101 are both incompatible with AGECl 102. A student who takes AGECl 102 will take AGEC3103. A student who has taken AGEC 1002 in lieu of AGEC 1102 must take either AGEC 3001 or AGEC 3101, and not AGEC 3103. 2) AGEC 3101 will not be available in the BAgrEc program after 2007.				
Year 4				
Year 4 will have a minimum of 48 credit points comprised of:				
AGEC **4112**	Research Project A	9	PAGEC3104or3004 CAGEC4113 NAGEC4012 NB: Department permission required for enrolment.	Semester 1
or				
AGEC **4121**	Research Exercises A	9	PAGEC3104 or AGEC 3004 CAGEC4122 NAGEC4012; AGEC4112	Semester 1
AGEC **4110**	Professional Skills	3	C AGEC 4111 N AGEC 4011	Semester 1
AGEC **4113**	Research Project B	9	P AGEC3104 or AGEC3004 C AGEC4112 N AGEC4013 NB: Department permission required for enrolment.	Semester 2
or				
AGEC **4122**	Research Exercises B	9	P AGEC3104 or AGEC 3004 C AGEC4121 N AGEC4013; AGEC4113	Semester 2
AGEC **4111**	Contemporary Issues	3	C AGEC 4110 NAGEC4011	Semester 2
and units from below (normally 24 credit points), with no more than 12 credit points of RSEC units. Not all of these units will be offered in all years.				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGEC 4103	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC 4104	Agribusiness Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 1
AGEC 4108	Quantitative Planning Methods	6	P AGEC 3101 or AGEC 3103 or AGEC3031 or AGEC3001 N AGEC4008	Semester 1
AGEC 4109	Agricultural Finance and Risk	6	P (AGEC 2103 and AGEC3101) or (AGEC2003 and AGEC3001) or (AGEC1102 and AGEC3103) N AGEC4009	Semester 2
AGEC 4101	Agricultural Marketing Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and 2003)	Semester 2
AGEC 4102	Agricultural Development Economics	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 2
AGEC 4107	Special Topics	6	P Faculty permission required for enrolment N AGEC4007 NB: Department permission required for enrolment.	Semester 1, Semester 2
RSEC 4131	Benefit-Cost Analysis	6	P ECON 2001, AGEC 2103 or AGEC 2003 N AGEC4037	Semester 1
RSEC 4132	Environmental Economics	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON 3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RESC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 1
RSEC 4133	Economics of Mineral & Energy Industries	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON 3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 2
RSEC 4134	Economics of Water & Bio-resources	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 2

Table 1 - BAgrEc Years 1 and 2 elective units

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Table 1: Elective units of study available for inclusion in years 1 or 2 of the BAgrEc degree				
ACCT 1001	Accounting IA	6	**A** HSC Mathematics N ACCT1003, ACCT1004 NB: Restricted entry	Semester 1, Semester 2
ACCT 1002	Accounting IB	6	P ACCT1001 N ACCT1003, ACCT1004 NB: Restricted entry	Semester 1, Semester 2 Summer
ACCT 1003	Financial Accounting Concepts	6	N Terminating unit. Cannot be counted with ACCT1001 and ACCT1002.	Semester 1
ACCT 1004	Management Accounting Concepts	6	N Terminating unit. Cannot be counted with ACCT1001 and ACCT1002.	Semester 2
BIOL 1001	Concepts in Biology	6	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
BIOL 1002	Living Systems	6	A HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. N BIOL1902	Semester 2
CROP 1001	Agricultural Science IA	6	A HSC Chemistry N HORT1001, LWSC1001	Semester 1
CROP 1002	Agricultural Science IB	6	C CROP1001 N HORT1002, LWSC1002	Semester 2
CLAW 1001	Commercial Transactions A	6		Semester 1, Semester 2
CLAW 1002	Commercial Transactions B	6	P CLAW1001	Semester 2
GEOG 1001	Biophysical Environments	6		Semester 1
GEOG 1002	Human Environments	6		Semester 2
GOVT 1101	Australian Politics	6		Semester 1
GOVT 1105	Geopolitics	6		Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
GOVT 1104	Power in Society	**6**		Semester 2
GOVT 1202	World Politics	**6**		Semester 2
GOVT 1406	International Business and Politics	**6**		Semester 2
HORT 1001	Horticultural Science 1A	**6**	A HSC 2 unit Chemistry N CROP1001, LWSC1001	Semester 1
HORT 1002	Horticultural Science IB	**6**	C HORT1001 N CROP1002, LWSC1002	Semester 2
INFS 1000	Business Information Systems Foundations	**6**	NISYS1003 or INFO1000 or INFO1003 or INFO1903	Semester 1, Semester 2 Summer
LWSC 1001	Land and Water Science 1A	**6**	N CROP1001 and HORT1001	Semester 1
LWSC 1002	Land and Water Science IB	**6**	C LWSC1001 Land and Water Science 1A N CROP1002 and HORT1002	Semester 2
MATH 1011	Life Sciences Calculus	**3**	A HSC Mathematics N MATH (1111 or 1001 or 1901 or 1906).	Semester 1, Summer
MATH 1012	Life Sciences Alge		NB: *** No info available for 2006. ***	
MATH 1013	Differential and Difference Equations	**3**	A HSC Mathematics or MATH 1111 N MATH (1003 or 1903 or 1907).	Semester 2
MKTG 1001	Marketing Principles	**6**	N MKTG2001	Semester 2, Semester 1
MKTG 1002	Marketing Research 1	**6**	P MKTG1001 (or MKTG2001) N MKTG2003	Semester 2
PSYC 1001	Psychology 1001	**6**		Semester 1, Summer
PSYC 1002	Psychology 1002	**6**		Semester 2, Summer
WORK 1003	Foundations of Work and Employment	**6**	NB: This is the compulsory unit of study for the Industrial Relations/Human Resource Management major.	Semester 1, Semester 2
Modern Language (Level 1 or higher) units, with the approval of the Dean FAFNR				

Notes:

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

Table 2 - BAgrEc Years 2 and 3 elective units

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Table 2: Elective units of study available for inclusion in years 2 or 3 of the BAgrEc degree				
AGEC 2102	Agribusiness Marketing	6	**P** AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
ANSC 2002	Animal Science 2	6	P CROP1001, BIOL1001 ORBIOL1101	Semester 2
HORT 2002	Horticultural Science 2	6	A HORT1001, HORT 1002 P Two of BIOL 1001, BIOL 1101, BIOL 1901, BIOL 1002, BIOL 1003, BIOL 1903.	Semester 2
LWSC 2002	Sustainable Land and Water Management	6	P LWSC1001, LWSC1002.	Semester 2
PLNT 2002	Aust Flora: Ecology and Conservation	6	P One of BIOL1001, BIOL1101, BIOL1901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.) N PLNT2902, BIOL2004 or BIOL2904.	Semester 1

Unit of Study			*CP A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
PLNT 2003	Plant Form and Function	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 N PLNT2903, BIOL2003, BIOL2903, CROP2001.	Semester 2
RSEC 4131	Benefit-Cost Analysis	6	P ECON 2001, AGEC 2103 or AGEC 2003 N AGEC4037	Semester 1
SOIL 2003	Soil Properties and Processes	6		Semester 1
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
Any level 2 or 3 semester units in Accounting (ACCT), Commercial Law (CLAW), Econometrics (ECMT), Economics (ECOS), Finance (FESTC), Geography (GEOG), Government (GOVT), Industrial Relations and Human Resource Management (WORK), Information Systems (INFS), Marketing (MKTG), Psychology (PSYC). Units in Asian Studies (ASNS) or Modern Languages may also be taken (with the approval of the Dean FAFNR)				
Any level 4 units in Agricultural Economics (AGEC) other than those which are core requirements for Year 4.				
Other units of study from the BScAgr, BHortSc and BLWSc degrees, with approval of the Dean FAFNR and the Head of the Discipline concerned.				

Notes:

1. AGEC2102 Agribusiness Marketing can only be included for Year 2.
2. Prerequisites and/or corequisites apply for most units.
3. Electives must be chosen such that the student will complete a non-AGEC major as specified in the Table of Majors.

Majors in the BAgrEc Degree

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

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

All students must complete an Agricultural Economics major and a non Agricultural Economics major. The Agricultural Economics major is defined in Table 3. The other majors available in the BAgrEc degree are defined in Table 4.

Table 3 - Agricultural Economics Major

Junior (Level 1) units
AGEC (1101 or 1001)
AGEC (1102 or 1002)
Level 2 and 3 units
AGEC (2101 or 2001) and AGEC (2103 or 2003)
AGEC (3001 or 3102) and AGEC (3101 or 3001 or 3103)
Two level 4 AGEC units.

Table 4 - Non AGEC Majors available in the BAgrEc Degree

Accounting

Junior (Level 1) units
ACCT 1001*, ACCT1002*
Level 2 and 3 units
ACCT 2011 and ACCT 2012
And four of the following units: ACCT 3011, ACCT 3012, ACCT 3013, ACCT 3014, ACCT 3031, ACCT 3032, CLAW 2201
See FEB Handbook
**NB: Restricted entry*

Agribusiness

Junior (Level 1) units
ACCT 1004 and either (INFS 1000 and CLAW 1001) or WORK 1003
Level 2 and 3 units
AGEC (2002 or 2102)
AGEC 4014
One of AGEC 4101, 4104, 4109
Either 12 credit points INFS level 2/3 units or 18 credit points WORK level 2/3 units

Agricultural Finance

Junior (Level 1) units
ACCT 1001* or ACCT 1003 and either ECMT 1010 or ECON 1001
Level 2 and 3 units
Two FINC 2000 units as for a Finance major
Two FINC 3000 units
AGEC 4104, AGEC 4108, AGEC 4109
**NB: Restricted entry*

Agricultural Marketing

Junior (Level 1) units
MKTG 1001
MKTG 1002 or AGEC 3104
Level 2 and 3 units
MKTG 2112 and MKTG 3118
Two other MKTG 3000 units
AGEC 4101, AGEC 4104

Agricultural Science

Junior (Level 1) units
CROP 1001 and CROP 1002
Level 2 and 3 units
PLNT 2003, SOIL 2003
Four other Level 2/3/4 Agricultural Science units of study

Commercial Law

Junior (Level 1) units
CLAW 1001
And either CLAW 1002 or any CLAW 2000 or CLAW 3000 unit of study
Level 2 and 3 units
Any five further CLAW 2000 or 3000 units
CLAW 2201
See FEB Handbook

Econometrics

Junior (Level 1) units
ECMT 1010 and ECMT 1020
Level 2 and 3 units
ECMT 2110 and ECMT 3110
Four further ECMT 2000 and ECMT 3000 units
See FEB Handbook

Economics

Junior (Level 1) units
ECON 1001 and ECON 1002
Level 2 and 3 units
ECOS 2001 and ECOS 2002
Any four further ECOS 2000 or ECOS 3000 units, of which at least two must be at the 3000 level.
See FEB Handbook

Finance

Junior (Level 1) units
ACCT 1001* or ACCT 1003 and either ECMT 1010 or ECON 1001
Level 2 and 3 units
FINC 2011 and either FINC 2012 or FINC 2014
Any four further FINC 3000 units, or three further FINC 3000 units and one of ACCT 3013 or CLAW 3201.
See FEB Handbook
**NB: Restricted entry*

Geography

Junior (Level 1) units
GEOG 1001 or ENVI1001 or GEOL 1002
GEOG 1002 or other level 1 science unit
Level 2 and 3 units
Two GEOG 2000 units
Four GEOG 3000 units
See FSc Handbook

Government and International Relations

Junior (Level 1) units
Two level 1000 Government (GOVT) units
Level 2 and 3 units
Six GOVT 2000 units
See FEB Handbook

Management

Junior (Level 1) units
WORK 1003
One GOVT 1000 unit or ECON 1001
Level 2 and 3 units
WORK 2201
Five units from: ECOS 3003, 3005, 3008, 3012, GOVT 2552, 2557, WORK 2204, 2205, 2209, 2210, 2211, 2217, 2218, 2219, 2221
See FEB Handbook

Marketing

Junior (Level 1) units
MKTG 1001 and MKTG 1002
Level 2 and 3 units
MKTG 2112 and MKTG 3111
Four other MKTG 2000 or 3000 units
See FEB Handbook

Psychology

Junior (Level 1) units
PSYC 1001 andPSYC 1002
Level 2 and 3 units
PSYC 2011, 2012, 2013 and 2014
24 credit points PSYC 3000 units
See FSc Handbook
NB: A Psychology major requires the completion of 60 credit points of PSYC units

Notes:

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

Bachelor of Horticultural Science

Unit of Study			*CP A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Year1				
Year 1 will have the following 48 credit point structure:				
AGEC **1006**	Economic Environment of Agriculture	6	A HSC Mathematics N AGEC1003, AGEC1004.	Semester 1
BIOL 1001	Concepts in Biology	6	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
or				
BIOL 1101	Biology - Ecosystems to Genes	6	**P** HSC 2-unit Biology or equivalent. N BIOL (1001 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1
or				
BIOL 1901	Biology - Ecosystems to Genes (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (lOOlorllOl) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.Department permission required for enrolment.	Semester 1
HORT 1001	Horticultural Science 1A	6	A HSC 2 unit Chemistry N CROP1001, LWSC1001	Semester 1
BIOL 1002	Living Systems	6	A HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. N BIOL 1902	Semester 2
or				
BIOL 1902	Living Systems (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1002 or 1904 or 1905) NB: Department permission required for enrolment.	Semester 2
BIOM 1003	Biometry 1	6	A 70 or more in HSC Mathematics	Semester 2
HORT 1002	Horticultural Science IB	6	C HORT1001 N CROP1002, LWSC1002	Semester 2
And 12 credit points of first year Chemistry				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
CHEM 1001	Fundamentals of Chemistry 1A	**6**	A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM 1101 or 1901 or 1903 or 1909	Semester 1
CHEM 1002	Fundamentals of Chemistry IB	**6**	P CHEM (1001 or 1101) or equivalent N CHEM (1102 or 1902 or 1904 or 1908)	Semester 2
or				
CHEM 1901	Chemistry 1A (Advanced)	**6**	P UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1101 or 1903 or 1909) NB: Department permission required for enrolment.	Semester 1
CHEM 1902	Chemistry IB (Advanced)	**6**	P CHEM (1901 or 1903) or Distinction in CHEM1101 or equivalent C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1102 or 1904 or 1908) NB: Department permission required for enrolment.	Semester 2
Year 2				
Year 2 will have the following 48 credit point structure:				
BIOM 2001	Biometry 2	**6**	P BIOM1003 or equivalent	Semester 1
PLNT 2001	Plant Biochemistry and Molecular Biology	**6**	P 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2901, AGCH2001.	Semester 1
or				
PLNT 2901	Plant Biochem & Molecular Biology (Adv)	**6**	P A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2001, AGCH2001	Semester 1
PLNT 2002	Aust Flora: Ecology and Conservation	**6**	P One of BIOL1001, BIOLl 101, BIOLl901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.) N PLNT2902, BIOL2004 or BIOL2904.	Semester 1
or				
PLNT 2902	Aust Rora: Ecology & Conservation (Adv)	**6**	P Distinction average in (one of BIOL 1001, BIOLl 101, BIOL 1901) and (one of BIOL 1002, BIOL 1003, BIOL1902, BIOL1903, LWSC1002) (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2002, BIOL2004, BIOL2904.	Semester 1
SOIL 2003	Soil Properties and Processes	**6**		Semester 1
ENTO 2001	Entomology	**6**		Semester 2
HORT 2002	Horticultural Science 2	**6**	A HORT1001, HORT 1002 P Two of BIOL 1001, BIOL 1101, BIOL 1901, BIOL 1002, BIOL 1003, BIOL 1903.	Semester 2
MICR 2024	Microbes in the Environment	6	P 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. N MICR (2021 or 2921 or 2001 or 2901 or 2003 or 2007 or 2011 or 2909). NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).	Semester 2
PLNT 2003	Plant Form and Function	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 N PLNT2903, BIOL2003, BIOL2903, CROP2001.	Semester 2
or				
PLNT 2903	Plant Form and Function (Advanced)	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) N PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3				
Year 3 will have the following structure: a core (36 credit points) of:				
GENE 2001	Agricultural Genetics 2	6	P BIOL1001 and BIOL1002 or BIOL (1101 or 1901) and BIOL 1902, BIOM1001 or BIOM1003	Semester 1
HORT 3004	Postharvest Biology and Technology	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
HORT 3005	Production Horticulture	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
PPAT 3003	Plant Disease	6	P Two of PLNT2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903, MICR 2024 or MICR 2026.	Semester 1
PLNT 3001	Plant, Cell and Environment	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT 3901	Semester 2
or				
PLNT 3901	Plant, Cell and Environment (Advanced)	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT3001 NB: Entry is restricted and is based on a combination of a high WAM and student motivation.Department permission required for enrolment.	Semester 2
PLNT 3002	Plant Growth and Development	6	P 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. N PLNT 3902, BIOL 3021, BIOL 3931.	Semester 2

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
or				
PLNT 3902	Plant Growth and Development (Advanced)	6	P Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit coordinator. N PLNT 3002, BIOL 3021, BIOL 3931.	Semester 2
And 12 credit points selected from the following electives:				
AGCH 3025	Chemistry and Biochemistry of Foods A	6	P 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGCH 3030	Rural Environmental Chemistry A	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022.	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
BIOM 3004	Biometry 3	6	P BIOM 2001 or BIOM2002 NB: (2 lee, 3 labs)/wk.	Semester 1
AGCH 3015	Agricultural Biotechnology	6	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC 2103	Production Economics	6	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
MICR 2022	Applied Microbiology	6	A MICR (2021 or 2921 or 2024) P (6 credit points of Junior Biology or MBLG1001) and 6 credit points of Junior Chemistry. N MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909) NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).	Semester 2
MICR 3022	Microbial Biotechnology	6	P At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. N MICR3922, MICR3002, MICR3902	Semester 2
SOIL 3004	The Soil Resource	6	P SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
Year 4				
In Year 4, students will complete:				
*two 6 credit point core units as indicated in the following table (Table 1)				
*a projecit of 24 credit points relevant to specialisation (Table 2)				
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.				

Table 1 - BHortSc

Unit	*of*	*Study*	*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
HORT 4004	Issues in Horticultural Science 4A		6	P HORT3001 or HORT3004	Semester 1
HORT 4005	Research and Practice in Hort Science 4B		6	P HORT3001 or HORT3004; HORT4004	Semester 2

Table 2 - BHortSc

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGRI 4101	Research Project A	12	C MICR 3022 or (AGEC 4103 or 4104) or AGRO (4003 or 4004) or BIOM (4003 or 4004 or 4005) or ENTO 4004 or AGCH 4007 or GENE 4012 or HORT 4004 or PPAT (4003 or 4004 or 4005) or SOIL (4005 or 4006) or LWSC 4003	Semester 1
AGRI 4102	Research Project B	12	P AGRI 4101.	Semester 2

Table 3 - BHortSc

Unit of Study		***CP***	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGCH 3025	Chemistry and Biochemistry of Foods A	6	P 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGCH 3030	Rural Environmental Chemistry A	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022.	Semester 1
AGCH 4007	Instrumentation in Analytical Chemistry	6	A PLNT2001, AGCH2003 or AGCH2004.	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGEC 4103	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC 4104	Agribusiness Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 1
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
AGRO 4003	Crop Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
AGRO 4004	Professional Practice in Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
ANSC 3102	Animal Reproduction	6	PANSC2002	Semester 1
ANSC 3103	Animal Structure and Function 3A	6	PANSC2002	Semester 1
BIOM 3004	Biometry 3	6	P BIOM 2001 or BIOM2002 NB: (2 lee, 3 labs)/wk.	Semester 1
BIOM 3005	Environmetrics 3	6	P BIOM2001 or BIOM2002 N BIOM 3004	Semester 1
BIOM 4003	Matrix Algebra and Linear Models	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4004	Applied Multivariate Analysis	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4005	Biometrical Methods	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
ENTO 4004	Insect Taxonomy	6	A ENTO 2001	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites: Q: Qualifying C: Corequisites N: Prohibition*	*Session*
ENVI 3111	Environmental Law and Ethics	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science• or Agriculture units. NENVI3001,ENVI3003.	Semester 1
GENE 4012	Plant Breeding	6	P BIOM 2001, GENE 2001	Semester 1
GENE 4013	Molecular Genetics and Breeding	6	P BIOM 2001, GENE 2001, AGCH 3016	Semester 1
GENE 4014	Population and Quantative Genetics	6	P BIOM 2001, GENE 2001 C GENE 4012	Semester 1
LWSC 3004	Limnology and Water Quality	6	A GEOG2303 or GEOG2321 P LWSC2001 .or LWSC2002 NAGCH3030	Semester 1
LWSC 4003	Landscape Hydrology and Management	6	P GEOG 2321 or LWSC 3001.	Semester 1
PPAT 4003	Molecular & Physiological Plant Path'ogy	6	P PPAT 3003 or equivalent.	Semester 1
PPAT 4004	Adv Mycology & Diagnostic Plant Path'ogy	6	P PPAT 3003 or equivalent.	Semester 1
PPAT 4005	Soil Biology and Biodiversity	6		Semester 1
SOIL 4005	Field and Laboratory Soil Physics	6	P SOIL 3004	Semester 1
SOIL 4006	Field and Laboratory Pedology	6	P SOIL 3004	Semester 1
VIRO 3001	Virology	6	A MICR (2021 or 2921 or 2022 or 2922) P At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MICR or BCHM or BIOL or EVIMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. N VIRO3901 NB: Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.	Semester 1
AGCH 3015	Agricultural Biotechnology	6	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGCH 4006	Food Processing Science	6	A AGCH 2003, AGCH 2004 or PLNT2001.	Semester 2
AGEC 2103	Production Economics	6	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGECl 102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
AGRO 4005	Sustainable Grazing Systems	6	A CROP 1001, HORT 1001 or LWSC 1001. P PLNT 2003/2903 or CROP 2001	Semester 2
ANSC 3101	Animal Nutrition 3	6	PANSC2002	Semester 2
ANSC 3104	Animal Structure and Function 3B	6	P ANSC2002, ANSC3103 OR ANSC 3101	Semester 2
ENTO 4003	Applied Entomology (Crops)	6	A ENTO 2001	Semester 2
ENVI 3112	Environmental Assessment	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. N ENVI3002, ENVI3004.	Semester 2
GENE 4011	Plant Cytogenetics	6	P BIOM 2001, GENE 2001.	Semester 2
MICR 2022	Applied Microbiology	6	A MICR (2021 or 2921 or 2024) P (6 credit points of Junior Biology or MBLGlOOl) and 6 credit points of Junior Chemistry. N MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909) NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLGlOOl or PLNT (2001 or 2901).	Semester 2
MICR 3022	Microbial Biotechnology	6	P At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. N MICR3922, MICR3002, MICR3902	Semester 2
SOIL 3004	The Soil Resource	6	P SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
SOIL 4007	Environmental Soil Chemistry	6	P SOIL 3004	Semester 2

Bachelor of Land and Water Science

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Yearl				
Year 1 will have the following 48 credit point structure:				
BIOL 1001	Concepts in Biology	6	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOLl 101 Ecosystems to Genes rather than BIOLlOOl. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
or				
BIOL 1101	Biology - Ecosystems to Genes	6	P HSC 2-unit Biology or equivalent. N BIOL (1001 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1
or				
BIOL 1901	Biology - Ecosystems to Genes (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1001 or 1101) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.Department permission required for enrolment.	Semester 1
ENVI 1002	Geomorphic Environments	6	NB: This unit of study is available to students in the Bachelor of Science (Environmental) and the Bachelor of Land & Water Science only.	Semester 1
LWSC 1001	Land and Water Science 1A	6	N CROP1001 and HORT1001	Semester 1
RSEC 1031	Resource Economics 1	6	NAGEC1031	Semester 2
BIOM 1003	Biometry 1	6	A 70 or more in HSC Mathematics	Semester 2
LWSC 1002	Land and Water Science IB	6	C LWSC1001 Land and Water Science 1A N CROP1002 and HORT1002	Semester 2
And 12 credit points of first year Chemistry				
CHEM 1001	Fundamentals of Chemistry 1A	6	A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM 1101 or 1901 or 1903 or 1909	Semester 1
CHEM 1002	Fundamentals of Chemistry IB	6	P CHEM (1001 or 1101) or equivalent N CHEM (1102 or 1902 or 1904 or 1908)	Semester 2
Or from standard level CHEM 1101 Chemistry 1A and CHEM 1102 Chemistry IB				
Or from advanced level CHEM 1901 Chemistry 1A (Advanced) and CHEM 1902 Chemistry IB (Advanced)				
Year 2				
Year 2 will have the following 48 credit point structure:				
AGCH 2003	Rural Environmental Chemistry (Intro)	6	P 12 credit points of Junior Chemistry. N AGCH2001, AGCH2002, CHEM2404	Semester 1
BIOM 2001	Biometry 2	6	P BIOM1003 or equivalent	Semester 1
PLNT 2002	Aust Flora: Ecology and Conservation	6	P One of BIOLlOOl, BIOLl 101, BIOL1901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.) N PLNT2902, BIOL2004 or BIOL2904.	Semester 1
or				
PLNT 2902	Aust Rora: Ecology & Conservation (Adv)	6	P Distinction average in (one of BIOLlOOl, BIOLl 101, BIOL 1901) and (one of BIOL 1002, BIOL 1003, BIOL1902, BIOL1903, LWSC1002) (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2002, BIOL2004, BIOL2904.	Semester 1
SOIL 2003	Soil Properties and Processes	6		Semester 1
GEOG 2321	Fluvial and Groundwater Geomorphology	6	P GEOG(2311 or 2001) or 36 credit points of Junior study including GEOGlOOl or ENVI (1001 or 1002) or GEOL (1001 or 1002 or 1501). Students in the Bachelor of Resource Economics should have 36 credit points of study in Biology (or Land and Water Science), Chemistry and Mathematics. Students in the Bachelor of Land and Water Science should have ENVI1002, 12 credit points of Chemistry, 6 credit points of Biology, BIOM1002. N GEOG (2002 or 2302 or 2303) or MARS2002 or MARS2006	Semester 2
LWSC 2002	Sustainable Land and Water Management	6	PLWSC1001, LWSC1002.	Semester 2
MICR 2024	Microbes in the Environment	6	P 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. N MICR (2021 or 2921 or 2001 or 2901 or 2003 or 2007 or 2011 or 2909). NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).	Semester 2
PLNT 2003	Plant Form and Function	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOLlOOl and ENVI1002 N PLNT2903, BIOL2003, BIOL2903, CROP2001.	Semester 2
or				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
PLNT 2903	Plant Form and Function (Advanced)	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) N PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3				
Year 3 will have a core (24 credit points) of:				
BIOM 3005	Environmetrics 3	6	P BIOM2001 or BIOM2002 N BIOM 3004	Semester 1
LWSC 3004	Limnology and Water Quality	6	A GEOG2303 or GEOG2321 P LWSC2001 or LWSC2002 N AGCH3030	Semester 1
SOIL 3004	The Soil Resource	6	P SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
And 24 credit points selected from the following electives:				
AGCH 3025	Chemistry and Biochemistry of Foods A	6	P 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
BIOM 3004	Biometry 3	6	P BIOM 2001 or BIOM2002 NB: (2 lee, 3 labs)/wk.	Semester 1
ENVI 3111	Environmental Law and Ethics	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. NENVI3001,ENVI3003.	Semester 1
GEOS 3108	Rivers: Science, Policy and Managem		NB: *** No info available for 2006. ***	
PPAT 3003	Plant Disease	6	P Two of PLNT2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903, MICR 2024 or MICR 2026.	Semester 1
AGCH 3015	Agricultural Biotechnology	6	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC 2103	Production Economics	6	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
ENVI 3112	Environmental Assessment	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. N ENVI3002, ENVI3004.	Semester 2
Year 4				
In Year 4 students will complete:				
*two 6-credit point core units as indicated in the following table (Table 1)				
*a project of 24 credit points relevant to specialisation (Table 2)				
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.				

Table 1 - BLWSc

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Year 4				
LWSC 4003	Landscape Hydrology and Management	6	P GEOG 2321 or LWSC 3001.	Semester 1
SOIL 4005	Field and Laboratory Soil Physics	6	P SOIL 3004	Semester 1

Table 2 - BLWSc

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGRI 4101	Research Project A	12	C MICR 3022 or (AGEC 4103 or 4104) or AGRO (4003 or 4004) or BIOM (4003 or 4004 or 4005) or ENTO 4004 or AGCH 4007 or GENE 4012 or HORT 4004 or PPAT (4003 or 4004 or 4005) or SOIL (4005 or 4006) or LWSC 4003	Semester 1
AGRI 4102	Research Project B	12	P AGRI 4101.	Semester 2

Table 3 - BLWSc

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGCH 3025	Chemistry and Biochemistry of Foods A	6	**P** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGCH 3030	Rural Environmental Chemistry A	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022.	Semester 1
AGCH 4007	Instrumentation in Analytical Chemistry	6	A PLNT2001, AGCH2003 or AGCH2004.	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGEC 4103	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC 4104	Agribusiness Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 1
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
AGRO 4003	Crop Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
AGRO 4004	Professional Practice in Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
ANSC 3102	Animal Reproduction	6	PANSC2002	Semester 1
ANSC 3103	Animal Structure and Function 3A	6	PANSC2002	Semester 1
BIOM 3004	Biometry 3	6	P BIOM 2001 or BIOM2002 NB: (2 lee, 3 labs)/wk.	Semester 1
BIOM 4003	Matrix Algebra and Linear Models	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4004	Applied Multivariate Analysis	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4005	Biometrical Methods	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
ENTO 4004	Insect Taxonomy	6	A ENTO 2001	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
ENVI 3111	Environmental Law and Ethics	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. NENVI3001,ENVI3003.	Semester 1
GENE 4012	Plant Breeding	6	P BIOM 2001, GENE 2001	Semester 1
GENE 4013	Molecular Genetics and Breeding	6	P BIOM 2001, GENE 2001, AGCH 3016	Semester 1
GENE 4014	Population and Quantative Genetics	6	P BIOM 2001, GENE 2001 C GENE 4012	Semester 1
HORT 3004	Postharvest Biology and Technology	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
HORT 3005	Production Horticulture	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
HORT 4004	Issues in Horticultural Science 4A	6	P HORT3001 or HORT3004	Semester 1
PPAT 3003	Plant Disease	6	P Two of PLNT2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903, MICR 2024 or MICR 2026.	Semester 1
PPAT 4003	Molecular & Physiological Plant Path'ogy	6	P PPAT 3003 or equivalent.	Semester 1
PPAT 4004	Adv Mycology & Diagnostic Plant Pathology	6	P PPAT 3003 or equivalent.	Semester 1
PPAT 4005	Soil Biology and Biodiversity	6		Semester 1
SOIL 4006	Field and Laboratory Pedology	6	P SOIL 3004	Semester 1
VIRO 3001	Virology	6	A MICR (2021 or 2921 or 2022 or 2922) P At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MICR or BCHM or BIOL or EVIMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. N VIRO3901 NB: Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.	Semester 1
AGCH 3015	Agricultural Biotechnology	6	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGCH 4006	Food Processing Science	6	A AGCH 2003, AGCH 2004 or PLNT2001.	Semester 2
AGEC 2103	Production Economics	6	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
AGRO 4005	Sustainable Grazing Systems	6	A CROP 1001, HORT 1001 or LWSC 1001. P PLNT 2003/2903 or CROP 2001	Semester 2
ANSC 3101	Animal Nutrition 3	6	PANSC2002	Semester 2
ANSC 3104	Animal Structure and Function 3B	6	P ANSC2002, ANSC3103 OR ANSC 3101	Semester 2
ENTO 4003	Applied Entomology (Crops)	6	A ENTO 2001	Semester 2
ENVI 3112	Environmental Assessment	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. N ENVI3002, ENVI3004.	Semester 2
GENE 4011	Plant Cytogenetics	6	P BIOM 2001, GENE 2001.	Semester 2
HORT 4005	Research and Practice in Hort Science 4B	6	P HORT3001 or HORT3004; HORT4004	Semester 2
MICR 2022	Applied Microbiology	6	A MICR (2021 or 2921 or 2024) P (6 credit points of Junior Biology or MBLG 1001) and 6 credit points of Junior Chemistry. N MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909) NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG 1001 or PLNT (2001 or 2901).	Semester 2
MICR 3022	Microbial Biotechnology	6	P At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. N MICR3922, MICR3002, MICR3902	Semester 2
PLNT 3001	Plant, Cell and Environment	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. **N** PLNT 3901	Semester 2

or

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
PLNT 3901	Plant, Cell and Environment (Advanced)	**6**	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT3001 NB: Entry is restricted and is based on a combination of a high WAM and student motivation.Department permission required for enrolment.	Semester 2
PLNT 3002	Plant Growth and Development	**6**	P 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. N PLNT 3902, BIOL 3021, BIOL 3931.	Semester 2
or				
PLNT 3902	Plant Growth and Development (Advanced)	6	P Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit coordinator. N PLNT 3002, BIOL 3021, BIOL 3931.	Semester 2
SOIL 4007	Environmental Soil Chemistry	6	P SOIL 3004	Semester 2

Bachelor of Resource Economics

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Yearl				
Year 1 will have a minimum of 48 credit points comprised of:				
ECON 1001	Introductory Microeconomics	**6**	A Mathematics	Semester 1, Summer
BIOL 1001	Concepts in Biology	**6**	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
or				
BIOL 1901	Biology - Ecosystems to Genes (Advanced)	**6**	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1001 or 1101) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.Department permission required for enrolment.	Semester 1
or				
CHEM 1001	Fundamentals of Chemistry 1A	**6**	A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM 1101 or 1901 or 1903 or 1909	Semester 1
or				
CHEM 1101	Chemistry 1A	**6**	A HSC Chemistry and Mathematics C Recommended concurrent units of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1901 or 1903 or 1909)	Semester 1 Semester 2, Summer
or				
CHEM 1901	Chemistry 1A (Advanced)	**6**	P UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1101 or 1903 or 1909) NB: Department permission required for enrolment.	Semester 1
or				
LWSC 1001	Land and Water Science 1A	**6**	N CROP1001 and HORT1001	Semester 1
MATH 1001	Differential Calculus	**3**	A HSC Mathematics Extension 1 N MATH 1011 or 1901 or 1906 or 1111	Semester 1, Summer
or				
MATH 1901	Differential Calculus (Advanced)	**3**	A HSC Mathematics Extension 2 N MATH (1111 or 1011 or 1001 or 1906)	Semester 1
MATH 1002	Linear Algebra	**3**	A HSC Mathematics Extension 1 N MATH 1902 or 1012 or 1014	Semester 1, Summer
or				
MATH 1902	Linear Algebra (Advanced)	**3**	A HSC Mathematics Extension 2 N MATH (1002 or 1012 or 1014)	Semester 1
ECON 1002	Introductory Macroeconomics	**6**	A Mathematics	Semester 2, Summer
Eitherl				
BIOL 1002	Living Systems	**6**	A HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. N BIOL1902	Semester 2
or				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
BIOL 1902	Living Systems (Advanced)	**6**	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1002 or 1904 or 1905) NB: Department permission required for enrolment.	Semester 2
or				
CHEM 1002	Fundamentals of Chemistry IB	**6**	P CHEM (1001 or 1101) or equivalent N CHEM (1102 or 1902 or 1904 or 1908)	Semester 2
or				
CHEM 1102	Chemistry IB	**6**	P CHEM (1101 or 1901) or a Distinction in CHEM 1001 or equivalent C Recommended concurrent units of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1902 or 1904 or 1908)	Semester 1 Semester 2, Summer
or				
CHEM 1902	Chemistry IB (Advanced)	**6**	P CHEM (1901 or 1903) or Distinction in CHEM 1101 or equivalent C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1102 or 1904 or 1908) NB: Department permission required for enrolment.	Semester 2
or				
LWSC 1002	Land and Water Science IB	**6**	C LWSC1001 Land and Water Science 1A N CROP1002 and HORT1002	Semester 2
MATH 1003	Integral Calculus and Modelling	**3**	A HSC Mathematics Extension 2 or MATH 1001 or MATH 1111 N MATH 1013 or 1903 or 1907	Semester 2, Summer
or				
MATH 1903	Integral Calculus and Modelling Advanced	**3**	A HSC Mathematics Extension 2 or Credit or better in MATH (1001 or 1901) N MATH (1003 or 1013 or 1907)	Semester 2
MATH 1005	Statistics	**3**	A HSC Mathematics N MATH (1905 or 1015) or ECMT Junior units of study or STAT (1021 or 1022)	Semester 2, Summer
or				
MATH 1905	Statistics (Advanced)	**3**	A HSC Mathematics Extension 2 N MATH (1005 or 1015) or ECMT Junior units of study or STAT (1021 or 1022)	Semester 2
or				
ECMT 1020	Business and Economic Statistics B	**6**	C ECMT1010 N ECMT1021, ECMT1022 and ECMT1023 NB: Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.	Semester 2
RSEC 1031	Resource Economics 1	**6**	N AGEC 1031	Semester 2
And units from Table RE1 (a minimum of 6 credit points)				
Note: 1. The second core science unit must be taken in the same discipline as the first core science unit.				
Year 2				
Year 2 will have a minimum of 48 credit points comprised of:				
AGEC 2101	Market and Price Analysis	**6**	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2105	Applied Econometric Modelling	**6**	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
or				
ECMT 2110	Regression Modelling	**6**	PECMT1010 NECMT2010	Semester 1
GEOG 2311	Landscape Processes	**6**	P 36cp of Junior units of study, including GEOG1001 or ENVI (1001 or 1002), or GEOL (1001 or 1002). Students enrolled in the Bachelor of Resource Economics should have 36cp from Junior units of study in Biology (or Land and Water Science), Chemistry and Mathematics. N GEOG2001	Semester 1
ECOS 2001	Intermediate Microeconomics	**6**	P ECONlOOl C ECMT1010 N ECON2001, ECOS2901 (or ECON2901) NB: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.	Semester 1 Semester 2,
or				
ECOS 2901	Intermediate Microeconomics Honours	**6**	P ECONlOOl and ECON1002 with a Credit average or better in the two units combined C ECOS2903 andECMTlOlO NECON2901,ECOS2001 (orECON2001) NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.	Semester 1
ECOS 2002	Intermediate Macroeconomics	**6**	P ECON1002. C ECMT1020 N ECON2002, ECOS2902 (or ECON2902) NB: Certain combinations of Maths/Stats may substitute for Econometrics -- consult the Chair of the Discipline of Economics.	Semester 1, Semester 2
or				
ECOS 2902	Intermediate Macroeconomics Honours	**6**	PECOS2901 CECMT1020 N ECON2902, ECOS2002 (or ECON2002) NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.	Semester 2
AGEC 2103	Production Economics	**6**	P ECONlOOl or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
And units from Tables RE1 and RE2 (normally a minimum of 12 credit points)				
Year 3				
Year 3 will have a minimum of 48 credit points comprised of:				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGEC **3103**	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGEC **3104**	Research Methods	6	P AGEC 2105 or ECMT 2010 or AGEC2005 N AGEC3004	Semester 1
ENVI 3111	Environmental Law and Ethics	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. NENVI3001,ENVI3003.	Semester 1
AGEC **3102**	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
ECOS 3ddd Economics level 3 unit (6 credit points)				
Level 2/3 Faculty of Economics and Business unit (6 credit points)				
And units from Table RE2 (normally a minimum of 12 credit points)				
Year 4				
Year 4 will have a minimum of 48 credit points comprised of:				
RSEC 4141	Resource Economics Project A	9	P AGEC3104 or AGEC3004 or AGEC4041 C RSEC4142 N AGEC4012; AGEC4112	Semester 1
RSEC 4131	Benefit-Cost Analysis	6	P ECON 2001, AGEC 2103 or AGEC 2003 N AGEC4037	Semester 1
RSEC 4142	Resource Economics Project B	9	PAGEC3104orAGEC3004orAGEC4041 CRSEC4141 NAGEC4013; AGEC4113	Semester 2
RSEC 4132	Environmental Economics	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON 3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RESC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 1
Plus at least 6 credit points form the following RSEC units:				
RSEC 4133	Economics of Mineral & Energy Industries	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON 3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 2
RSEC 4134	Economics of Water & Bio-resources	6	A ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). P ECON 2001, AGEC 2103 or AGEC 2003 N ECON3013 NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.	Semester 2
Plus AGEC units from below, for at least 12 credit points of RSEC and AGEC units in aggregate:				
AGEC **4110**	Professional Skills	3	C AGEC 4111 N AGEC 4011	Semester 1
AGEC **4103**	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC **4108**	Quantitative Planning Methods	6	P AGEC 3101 or AGEC 3103 or AGEC3031 or AGEC3001 N AGEC4008	Semester 1
AGEC **4107**	Special Topics	6	P Faculty permission required for enrolment N AGEC4007 NB: Department permission required for enrolment.	Semester 1 Semester 2,
AGEC **4102**	Agricultural Development Economics	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 2
AGEC **4111**	Contemporary Issues	3	C AGEC 4110 NAGEC4011	Semester 2
Plus other level 3 units from Table RE2 when needed to complete a major, with approval of the degree coordinator				

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

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
ACCT 1001	Accounting IA	6	A HSC Mathematics N ACCT1003, ACCT1004 NB: Restricted entry	Semester 1 Semester 2,
ACCT 1003	Financial Accounting Concepts	6	N Terminating unit. Cannot be counted with ACCT1001 and ACCT1002.	Semester 1
BIOL 1001	Concepts in Biology	6	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
BIOL 1901	Biology - Ecosystems to Genes (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1001 or 1101) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.Department permission required for enrolment.	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
BIOL 1002	Living Systems	6	A HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. N BIOL 1902	Semester 2
BIOL 1902	Living Systems (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a Universíty level Bíology unít, or by ínvítatíon. N BIOL (1002 or 1904 or 1905) NB: Department permission required for enrolment.	Semester 2
CHEM 1001	Fundamentals of Chemistry 1A	6	A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM 1101 or 1901 or 1903 or 1909	Semester 1
CHEM 1101	Chemistry 1A	6	A HSC Chemistry and Mathematics C Recommended concurrent units of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1901 or 1903 or 1909)	Semester 1 Semester 2, Summer
CHEM 1901	Chemistry 1A (Advanced)	6	P UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1101 or 1903 or 1909) NB: Department permission required for enrolment.	Semester 1
CHEM 1002	Fundamentals of Chemistry IB	6	P CHEM (1001 or 1101) or equivalent N CHEM (1102 or 1902 or 1904 or 1908)	Semester 2
CHEM 1102	Chemistry IB	6	P CHEM (1101 or 1901) or a Distinction in CHEM 1001 or equivalent C Recommended concurrent units of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1902 or 1904 or 1908)	Semester 1 Semester 2, Summer
CHEM 1902	Chemistry IB (Advanced)	6	P CHEM (1901 or 1903) or Distinction in CHEM 1101 or equivalent C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1102 or 1904 or 1908) NB: Department permission required for enrolment.	Semester 2
CLAW 1001	Commercial Transactions A	6		Semester 1 Semester 2,
CLAW 1002	Commercial Transactions B	6	P CLAW1001	Semester 2
CROP 1001	Agricultural Science 1A	6	A HSC Chemistry N HORT1001, LWSC1001	Semester 1
CROP 1002	Agricultural Science IB	6	C CROP1001 N HORT1002, LWSC1002	Semester 2
ECMT 1010	Business and Economic Statistics A	6	N ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021	Semester 1 Semester 2,
GEOG 1001	Biophysical Environments	6		Semester 1
GEOG 1002	Human Environments	6		Semester 2
GEOL 1002	Earth Processes and Resources	6	A No previous knowledge of Geology assumed N GEOL1501	Semester 2
LWSC 1001	Land and Water Science 1A	6	N CROP1001 and HORT1001	Semester 1
LWSC 1002	Land and Water Science IB	6	C LWSC1001 Land and Water Science 1A N CROP1002 and HORT1002	Semester 2
PSYC 1001	Psychology 1001	6		Semester 1, Summer
PSYC 1002	Psychology 1002	6		Semester 2, Summer
Modern Language (Level 1 or higher) units, with the approval of the Dean FAFNR				

Notes:

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

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

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	
ECOS 3002	Development Economics	6	P One of ECOS2001 (or ECON2001), ECOS2002 (or ECON2002), ECOS2901 (or ECON2901), ECOS2902 (orECON2902) NECON3002	Semester 2
ECOS 3003	Hierarchies, Incentives & Firm Structure	6	P Either ECOS2001 (or ECON2001) or ECOS2901(or ECON2901) N ECON3003	Semester 1
ECOS 3005	Industrial Organisation	6	P One of ECOS2001 (or ECON2001), or ECOS2901 (or ECON2901) N ECON3005, ECOS2201	Semester 2
ECOS 3006	International Trade	6	P Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901) N ECON3006	Semester 1
ECOS 3007	International Macroeconomics	6	P One of ECOS2002 (or ECON2002) or ECOS2902 (or ECON2902) N ECON3007	Semester 2
ECOS 3009	Markets, Regulation & Government Policy	6	P One of ECOS2001 (or ECON2001), ECOS2901 (or ECON2901), ECOP2011 (or ECOP2001), plus one of ECOS2002 (or ECON2002), ECOS2902 (or ECON2902), ECOP2012 (or ECOP2002). N ECON3009 NB: Department permission required for enrolment.	Semester 2
ECOS 3010	Monetary Economics	6	P one of ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901) or ECOS2002 (or ECON2002) or ECOS2902 (or ECON2902) N ECON3010	Semester 1
ECOS 3011	Public Finance	6	P Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901) N ECON3011	Semester 2
ECOS 3012	Strategic Behaviour	6	P Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901) N ECON3012	Semester 2
Units of *i*study in the following discipline areas (level 2000 or level 3000 unless otherwise specified):				
Agricultural Economics (Level 3000), Agricultural Chemistry, Animal Science, Biology (including plant science units), Chemistry, Commercial Law, Crop, Science, Econometrics, Environmental Science, Finance, Geography, Geology, Land and Water Science, Mathematics (including Statistics), Marine Science, Psychology, Soil Science				

Notes:

1. AGEC 2102 is permitted for Year 2 only.
2. Prerequisites and/or corequisites apply for most units

Majors in the BResEc Degree

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

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

All students must complete a Resource Economics major and a non-Resource Economics major. The Resource Economics major is defined as follows. The other majors available in the BResEc degree are also defined below.

Resource Economics Major

Junior (Level 1) units
RSEC 1031
Two of (MATH 1001, 1002, 1003 and 1005) or ECMT 1010
Level 2 and 3 units
AGEC 2101 and 2103
Three of AGEC 3103 and level 4 RSEC units

Non-Resource Economics Majors available in the BResEc Degree

Agricultural Science

Junior (Level 1) units
CROP 1001
CROP 1002
Level 2 and 3 units
PLNT 2003
SOIL 2003
Four other level 2/3/4 Agricultural Science units of study

Biology

Junior (Level 1) units
Two BIOL 1000 units
Level 2 and 3 units
Two BIOL 2000 units
Two BIOL 3000 units
See FSc Handbook

Chemistry

Junior (Level 1) units
One or two CHEM 1000 units
Two of MATH 1001, 1002, 1003 and 1005
Level 2 and 3 units
Two specified CHEM 2000 units
Four CHEM 2000 units
See FSc Handbook

Commercial Law

Junior (Level 1) units
CLAW 1001
And either CLAW 1002 or any CLAW 2000 or CLAW 3000 level units of study
Level 2 and 3 units
CLAW 2201
Any five further CLAW 2000 or 3000 units
See FEB Handbook

Economics

Junior (Level 1) units
ECON 1001 and ECON 1002
Level 2 and 3 units
ECOS 2001 and ECOS 2002
Any four further ECOS 2000 or ECOS 3000 units, of which at least two must be at the 3000 level.
See FEB Handbook

Finance

Junior (Level 1) units
ACCT 1001* or ACCT 1003 and either ECMT 1010 or ECON 1001
Level 2 and 3 units
FINC 2011 and either FINC 2012 or FINC 2014
Any four further FINC 3000 units, or three further FINC 3000 units and one of either ACCT 3013 or CLAW 3201
See FEB Handbook
**NB: Restricted entry*

Geography

Junior (Level 1) units
GEOG 1001 or ENVI1001 or GEOL 1002
GEOG 1002 or other level 1 science unit
Level 2 and 3 units
Two GEOG 2000 units
Four GEOG 3000 units
See FSc Handbook

Geology

Junior (Level 1) units
GEOL 1002 and CHEM 1001
Level 2 and 3 units
Two GEOL 2000 or MARS 2000 units
Four GEOS 3000 or MARS 3000 units
See FSc Handbook

Government and International Relations

Junior (Level 1) units
Two Level 1000 Government (GOVT) units
Level 2 and 3 units
Six GOVT 2000 units
See FEB Handbook

Marine Science

Junior (Level 1) units
Two units (12 credit points) of Level 1 units in CHEM, BIOL or LWSC
Level 2 and 3 units
MARS 2005 and MARS 2006
Four MARS 3000 units
See FSc Handbook

Mathematics

Junior (Level 1) units
MATH 1001, 1002, 1003 and 1005 (or parallel advanced units)
Level 2 and 3 units
Two of MATH 2061 and MATH 2065, MATH 2070
Six 4 credit point MATH 3000 units
See FSc Handbook

Soil Science

Junior (Level 1) units
Two CHEM 1000 units
Level 2 and 3 units
AGCH 2003
SOIL 2003
24 credit points of SOIL 3000 units

Statistics

Junior (Level 1) units
MATH 1001, 1002, 1003 and 1005 (or parallel advanced units)
Level 2 and 3 units
STAT 2011 and STAT 2012
24 credit points of STAT 3000 units
See FSc Handbook

Notes:

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

Bachelor of Science in Agriculture

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Year1				
Year 1 will have the following 48 credit point structure:				
AGEC **1006**	Economic Environment of Agriculture	6	A HSC Mathematics N AGEC1003, AGEC1004.	Semester 1
BIOL 1001	Concepts in Biology	6	A No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. N BIOL (1101 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1, Summer
or				
BIOL 1101	Biology - Ecosystems to Genes	6	P HSC 2-unit Biology or equivalent. N BIOL (1001 or 1901) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.	Semester 1
or				
BIOL 1901	Biology - Ecosystems to Genes (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1001 or 1101) NB: It is recommended that BIOL (1001 or 1101 or 1901) be taken before all Semester 2 Junior units of study in Biology.Department permission required for enrolment.	Semester 1
CROP 1001	Agricultural Science 1A	6	A HSC Chemistry N HORT1001, LWSC1001	Semester 1
BIOL 1002	Living Systems	6	A HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. N BIOL1902	Semester 2
BIOL 1902	Living Systems (Advanced)	6	P UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. N BIOL (1002 or 1904 or 1905) NB: Department permission required for enrolment.	Semester 2
BIOM 1003	Biometry 1	6	A 70 or more in HSC Mathematics	Semester 2
CROP 1002	Agricultural Science IB	6	C CROP1001 N HORT1002, LWSC1002	Semester 2
and 12 credit points of first year chemistry				
CHEM 1001	Fundamentals of Chemistry 1A	6	A There is no assumed knowledge of chemistry for this unit of study, but students who have not undertaken an HSC chemistry course are strongly advised to complete a chemistry bridging course before lectures commence. N CHEM 1101 or 1901 or 1903 or 1909	Semester 1
or				
CHEM 1901	Chemistry 1A (Advanced)	6	P UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1001 or 1101 or 1903 or 1909) NB: Department permission required for enrolment.	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
CHEM 1002	Fundamentals of Chemistry IB	**6**	P CHEM (1001 or 1101) or equivalent N CHEM (1102 or 1902 or 1904 or 1908)	Semester 2
or				
CHEM 1902	Chemistry IB (Advanced)	**6**	P CHEM (1901 or 1903) or Distinction in CHEM 1101 or equivalent C Recommended concurrent unit of study: 6 credit points of Junior Mathematics N CHEM (1002 or 1102 or 1904 or 1908) NB: Department permission required for enrolment.	Semester 2
Year 2				
Year 2 will have the following 48 credit point structure:				
BIOM 2001	Biometry 2	**6**	P BIOM 1003 or equivalent	Semester 1
GENE 2001	Agricultural Genetics 2	**6**	P BIOL1001 and BIOL1002 or BIOL (1101 or 1901) and BIOL 1902, BIOM1001 or BIOM1003	Semester 1
PLNT 2001	Plant Biochemistry and Molecular Biology	**6**	P 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2901, AGCH2001.	Semester 1
or				
PLNT 2901	Plant Biochem & Molecular Biology (Adv)	**6**	P A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2001, AGCH2001	Semester 1
SOIL 2003	Soil Properties and Processes	**6**		Semester 1
ANSC 2002	Animal Science 2	**6**	**P** CROP1001, BIOL1001 ORBIOL1101	Semester 2
ENTO 2001	Entomology	**6**		Semester 2
MICR 2024	Microbes in the Environment	6	P 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. N MICR (2021 or 2921 or 2001 or 2901 or 2003 or 2007 or 2011 or 2909). NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).	Semester 2
PLNT 2003	Plant Form and Function	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002 N PLNT2903, BIOL2003, BIOL2903, CROP2001.	Semester 2
or				
PLNT 2903	Plant Form and Function (Advanced)	6	A The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. P Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202) N PLNT2003, BIOL2003, BIOL2903, CROP2001	Semester 2
Year 3				
Year 3 will have the following structure: a core (18 credit points) of				
AGRO 3002	Agronomy 3	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 1
PPAT 3003	Plant Disease	6	P Two of PLNT2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903, MICR 2024 or MICR 2026.	Semester 1
SOIL 3004	The Soil Resource	6	P SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001	Semester 2
And 30 credit points selected from the following electives:				
AGCH 3025	Chemistry and Biochemistry of Foods A	6	P 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGCH 3030	Rural Environmental Chemistry A	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022.	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
ANSC 3102	Animal Reproduction	6	PANSC2002	Semester 1
ANSC 3103	Animal Structure and Function 3A	6	PANSC2002	Semester 1
BIOM 3004	Biometry 3	6	**P** BIOM 2001 or BIOM2002 NB: (2 lec, 3 labs)/wk.	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
HORT 3004	Postharvest Biology and Technology	**6**	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
HORT 3005	Production Horticulture	**6**	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
PLNT 2002	Aust Flora: Ecology and Conservation	**6**	P One of BIOLlOOl, BIOLl 101, BIOL1901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.) N PLNT2902, BIOL2004 or BIOL2904.	Semester 1
or				
PLNT 2902	Aust Rora: Ecology & Conservation (Adv)	**6**	P Distinction average in (one of BIOLlOOl, BIOLl 101, BIOL 1901) and (one of BIOL 1002, BIOL 1003, BIOL1902, BIOL1903, LWSC1002) (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2002, BIOL2004, BIOL2904.	Semester 1
AGCH 3015	Agricultural Biotechnology	**6**	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	**6**	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGEC 2103	Production Economics	**6**	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	**6**	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	**6**	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	**6**	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
ANSC 3101	Animal Nutrition 3	**6**	PANSC2002	Semester 2
ANSC 3104	Animal Structure and Function 3B	**6**	PANSC2002, ANSC3103 OR ANSC 3101	Semester 2
MICR 2022	Applied Microbiology	6	A MICR (2021 or 2921 or 2024) P (6 credit points of Junior Biology or MBLG1001) and 6 credit points of Junior Chemistry. N MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909) NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).	Semester 2
PLNT 3001	Plant, Cell and Environment	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT 3901	Semester 2
or				
PLNT 3901	Plant, Cell and Environment (Advanced)	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT3001 NB: Entry is restricted and is based on a combination of a high WAM and student motivation.Department permission required for enrolment.	Semester 2
PLNT 3002	Plant Growth and Development	6	P 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. N PLNT 3902, BIOL 3021, BIOL 3931.	Semester 2
or				
PLNT 3902	Plant Growth and Development (Advanced)	6	P Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study ineluding at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit coordinator. N PLNT 3002, BIOL 3021, BIOL 3931.	Semester 2
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
Year 4				
In Year 4 students will complete:				
*two or three 6-credit point core units specified for their chosen specialisation, as indicated in the following table (Table 1)				
*a project of 24 credit points relevant to specialisation (Table 2)				
*electives shown in Table 3 to make up 48 credit points, subject to prerequisites, prohibitions and timetabling.				

Table 1 - BScAgr

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Agricultural Microbiology				
PPAT 4005	Soil Biology and Biodiversity	***6***		Semester 1
MICR 3022	Microbial Biotechnology	*6*	**P** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. N MICR3922, MICR3002, MICR3902	Semester 2

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
Agricultural Economics				
AGEC **3102**	Agricultural and Resource Policy	6	**P** (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGEC **4103**	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC 4104	Agribusiness Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 1
Agronomy				
AGRO **4003**	Crop Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
AGRO 4004	Professional Practice in Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
Biometry				
BIOM 4003	Matrix Algebra and Linear Models	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4004	Applied Multivariate Analysis	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4005	Biometrical Methods	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
Entomology				
ENTO **4003**	Applied Entomology (Crops)	6	A ENTO 2001	Semester 2
ENTO 4004	Insect Taxonomy	6	A ENTO 2001	Semester 1
Environmental Chemistry				
AGCH **4007**	Instrumentation in Analytical Chemistry	6	A PLNT2001, AGCH2003 or AGCH2004.	Semester 1
SOIL 4007	Environmental Soil Chemistry	6	P SOIL 3004	Semester 2
Food Science				
AGCH **4006**	Food Processing Science	6	A AGCH 2003, AGCH 2004 or PLNT2001.	Semester 2
AGCH 4007	Instrumentation in Analytical Chemistry	6	A PLNT2001, AGCH2003 or AGCH2004.	Semester 1
Genetics/Plant Breeding/Biotechnology				
GENE **4011**	Plant Cytogenetics	6	P BIOM 2001, GENE 2001.	Semester 2
GENE **4012**	Plant Breeding	6	P BIOM 2001, GENE 2001	Semester 1
Horticulture				
HORT 4004	Issues in Horticultural Science 4A	6	P HORT3001 or HORT3004	Semester 1
HORT 4005	Research and Practice in Hort Science 4B	6	P HORT3001 or HORT3004; HORT4004	Semester 2
Livestock Production				
AGRO **4004**	Professional Practice in Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
AGRO 4005	Sustainable Grazing Systems	6	A CROP 1001, HORT 1001 or LWSC 1001. P PLNT 2003/2903 or CROP 2001	Semester 2
Plant Pathology				
PPAT **4003**	Molecular & Physiological Plant Path'ogy	6	P PPAT 3003 or equivalent.	Semester 1
PPAT 4004	Adv Mycology & Diagnostic Plant Pathology	6	P PPAT 3003 or equivalent.	Semester 1
PPAT **4005**	Soil Biology and Biodiversity	6		Semester 1
Soil Science				
SOIL 4005	Field and Laboratory Soil Physics	6	P SOIL 3004	Semester 1
SOIL 4006	Field and Laboratory Pedology	6	P SOIL 3004	Semester 1
SOIL 4007	Environmental Soil Chemistry	6	P SOIL 3004	Semester 2

Table 2 - BScAgr

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGRI 4101	Research Project A	12	C MICR 3022 or (AGEC 4103 or 4104) or AGRO (4003 or 4004) or BIOM (4003 or 4004 or 4005) or ENTO 4004 or AGCH 4007 or GENE 4012 or HORT 4004 or PPAT (4003 or 4004 or 4005) or SOIL (4005 or 4006) or LWSC 4003	Semester 1
AGRI 4102	Research Project B	12	P AGRI 4101.	Semester 2

Table 3 - BScAgr

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
AGCH 3025	Chemistry and Biochemistry of Foods A	6	P 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry N May not be counted with AGCH (3017, 3024).	Semester 1
AGCH 3026	Chemistry and Biochemistry of Foods B	6	P 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry C AGCH 3025 N AGCH3003, AGCH3005	Semester 1
AGCH 3030	Rural Environmental Chemistry A	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022.	Semester 1
AGCH 4007	Instrumentation in Analytical Chemistry	6	A PLNT2001, AGCH2003 or AGCH2004.	Semester 1
AGEC 2101	Market and Price Analysis	6	P ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004) N AGEC 2001	Semester 1
AGEC 2102	Agribusiness Marketing	6	P AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031	Semester 1
AGEC 2105	Applied Econometric Modelling	6	P (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) oi• BIOM1003 N AGEC2005	Semester 1
AGEC 3103	Applied Optimisation	6	P (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103) N AGEC 3101	Semester 1
AGEC 4103	International Agricultural Trade	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003) N AGEC 4003	Semester 1
AGEC 4104	Agribusiness Analysis	6	P (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003)	Semester 1
AGRO 4003	Crop Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
AGRO 4004	Professional Practice in Agronomy	6	PAGRO3001 or AGRO3002.	Semester 1
ANSC 3102	Animal Reproduction	6	PANSC2002	Semester 1
ANSC 3103	Animal Structure and Function 3A	6	PANSC2002	Semester 1
BIOM 3004	Biometry 3	6	P BIOM 2001 or BIOM2002 NB: (2 lee, 3 labs)/wk.	Semester 1
BIOM 3005	Environmetrics 3	6	P BIOM2001 or BIOM2002 N BIOM 3004	Semester 1
BIOM 4003	Matrix Algebra and Linear Models	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4004	Applied Multivariate Analysis	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
BIOM 4005	Biometrical Methods	6	P BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent	Semester 1
ENTO 4004	Insect Taxonomy	6	A ENTO 2001	Semester 1
ENVI 3111	Environmental Law and Ethics	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. NENVI3001,ENVI3003.	Semester 1
GENE 4012	Plant Breeding	6	P BIOM 2001, GENE 2001	Semester 1
GENE 4013	Molecular Genetics and Breeding	6	P BIOM 2001, GENE 2001, AGCH 3016	Semester 1
GENE 4014	Population and Quantative Genetics	6	P BIOM 2001, GENE 2001 C GENE 4012	Semester 1
HORT 3004	Postharvest Biology and Technology	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1
HORT 3005	Production Horticulture	6	A HORT 1001, HORT 1002 and HORT 2002. P Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903.	Semester 1

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
HORT 4004	Issues in Horticultural Science 4A	**6**	P HORT3001 or HORT3004	Semester 1
LWSC 3004	Limnology and Water Quality	**6**	A GEOG2303 or GEOG2321 P LWSC2001 or LWSC2002 N AGCH3030	Semester 1
LWSC 4003	Landscape Hydrology and Management	**6**	P GEOG 2321 or LWSC 3001.	Semester 1
PLNT 2002	Aust Flora: Ecology and Conservation	**6**	P One of BIOLlOOl, BIOLl 101, BIOL1901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.) N PLNT2902, BIOL2004 or BIOL2904.	Semester 1
or				
PLNT 2902	Aust Flora: Ecology & Conservation (Adv)	**6**	P Distinction average in (one of BIOLlOOl, BIOLl 101, BIOL1901) and (one of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002) (or with the Dean's permission BIOL1201 and BIOL1202) N PLNT2002, BIOL2004, BIOL2904.	Semester 1
PPAT 4003	Molecular & Physiological Plant Path'ogy	**6**	P PPAT 3003 or equivalent.	Semester 1
PPAT 4004	Adv Mycology & Diagnostic Plant Path'ogy	**6**	P PPAT 3003 or equivalent.	Semester 1
PPAT 4005	Soil Biology and Biodiversity	**6**		Semester 1
SOIL 4005	Field and Laboratory Soil Physics	**6**	P SOIL 3004	Semester 1
SOIL 4006	Field and Laboratory Pedology	**6**	P SOIL 3004	Semester 1
VIRO 3001	Virology	6	A MICR (2021 or 2921 or 2022 or 2922) P At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MICR or BCHM or BIOL or EVIMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. N VIRO3901 NB: Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.	Semester 1
AGCH 3015	Agricultural Biotechnology	6	A GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units.	Semester 2
AGCH 3031	Rural Environmental Chemistry B	6	P 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science N AGCH3020, AGCH3021, AGCH3022	Semester 2
AGCH 4006	Food Processing Science	6	A AGCH 2003, AGCH 2004 or PLNT2001.	Semester 2
AGEC 2103	Production Economics	6	P ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC2003	Semester 2
AGEC 3101	Agribusiness Management	6	P AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004) N AGEC1102; AGEC3103; AGEC3001	Semester 2
AGEC 3102	Agricultural and Resource Policy	6	P (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002) N AGEC 3002	Semester 2
AGRO 3003	Crop Water Management	6	A CROP 1001 or HORT 1001 or LWSC 1001 P PLNT 2003 or PLNT 2903	Semester 2
AGRO 4005	Sustainable Grazing Systems	6	A CROP 1001, HORT 1001 or LWSC 1001. P PLNT 2003/2903 or CROP 2001	Semester 2
ANSC 3101	Animal Nutrition 3	6	PANSC2002	Semester 2
ANSC 3104	Animal Structure and Function 3B	6	P ANSC2002, ANSC3103 OR ANSC 3101	Semester 2
ENTO 4003	Applied Entomology (Crops)	6	A ENTO 2001	Semester 2
ENVI 3112	Environmental Assessment	6	A Intermediate Environmental Science. P 12 credit points of Intermediate Science or Agriculture units. N ENVI3002, ENVI3004.	Semester 2
GENE 4011	Plant Cytogenetics	6	P BIOM 2001, GENE 2001.	Semester 2
HORT 4005	Research and Practice in Hort Science 4B	6	P HORT3001 or HORT3004; HORT4004	Semester 2
MICR 2022	Applied Microbiology	6	A MICR (2021 or 2921 or 2024) P (6 credit points of Junior Biology or MBLG 1001) and 6 credit points of Junior Chemistry. N MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909) NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG 1001 or PLNT (2001 or 2901).	Semester 2
MICR 3022	Microbial Biotechnology	6	P At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. N MICR3922, MICR3002, MICR3902	Semester 2
PLNT 3001	Plant, Cell and Environment	6	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. **N** PLNT 3901	Semester 2
or				

Unit of Study		*CP*	*A: Assumed knowledge P: Prerequisites Q: Qualifying C: Corequisites N: Prohibition*	*Session*
PLNT 3901	Plant, Cell and Environment (Advanced)	**6**	P 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. N PLNT3001 NB: Entry is restricted and is based on a combination of a high WAM and student motivation.Department permission required for enrolment.	Semester 2
PLNT 3002	Plant Growth and Development	**6**	P 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. N PLNT 3902, BIOL 3021, BIOL 3931.	Semester 2
or				
PLNT 3902	Plant Growth and Development (Advanced)	6	P Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit coordinator. N PLNT 3002, BIOL 3021, BIOL 3931.	Semester 2
SOIL 3008	Rural Spatial Information Systems	6		Semester 2
SOIL 4007	Environmental Soil Chemistry	6	P SOIL 3004	Semester 2

3. Undergraduate units of study

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Undergraduate units of study

Bachelor of Agricultural Economics

Bachelor of Horticultural Science

Bachelor of Land and Water Science

Bachelor of Resource Economics

Bachelor of Science in Agriculture

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

ACCT 1001 **Accounting IA**
6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1, Semester 2. **Classes:** Three hours of lectures/tutorials. **Assumed Knowledge:** HSC Mathematics. **Prohibitions:** ACCT1003, ACCT1004. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Restricted entry
Introduces accounting and the double entry system of financial recording. Students are introduced to the skills necessary to prepare, interpret and analyse financial statements. Examines assumptions underlying the preparation of financial statements for external users. Development of skills necessary to understand, discuss, analyse and write about accounting-related topics. Designed as an introduction to accounting. No prior knowledge of accounting assumed.

ACCT 1002 **Accounting IB**
6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Semester 2, Summer. **Classes:** Three hours of lectures/tutorials. **Prerequisites**: ACCT 1001. **Prohibitions**: ACCT 1003, ACCT1004. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Restricted entry
Accounting is about the recording, classification, reporting and interpretation of information to help make economic decisions. Accounting 1A introduces accounting and the double entry system for financial recording. Accounting IB develops themes and competencies learnt in Accounting 1 A. The primary focus of this unit of study is on conceptual and technical issues relating to management accounting and the information required by internal users to make strategic and operational decisions relating to managing a business. A second theme is the financial accounting information businesses are required to produce to assess a firm's financial state and performance. Students examine how commercial and ethical issues affect business decisions and how there are present and future consequences that will affect different groups of interest

ACCT 1003 **Financial Accounting Concepts**
6 credit points. B Agr Ec, B E, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, B S T, UG Study Abroad Program. **Session:** Semester 1. **Classes:** Three hours of lectures/tutorials. **Prohibitions:** Terminating unit. Cannot be counted with ACCT1001 and ACCT1002.. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
Provides an introduction to the concepts underlying "external" accounting and is designed for students who are not majoring in accounting. The unit utilises a transaction-effect approach to the preparation of financial statements with basic bookkeeping minimalised. Accounting-method choices are analysed for their effect on the financial statements, and, thus, on decision-making.

ACCT 1004 **Management Accounting Concepts**
6 credit points. B Agr Ec, B Com (Liberal Studies), B E, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B S T, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Three hours of lectures/tutorials. **Prohibitions:** Terminating unit. Cannot be counted with ACCT 1001 and ACCT1002.. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit is designed to explain how managers use accounting information, with an emphasis on identifying relevant accounting information for decision-making. Topics include: estimating cost functions, relevant costing, cost allocation, budgeting, short and long term decision making and managing within a changing environment.

AGCH 2003 **Rural Environmental Chemistry (Intro)**
6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Environmental), B Sc Agr, UG Study Abroad Program. Dr Robert Caldwell. **Session:** Semester 1. **Classes:** 3 lec/week and 33 hours of lab/semester. **Prerequisites:** 12 credit points of Junior Chemistry. **Prohibitions:** AGCH2001, AGCH2002, CHEM2404. **Assessment:** One 2 hr exam, prac & quizzes.
This introductory unit of study consists of aspects of chemistry relevant in studies of basic and applied biological sciences including agriculture, food and the rural environment. Lecture topics include an introduction to quantitative aspects of biophysical, environmental and aquatic chemistry with particular reference to protocols for specimen sampling and maintenance of specimen quality; the principles of basic analytical methods such as spectroscopy, chromatography and electrochemistry; environmental aspects of water such as thermal properties and its behaviour as a solvent of hydrophobic solutes, surfactants, neutral hydrophilic solutes, salts and other electrolytes, and gases. The lectures will also include environmental nutrient cycling (C, N, S, O, P, micronutrients) with reference to pesticides, herbicides, organic and inorganic pollutants affecting agricultural produce and the environment, and gases of environmental concern.
Eleven laboratory sessions will demonstrate aspects of analytical chemistry including: elemental analysis of foods and natural waters, spectrophotometry, chromatographic techniques, preparation of buffers, fundamentals of pH and conductance measurement, water as a solvent including the effect of surfactants and electrolytes. Students will analyse natural water samples using the skills acquired in earlier laboratory and write an environmental assessment from their findings. The introductory laboratory session for the unit will include a tutorial on safety procedures in a chemistry laboratory.

AGCH 3015 **Agricultural Biotechnology**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Peter Sharp. **Session:** Semester 2. **Classes:** 3 lec/wk, 1.5hr tut/wk for 6 wks, 3h lab/wk for 5 wks. **Assumed Knowledge:** GENE2001, PLNT2001/PLNT2901, CROP2003, MICR 2024, PLNT2003/PLNT2903 or the equivalent of these units. **Assessment:** One 3 hr exam (60%), Practical Reports 20%, Assignments (20%). Two assignments during the course, one including an oral presentation.
The unit develops a basic understanding of the principles, practice and applications of biotechnology related to agricultural and environmental sciences. Students are introduced to the principles of molecular biology, recombinant technology, genomics, transformation of plants and animals, molecular diagnostics, bioinformatics and issues concerning bioethics. The theory of biotechnology is integrated into practical and tutorial sessions. Case studies will be drawn from the plant and animal sciences, bioremediation and gene therapy areas.

AGCH 3025 **Chemistry and Biochemistry of Foods A**
6 credit points. B An Vet Bio Sc, B Hort Sc, B L W Sc, B Sc, B Sc (Environmental), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Dr Robert Caldwell. **Session:** Semester 1. **Classes:** 3 lec/wk, 8 x 3 hr prac per semester. **Prerequisites:** 6 credit points of Intermediate units in Agricultural Chemistry, Chemistry or Biochemistry. **Prohibitions:** May not be counted with AGCH (3017, 3024).. **Assessment:** One 2 hr theory exam, one 1 hr theory of prac exam, assignment and prac reports.
This unit of study aims to give students an understanding of the constituents of foods and fibres. The lecture topics cover:
- the chemistry, biochemistry and processing behaviour of major food constituents - oligosaccharides, polysaccharides, lipids and proteins;
- the relationship between molecular structure of constituents and their functionality in foods;
- natural fibres and gel-forming biopolymers - uses in foods, importance in dietary fibre and commercial products;
- enzymes in foods and food processing;
- wheat flour dough and protein chemistry during baking and cooking;

- anti-nutritional and toxic constituents of plants and foods; and
- flavour chemistry

The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include:
- analysis of carbohydrates including starch and dietary fibre;
- spectroscopic, enzymic, and chromatographic methods.

AGCH 3026 **Chemistry and Biochemistry of Foods B**

6 credit points. B An Vet Bio Sc, B Hort Sc, B L W Sc, B Sc, B Sc (Environmental), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Dr Robert Caldwell. **Session:** Semester 1. **Classes:** 2 hr lec/seminar/workshop/wk; 24 hrs of prac/semester; site visits. **Prerequisites:** 6 credit points of Intermediate Chemistry, Biochemistry or Agricultural Chemistry. **Corequisites:** AGCH 3025. **Prohibitions:** AGCH3003, AGCH3005. **Assessment:** Five written assignments, one 1 hr theory of prac exam, prac reports and poster presentation.

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

AGCH 3030 **Rural Environmental Chemistry A**

6 credit points. B An Vet Bio Sc, B Hort Sc, B L W Sc, B Sc, B Sc (Environmental), B Sc Agr, UG Study Abroad Program. Prof Ivan Kennedy (Coordinator). **Session:** Semester 1. **Classes:** 6 day field trip in orientation week, 21 hr lee & 25 hr prac. **Prerequisites:** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science. **Prohibitions:** AGCH3020, AGCH3021, AGCH3022.. **Assessment:** One 2 hr exam, field trip and laboratory reports.

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

AGCH 3031 **Rural Environmental Chemistry B**

6 credit points. B An Vet Bio Sc, B Hort Sc, B L W Sc, B Sc, B Sc (Environmental), B Sc Agr, UG Study Abroad Program. Prof Ivan Kennedy (Coordinator). **Session:** Semester 2. **Classes:** 5-day field trip in AVCC common break; 21 hr lee and 30 hr prac and project/semester. **Prerequisites:** 6 credit points of either Intermediate Agricultural Chemistry, Chemistry, Biochemistry, Plant Science or Environmental Science. **Prohibitions:** AGCH3020, AGCH3021, AGCH3022. **Assessment:** One 2 hr exam, field-trip report and laboratory reports.

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

AGCH 4006 **Food Processing Science**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Robert Caldwell. **Session:** Semester 2. **Classes:** Classes (24 hrs of lectures and 36 hrs of laboratory during the semester). **Assumed Knowledge:** AGCH 2003, AGCH 2004 or PLNT2001. **Assessment:** One 2-hr exam (40%), laboratory reports (20%), major assignment (40%).

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

AGCH 4007 **Instrumentation in Analytical Chemistry**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Robert Caldwell. **Session:** Semester 1. **Classes:** 22 hrs of lectures and 32 hrs of laboratory during the semester. **Assumed Knowledge:** PLNT2001, AGCH2003 or AGCH2004. **Assessment:** One 2-hr exam (30%), laboratory reports (30%), major assignment (40%).

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

AGEC 1006 **Economic Environment of Agriculture**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B Sc Agr, UG Study Abroad Program. Ms Liz Nolan, Ms Lynn Henry. **Session:** Semester 1. **Classes:** (3 lee & 1 tut)/wk, seminars/workshops. **Assumed Knowledge:** HSC Mathematics. **Prohibitions:** AGEC 1003, AGEC 1004.. **Assessment:** One two hour exam, one assignment, tutorial reports.

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

Textbooks

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

Reference Books:

KO Campbell and BS Fisher, Agricultural Marketing and Prices (Longman Cheshire, 1991)

F Douglas (ed), Australian Agriculture: the complete reference on rural industry (Morescope, 1995)

LR Malcolm, P Sale and A Egan, Agriculture in Australia: An Introduction (Oxford UP, 1996)

AGEC 1101 **Agricultural and Resource Systems**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (3 lee & 1 tut)/wk. **Assumed Knowledge:** HSC Mathematics. **Prohibitions:** AGEC 1001. **Assessment:** a) Formal Assessment: One 1 hour mid semester exam; one 2 hour final exam; one assignment; tutorial papers

b) Out of class prescribed student workload (e.g. exercises, assignments): 8 hours per week of reading, study and assignment work.

An introductory unit of study serving as a foundation for other units in agricultural and resource economics. Topics covered include the agricultural and resource industries in the Australian and world economies; changing place of agriculture in world economies; place of agriculture in economic development; economic and physical factors determining the location of agricultural and resources industries; the changing structure of the Australian agricultural and resource sectors; problems of structural adjustment and technical change; the physical and biological environment in which farm firms operate; issues in natural resources.

Textbooks

Collection of readings

AGEC 1102 **Agricultural Economics 1**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (3 lee & 1 two hr tut)/wk. **Assumed Knowledge:** HSC Mathematics. **Prerequisites:** AGEC 1101. **Prohibitions:** AGEC 1002. **Assessment:** a) Formal Assessment: One mid semester exam (one hour), Final Exam (two hours), one 2000 word case study, tutorial papers]

b) Out of class prescribed student workload (e.g. exercises, assignments): 7 hours per week of reading, study and assignment work.

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

Textbooks

Kay, R.D., Edwards, W.M. and Duffy, P.A. 2004, Farm Management, McGraw Hill, New York.

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

AGEC 2101 **Market and Price Analysis**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (3 lee & 1 tut)/wk. **Prerequisites:** ECON 1001 or AGEC 1006 or (AGEC1003 AND 1004). **Prohibitions:** AGEC 2001. **Assessment:** a) Formal Assessment: Mid semester exam (I hour), Final Examination (2 hours), tutorial assignments

b) Out of class prescribed student workload (e.g. exercises, assignments)

c) Other expected student workload (e.g. preparation revision and private study) Out of class prescribed student workload (e.g. exercises, assignments):

8 hours per week of reading, study and assignment work

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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.

Textbooks

Tomek, W.G. and Robinson, K.L. 2003, Agricultural Product Prices, Cornell University Press, Ithaca

Pindyck, R.S. and Rubinfeld, D.L. 2005, Microeconomics, Pearson Prentice-Hall, New Jersey.

NB. Students are advised not to buy the textbook before lectures commence in case there are any changes.

AGEC 2102 **Agribusiness Marketing**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 1 tut)/wk. **Prerequisites:** AGEC 1006 or (AGEC1003 and AGEC1004) or AGEC 1102 or AGEC1002 or RSEC1031. **Assessment:** Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]

One 1 hour mid semester exam, one 2 hour final exam, tutorial papers, essays

b) Out of class prescribed student workload (e.g. exercises, assignments)

c) Other expected student workload (e.g. preparation revision and private study)

9 hours per week of reading, study and assignment work

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks

Kohls, R.L. and Uhl, J.N. 2002, Marketing of Agricultural Products, Prentice-Hall, Upper Saddle River.

Tomek, W.G. and Robinson, K.L. 2003, Agricultural Product Prices, Cornell University Press, Ithaca

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

AGEC 2103 **Production Economics**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (3 lee & 2 tut)/wk. **Prerequisites:** ECON1001 or AGEC1006 or (AGEC1003 and AGEC1004). **Prohibitions:** AGEC2003. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]

One mid semester exam (1 hour) 2 hr exam, assignments, class work.

b) Out of class prescribed student workload (e.g. exercises, assignments)

2 assignments, weekly exercises

c) Other expected student workload (e.g. preparation revision and private study)

To a total of 12 hrs/wk for an average student seeking satisfactory results

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks

D.L. Debertin Agricultural Production Economics 2nd edn (2002)

AGEC 2105 **Applied Econometric Modelling**

6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 2 tut)/wk. **Prerequisites:** (ECMT 1010 and ECMT 1020) or (MATH 1001 and 1002 and 1003 and 1005) or BIOM1003. **Prohibitions:** AGEC2005. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]

One mid semester exam (1 hour) one 1.5 hr final exam, one 1 hr prac exam, assignments

b) Out of class prescribed student workload (e.g. exercises, assignments)

Assignments

c) Other expected student workload (e.g. preparation revision and private study)

To total of 12 hrs/wk for an average student seeking satisfactory results

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks

G.S. Maddala Introduction to Econometrics 3rd Ed.

AGEC 3101 **Agribusiness Management**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (3 lee & 2 wkshp)/wk. **Prerequisites:** AGEC2103 or AGEC2003 or AGEC1006 or (AGEC1003 and AGEC1004). **Prohibitions:** AGEC1102; AGEC3103; AGEC3001. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]

One mid semester exam (1 hour) one final exam (2hr), assignments

b) Out of class prescribed student workload (e.g. exercises, assignments)

Computer-based assignments

c) Other expected student workload (e.g. preparation revision and private study)

To a total of 12 hrs/wk for an average student seeking satisfactory results

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks

J.B. Hardaker et al. Coping with Risk in Agriculture, 2nd edn (CABI, 2004)

R.D.Kay et al. Farm Management, 5th edn (McGraw Hill, 2004)

AGEC 3102 **Agricultural and Resource Policy**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 lee & 1 tut)/wk. **Prerequisites:** (AGEC 2101 and AGEC 2103) or (AGEC 2001 and AGEC 2003) OR (ECON 2001 and ECON 2002). **Prohibitions:** AGEC 3002. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]

One mid semester exam (1 hour); one final exam (2 hours); assignments; tutorial papers

b) Out of class prescribed student workload (e.g. exercises, assignments)

c) Other expected student workload (e.g. preparation revision and private study)

9 hours per week of reading, study and assignment work

You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

linkages between agriculture and the resource industries and with the rest of the economy. Students will be expected to read widely.
Textbooks
Godden, D. 1997, Agricultural and Resource Policy: Principles and Practice, Oxford University Press, Melbourne (currently out of print)
Stiglitz, J. 2000, Economics of the Public Sector, Norton, New York.
N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

AGEC 3103 **Applied Optimisation**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 2 tut)/wk. **Prerequisites:** (AGEC2001 and AGEC2003) or (AGEC 2101and AGEC 2103). **Prohibitions:** AGEC 3101. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
1 mid semester exam (1 hour), one final exam (2 hours), assignments, computer assignments
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
a minimum of 8 hours per week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
This unit of study deals with constrained optimization problems in which when one or m ore constraints are inequaliites. Such problems are explored/solved by "mathematical programming" techniques . The focus of the unit in on linear programming (LP) problems, ie ones in which both the objective and the constraints are linear functions. Linear programming thas wide application to farm planning, financial planning, and other planning contexts. Graphical and mathematical representations of linear programming problems are covered. Topics include solution methods, solution information, primal and dual formulations, stability of optimal solutions, and parametric programming. After covering the basics of LP, the focus shifts to modelling of real world scenarios in LP models. Special formulations (eg. transportation model), and extension to integer programming are examined. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (eg. LINDO).
Textbooks
H.P.Williams Model Building in Mathematical Programming, 4th edn (Wiley, 1999).

AGEC 3104 **Research Methods**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 1 hr tut)/wk. **Prerequisites:** AGEC 2105 or ECMT 2010 orAGEC2005. **Prohibitions:** AGEC3004. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour), one final exam (2 hours), assignments, research proposal
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
9 hours per week of reading, study and assignment work
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; inductive thought and deductive logic; creativity; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data; statistical design of sample surveys; questionnaire construction; interviewing techniques; and methods of analysis of survey data. Topics are illustrated with examples of research in theoretical economics, empirical discipline-advancing research, empirical exploratory research, and research using policy-evaluation modelling. Students are expected to read widely.
Textbooks
Sharp, J., Peters, J. and Howard, K. 2002, The Management of a Student Research Project, Gower, Aldershot
Trochim, W. 1999, The Research Methods Knowledge Base, Cornell University Press, Ithaca, New York.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

AGEC 4101 **Agricultural Marketing Analysis**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 hr lee & 2 hr sem)/wk. **Prerequisites:** (AGEC 2101 and AGEC 2103) or (AGEC2001 and 2003). **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour) one final exam (2 hours), case studies
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
8 hours per week of reading, study and assignment work
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
Performance of the agricultural and resource marketing systems, marketing margins, transportation, storage, advertising, wholesaling, and retailing. The structure, conduct and performance of marketing firms, and government and public interest in the food system will also be addressed via a number of case studies. Extensive readings will be required. The unit is designed to focus on analysing applied strategic management problems facing marketing firms. Students will be required to read widely.
Textbooks
Collections of Readings

AGEC 4102 **Agricultural Development Economics**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 hr lee & 2 hr sem)/wk. **Prerequisites:** (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003). **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour) one final exam (2 hours), case studies
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
9 hours per week of reading, study and assignment work
You may find the Excel spreadsheet "AssessmentAudit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
This unit is designed to expose students to issues of economic growth and development, and their policy and welfare impacts in developing countries. More specifically the unit will focus on agricultural development policies and outcomes. Linkages with other industries, environment, sustainability, globalisation and national and international development agencies will also be discussed. Extensive reading will be required.
Textbooks
Collections of Readings

AGEC 4103 **International Agricultural Trade**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 hr lee & 2 hr sem)/wk. **Prerequisites:** (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003). **Prohibitions:** AGEC 4003. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour) one final exam (2 hours), case studies
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
9 hours per week of reading, study and assignment work
You may find the Excel spreadsheet "AssessmentAudit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
In this unit of study the basic economic principles underlying international trade in agricultural and resource commodities and the policies involved will be presented. Issues related to trade and development will also be considered. The main topics covered will include: trends in agricultural and resources trade; economics and politics of protection, economic integration and impacts on international commodity trade; international trade policy making. An understanding of globalisation, including foreign direct investment, will also be required. Extensive reading will be required.
Textbooks
Collections of Readings

AGEC 4104 **Agribusiness Analysis**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 hr lee & 2 hr sem)/wk. **Prerequisites:** (AGEC 2101 and AGEC 2103) or (AGEC2001 and AGEC2003). **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour) one final exam (2 hours), case studies
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
9 hours per week of reading, study and assignment work
You may find the Excel spreadsheet "AssessmentAudit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
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

AGEC 4107 **Special Topics**

6 credit points. B Agr Ec, B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1, Semester 2. **Classes:** Individual research and consultation. **Prerequisites:** Faculty permission required for enrolment. **Prohibitions:** AGEC4007. **Assessment:** a) Formal Assessment: Research paper
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study) 12 hours per week independent research
You may find the Excel spreadsheet "AssessmentAudit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
NB: 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

AGEC 4108 **Quantitative Planning Methods**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 2 tut/lab session)/wk. **Prerequisites:** AGEC 3101 or AGEC 3103 or AGEC3031 orAGEC3001. **Prohibitions:** AGEC4008. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour), one final exam (2 hours), 2 assignments
b) Out of class prescribed student workload (e.g. exercises, assignments)
Complete parts of weekly lab. exercises not completed in class
c) Other expected student workload (e.g. preparation revision and private study)
To a total of 12 hours/week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sectoral level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are briefly discussed. Topics include non-linear programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (eg. dynamic programming and optimal control). Sectoral level planning applications considered include transportation and plant location studies; spatial equilibrium; and resource utilization across time; and . Firm level applications include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization.

Textbooks
L.J. Moore et al. Management Science 4th edn (Allyn and Bacon, 1993)
L. Schrage LINDO: An Optimization Modeling System, 4th edn (Scientific Press, 1991)
[NB. Students are advised not to buy the textbooks prior to commencement of classes.]

AGEC 4109 Agricultural Finance and Risk

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 lee & 2 tut/lab session)/wk. **Prerequisites:** (AGEC 2103 and AGEC3101) or (AGEC2003 and AGEC3001) or (AGEC1102 and AGEC3103). **Prohibitions:** AGEC4009. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
One mid semester exam (1 hour), one final exam (2 hours), 2 assignments
b) Out of class prescribed student workload (e.g. exercises, assignments)
Complete parts of weekly lab. exercises not completed in class
c) Other expected student workload (e.g. preparation revision and private study)
To a total of 12 hours/week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks
P.J. Barry et al. Financial Management in Agriculture 6th edn (Interstate Press 2000)
J. Williams and W. Schroder Agricultural Price Risk Management (OUP, 1999)
[NB. Students are advised not to buy the textbooks prior to commencement of classes.]

AGEC 4110 Professional Skills

3 credit points. B Agr Ec, B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (One 2 hr sem)/wk. **Corequisites:** AGEC 4111. **Prohibitions:** AGEC 4011. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Discussion papers
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
4 hours per week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks
Not applicable

AGEC 4111 **Contemporary Issues**

3 credit points. B Agr Ec, B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (One 2 hr sem)/wk. **Corequisites:** AGEC 4110. **Prohibitions:** AGEC4011. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Discussion papers, 2 hour examination
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
At least 6 hours per week of reading about current issues
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

Textbooks
Collection of readings

AGEC 4112 **Research Project A**

9 credit points. B Agr Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 hr sem)/wk. **Prerequisites:** AGEC3104 or 3004. **Corequisites:** AGEC4113. **Prohibitions:** AGEC4012. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Research thesis; presentations
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
12 hours per week minimum
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
NB: Department permission required for enrolment.

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

Textbooks
Not applicable as this is a research unit

AGEC 4113 **Research Project B**

9 credit points. B Agr Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 hr sem)wk. **Prerequisites:** AGEC3104 or AGEC3004. **Corequisites:** AGEC4112. **Prohibitions:** AGEC4013. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Research thesis; presentations
b) Out of class prescribed student workload (e.g. exercises, assignments)
c) Other expected student workload (e.g. preparation revision and private study)
12 hours per week minimum
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.
NB: Department permission required for enrolment.

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

Textbooks
Not applicable as this is a research unit.

AGEC 4121 **Research Exercises** A

9 credit points. B Agr Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee or sem)/wk. **Prerequisites:** AGEC3104 or AGEC 3004. **Corequisites:** AGEC4122. **Prohibitions:** AGEC4012; AGEC4112. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Written research reports and papers
b) Out of class prescribed student workload (e.g. exercises, assignments)
Undertake research project
c) Other expected student workload (e.g. preparation revision and private study)
Undertake research project on individual and group basis, to a total of 18 hours/week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

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

of the research exercise(s) undertaken in the companion unit, AGEC4122.

AGEC 4122 **Research Exercises B**

9 credit points. B Agr Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 lee or sem)/wk. **Prerequisites:** AGEC3104 or AGEC 3004. **Corequisites:** AGEC4121. **Prohibitions:** AGEC4013; AGEC4113. **Assessment:** a) Formal Assessment: [e.g. One 2hr exam, 2000w essay, tutorial papers, prac reports]
Written research reports and papers
b) Out of class prescribed student workload (e.g. exercises, assignments)
Undertake research project
c) Other expected student workload (e.g. preparation revision and private study)
Undertake research project on individual and group basis, to a total of 18 hours/week
You may find the Excel spreadsheet "Assessment Audit.xls" (available at this intranet site) useful in allocating assessment tasks through the unit.

This unit of study is taken in conjunction with the companion unit, AGEC4121 Research Exercises A. SeeAGEC4121 for details.

AGRI 4101 **Research Project A**

12 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess. **Session:** Semester 1. **Classes:** No formal classes, approx 18 hrs per week. **Corequisites:** MICR 3022 or (AGEC 4103 or 4104) or AGRO (4003 or 4004) or BIOM (4003 or 4004 or 4005) or ENTO 4004 or AGCH 4007 or GENE 4012 or HORT 4004 or PPAT (4003 or 4004 or 4005) or SOIL (4005 or 4006) or LWSC 4003. **Assessment:** Oral presentation, literature review.

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

AGRI 4102 **Research Project B**

12 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess. **Session:** Semester 2. **Classes:** No formal classes, approx 18 hrs per week. **Prerequisites:** AGRI 4101. **Assessment:** Oral presentation, literature review.

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

AGRF 4000 **Professional Experience**

***** No info available for 2006. *****

AGRO 3002 **Agronomy 3**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc Agr, UG Study Abroad Program. A/Prof Bruce Sutton. **Session:** Semester 1. **Classes:** 5 student contact hrs/wk, workshops and discussions (36 hr total), labs (26 hr total). **Assumed Knowledge:** CROP 1001 or HORT 1001 or LWSC 1001. **Prerequisites:** PLNT 2003 or PLNT 2903. **Assessment:** One 2 hour exam, consultancy report, practical reports.

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

AGRO 3003 **Crop Water Management**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Prof Bruce Sutton. **Session:** Semester 2. **Classes:** Five student contact hours per week (65 h total); Workshops and discussions (36 h total) Laboratories (26 h total). **Assumed Knowledge:** CROP 1001 or HORT 1001 or LWSC 1001. **Prerequisites:** PLNT 2003 or PLNT 2903. **Assessment:** One 2 hour exam, consultancy report, practical reports.

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

Textbooks

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

AGRO 4003 **Crop Agronomy**

6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. Dr Lindsay Campbell. **Session:** Semester 1. **Classes:** Tutes, intensives/workshops, excursion. **Prerequisites:** AGRO3001 or AGRO3002. **Assessment:** Report, oral presentation and exam.

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

AGRO 4004 **Professional Practice in Agronomy**

6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. Dr Lindsay Campbell. **Session:** Semester 1. **Classes:** Pracs, workshops as advised. **Prerequisites:** AGRO3001 or AGRO3002. **Assessment:** Reports.

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

AGRO 4005 **Sustainable Grazing Systems**

6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Prof Bruce Sutton. **Session:** Semester 2. **Classes:** (2 tut, 2hr prac)/wk, excursion. **Assumed Knowledge:** CROP 1001, HORT 1001 or LWSC 1001. **Prerequisites:** PLNT 2003/2903 or CROP 2001. **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%).

This unit of study provides a scientific understanding and practical working knowledge of sustainable grazing systems in both dryland and intensively managed and irrigated pastoral systems. Understanding the demands of herbivores and of the soil-plant-rhizospherre ecosystem and of the grazier will be used as the basis of developing scientific principles of sustainable grazing management in different socio-economic and environmental conditions. The specific attributes of typical pastoral species for diverse environments will be examined.

ANSC 2002 **Animal Science 2**

6 credit points. B An Vet Bio Sc, B Anim Sc, B L W Sc, B Sc (Molecular Biotechnology), B Sc Agr. Mrs I van Ekris (coordinator), Dr Melanie Collier, A/Prof Rosanne Taylor, Ms Jane Stevenson. **Session:** Semester 2. **Classes:** 3 hours/week. **Prerequisites:** CROP 1001, BIOL1001 OR BIOL1101. **Assessment:** Assignments (65%), end of semester exam (35%).

The unit of study is an integrated course providing a framework for understanding the structure, function and management of agricultural animals. The emphasis of the course is on how animals maintain a steady state in the face of variations in their environment, physiological state and management systems. It aims to help students acquire the language necessary to discuss body structure and function and

to understand the fundamental internal processes and their interactions, which take place in the maintenance of normal function. Concepts discussed in lectures are reinforced by practical classes held in the laboratory and on-farm at Camden.

Textbooks

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

Battaglia, R.A. Handbook of Livestock Management. (Prentice Hall, 2001)

Frandson, R.D., Wilke, W.L. and Fails, A.D. Anatomy and Physiology of Farm Animals (Williams and Wilkins, 2003)

McDonald, P. et al., Animal Nutrition, 4th ed (Longman Scientific & Technical, 1988)

Reece, W.O. Physiology of Domestic Animals (Lea and Febiger, 1991)

Starr, C. and Taggart, R. Animal Structure and Function (Brooks and Cole, 2004)

ANSC 3101 **Animal Nutrition 3**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc (Molecular Biotechnology), B Sc Agr. Dr Michelle Hyde. **Session:** Semester 2. **Classes:** Lectures: 3 hours/week

Tutorials: 0.5 hours/week. **Prerequisites:** ANSC2002. **Assessment:** Assignments - including web based problem solving exercises (50%), oral presentation (10%), written end of semester examination (40%).

This Unit of Study builds upon principles discussed in ANSC 2002 (Animal Science 2).

The Unit is broadly divided into four sections, namely:

- Estimating the nutritive value of feeds
- Estimating the nutrient requirements of animals
- Diet formulation
- Errors in feeding

The focus is on coming to an understanding of the assessment of nutritional adequacy and the avoidance and solving of nutritional problems, with a particular emphasis on animals used in agricultural production systems. The principles discussed in this course will be expanded in ANSC 4001 and ANSC 4002 (Animal Production 4A and 4B) in the following year, in which species-specific systems will be described.

The basis of successful feeding management is an understanding of the following:

- the composition of feeds
- the digestibility and efficiency of utilisation of nutrients by the animal
- the requirements of the animal for nutrients
- interactions between nutrients that influence health and production

and following from this an ability to:

- formulate diets to meet animal requirements for a variety of purposes and under a variety of constraints
- identify deficiencies, excesses and imbalances in diets and so avoid a decline in - productive efficiency and/or a decline in health

Textbooks

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

ANSC 3102 **Animal Reproduction**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc (Molecular Biotechnology), B Sc Agr. Prof G Evans. **Session:** Semester 1. **Classes:** lectures (2 hours/week) and tutorials (1 hours/week). **Prerequisites:** ANSC2002. **Assessment:** One written exam (60%), practical report (20%), written and oral assignments (20%).

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

Textbooks

Hafez, B & Hafez, E.S.E. (Eds) (2000) Reproduction in Farm Animals Lippincott Williams and Wilkins

Senger, PL. (2003) Pathway to Pregnancy and Parturition (2nd Edition). Current Conceptions Inc.

ANSC 3103 **Animal Structure and Function 3A**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc (Molecular Biotechnology), B Sc Agr. Dr Melanie Collier. **Session:** Semester 1. **Classes:** lectures (2 hours/week), tutorials (1 hours/week), seminars/workshops (1 hours/week). **Prerequisites:** ANSC2002. **Assessment:** One theory exam (50%), practical test (15%), assignments/presentations (35%).

Animal Structure and Function 3A will build on the understanding of animal form and operation that students have developed in prior Units, particularly ANSC 2002. In ASF3A the structure and function of the digestive, endocrine and immune systems of the body are explored in depth. A study of animal behaviour and welfare is also an integral component of this unit. This Unit enables students to develop a three dimensional appreciation of the species differences in structure of the major visceral organs of the body through demonstrations and dissections and provides the basis for advanced, applied studies in Animal Nutrition.

The overall goals of the Unit are twofold. First, to enable students to develop a rich understanding of the relationships between body systems and structures (begun in ANSC 2002 and continued in ASF3B). Second, to develop an appreciation of the links between structure, function and their relevance to animal production that will be further developed in 4th year Animal Production.

Textbooks

The recommended textbook for the animal structure component of the unit is:

Dyce, K.M., Sack, W.O. and Wensing, C.J.G. (2002). Textbook of Veterinary Anatomy. 3rd edn. W.B. Saunders, Philadelphia

Each student should purchase for the function component of this unit:

Starr, C. and Taggart, R (2001) Animal Structure and Function, 9th edition, Brooks/Cole, Thomson Learning, Australia

OR

Currie, W.B. (1995) Structure and Function of Domestic Animals, CRC, Boca Raton

OR

Cunningham, J.G. (1997) Textbook of Veterinary Physiology. 2nd edition, Saunders, Philadelphia

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

ANSC 3104 **Animal Structure and Function 3B**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc (Molecular Biotechnology), B Sc Agr. Dr Melanie Collier. **Session:** Semester 2. **Classes:** Lectures (2 hours/week), tutorials (2 hours/week). Activities will vary on a weekly basis. **Prerequisites:** ANSC2002, ANSC3103 OR ANSC 3101. **Assessment:** One exam (55%), anatomy dissection project (15%), assignments (30%).

Through 80 hours of tutorials, practicals and workshops students in this Unit of Study will build on the concepts introduced, and skills acquired in ASF3A. This unit will introduce topics not covered in ASF3 A and will integrate in livestock animals structure and function of the urinary tract, bone and skin, cardiovascular and nervous systems, avian structure, aquaculture and deer production. The concepts developed will be applied to analysis and resolution of problems in animal production.

Handbook- a comprehensive course handbook will be available. It contains details of practicals, assessments, lecture outlines and handouts, objectives, reference lists and textbooks, staffing.

Textbooks

For Animal Structure :

Dyce, K.M., Sack, W.O. and Wensing, C.J.G. (2002) Textbook of Veterinary Anatomy 3rd Edn W.B.Saunders, Philadelphia OR

Smallwood, J.E. (1973) An introductory study to bovine anatomy. The author, Bryan,Texas

For Animal function:

Starr, C. and Taggart, R. (2001) Animal Structure and Function, 9thEdn, Brooks/Cole, Thompson Learning,Australia OR

Currie, W.B. (1995) Structure and Function of domestic animals, CRC, Boca Raton.

BIOL 1001 **Concepts in** Biology

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Anim Sc, B E, B Hort Sc, B L W Sc, B Med Sc, B N, B N (I A H), B N, B A, B N, B Sc, B Pharm, B Pharm (Rural), B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Gene. **Session:** Semester 1, Summer. **Classes:** 3 lee & 3 hrs prac/wk. **Assumed Knowledge:** No previous knowledge required. Students are encouraged to take the Biology Bridging Course. Students who have completed HSC Biology are advised to enrol in BIOL1101 Ecosystems to Genes rather than BIOL1001. **Prohibitions:** BIOL (1101 or 1901). **Assessment:** One 2.5hr exam, assignments, quizzes.

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

Concepts in Biology is an introduction to the major themes of modern biology. We start with introductory cell biology, which particularly emphasises how cells obtain and use energy. We then discuss the structure and function of microorganisms. The significance of molecular biology is covered, working from the role of DNA in protein synthesis and development through to modern techniques and their uses. The genetics of organisms is then discussed, leading to consideration of theories of evolution and the origins of the diversity of modern organisms. We bring all the abovementioned concepts together to develop an understanding of interactions between organisms in biological communities or ecosystems. Finally we discuss the significance of human impact on other living organisms, with particular reference to finding solutions to problems in areas such as global warming, introduced pests, and extinctions. The unit is designed so that lab classes and the field trip integrate with the lectures. Lab activities are carried out in groups so that team work skills are developed. This unit also incorporates a number of key generic skills such as written communication skills, discussion and data interpretation, and experimental design and hypothesis testing skills.

Textbooks

Knox R B, Ladiges P and Evans B, (2005) Biology, 3rd Ed. McGraw-Hill

A Unit of Study Manual will be available for purchase from the Copy Centre during the first week of semester.

BIOL 1002 Living Systems

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Hort Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. **Session:** Semester 2. **Classes:** (3 lee &

2 h prac)/wk. **Assumed Knowledge:** HSC 2-unit Biology. Students who have not undertaken an HSC biology course are strongly advised to complete Biology Bridging Course before lectures commence. **Prohibitions:** BIOL1902. **Assessment:** One 2.5hr exam, assignments, class work.

Living Systems deals with the biology of all sorts of organisms, from bacteria to large plants and animals, and emphasises the ways in which they can live in a range of habitats. The importance of energy in living systems, and how elements are used and recycled in biological communities, are described. The unit of study includes lectures and laboratory classes on the physiology of nutrition and growth, basic physiological processes of animals and plants, the ways in which organisms control and integrate their activities, and their reproduction. Finally applications of knowledge of genetics and ecology to practical problems in agriculture and conservation are introduced. It is recommended that BIOL (1001 or 1101 or 1901) be taken before this unit of study. This unit of study, together with BIOL (1001 or 1101 or 1901) provides entry to all Intermediate units of study in biology in the School of Biological Sciences.

Textbooks

Knox R B, Ladiges P and Evans B (2005) Biology., 3rd Ed., McGraw-Hill.

A Unit of Study Manual will be available for purchase from the Copy Centre during the first week of semester.

BIOL 1101 **Biology - Ecosystems to Genes**

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B E, B Hort Sc, B L W Sc, B Med Sc, B N, B N (I A H), B N, B A, B N, B Sc, B Pharm, B Pharm (Rural), B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc. **Session:** Semester 1. **Classes:** 3 lee & 2-3 hrs. prac/wk. **Prerequisites:** HSC 2-unit Biology or equivalent. **Prohibitions:** BIOL (1001 or 1901). **Assessment:** One 2.5hr exam, assignments, quizzes.

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

Biology - Ecosystems to Genes builds on the main themes introduced in HSC 2-unit Biology to provide a background to the breadth of biology, including: cell biology, with emphasis on how cells obtain and use energy; diversity of microorganisms; genetics of organisms; modern molecular biology; theories of evolution and the origins of diversity of modern organisms; and interactions between organisms in biological communities.

Textbooks

Knox R B, Ladiges P and Evans B (2005) Biology., 3rd Ed., McGraw-Hill

A Unit of Study Manual will be available for purchase from the Copy Centre during the first week of semester.

BIOL 1901 **Biology - Ecosystems to Genes (Advanced)**

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Hort Sc, B L W Sc, B Med Sc, B N, B N (I A H), B N, B A, B N, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), B Sc Agr. **Session:** Semester 1. **Classes:** 3 lee & 3 hrs prac/wk. **Prerequisites:** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **Prohibitions:** BIOL (1001 or 1101). **Assessment:** One 2.5hr exam, assignments, quizzes.

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

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

Textbooks

AsforBIOLllOl.

A Unit of Study Manual will be available for purchase from the Copy Centre during the first week of semester.

BIOL 1902 **Living Systems (Advanced)**

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Hort Sc, B Med Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), B Sc Agr. **Session:** Semester 2. **Classes:** (3 lee & 2 h prac)/wk. **Prerequisites:** UAI of at least 93 and HSC Biology result in the 90th percentile or better, or Distinction or better in a University level Biology unit, or by invitation. **Prohibitions:** BIOL (1002 or 1904 or 1905). **Assessment:** One 2.5hr exam, assignments, quizzes, independent project.

NB: Department permission required for enrolment.

This unit of study shares lectures and practical classes with BIOL 1002 but also includes more demanding alternative components of Living Systems

Textbooks

As for BIOL1002.

A Unit of Study Manual will be available for purchase from the Copy Centre during the first week of semester,

BIOM 1003 **Biometry 1**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Ms Kath Bartimote. **Session:** Semester 2. **Classes:** (2 lee & 1 tut)/wk. **Assumed Knowledge:** 70 or more in HSC Mathematics. **Assessment:** Assignments (50%), exam (50%).

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

Textbooks

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

Reference books:

Causton, DR (1977). A Biologist's Mathematics. Edward Arnold: London.

Clewer, AG & Scarisbrick, DH (2001). Practical Statistics and Experimental Design for Plant and Crop Science. John Wiley & Sons: West Sussex.

Glover, T and Mitchell, K (2002). An Introduction to Biostatistics. McGraw-Hill: New York

McConway, KJ Jones, MC and Taylor, PC (1999). Statistical Modelling using GenStat. Arnold: London.

Mead, R, Curnow, RN and Hasted, AM (2003). Statistical Methods in Agriculture and Experimental Biology, 3rd ed. Chapman & Hall/CRC: Boca Raton.

Morris, TR (1999). Experimental Design and Analysis in Animal Sciences. Oxon: CABI Publishing

BIOM 2001 **Biometry 2**

6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Ms Kath Bartimote. **Session:** Semester 1. **Classes:** (3 lee, 2 prac & 1 tut)/wk. **Prerequisites:** BIOM1003 or equivalent. **Assessment:** Assignments (50%), one 3 hr theory/prac exam (50%). All open book.

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

Textbooks

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

BIOM 3004 **Biometry 3**

6 credit points. B An Vet Bio Sc, B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Mick O'Neill. **Session:** Semester 1. **Classes:** (2 lee, 3 prac)/wk, individual research lhr/wk. **Prerequisites:** BIOM 2001 or BIOM2002. **Assessment:** Reports (25%), Assignment (20%), Presentation (5%), Theory/Prac Examination (50%). All open book.

NB: (2 lee, 3 labs)/wk.

This unit is designed for students who are interested in majoring in Biometry, or for students from other disciplines with an interest in further developing their skills in experimental design and advanced statistical modelling. It builds on the topics introduced in Biometry 2, and aims to give students sufficient skills and confidence to complete the analysis of their own research data in Fourth Year with a high degree of competence. We start by learning how to determine the number of replicates to use in an experiment. We revise multiple regression and extend the linear model to a time series system. We then examine how normally distributed data from designed experiments can be analysed in a general linear model framework, and hence how to cope with missing or incomplete data. The difference between maximum likelihood and residual maximum likelihood (REML) is studied for a single sample. A REML analysis is obtained for complete and incomplete factorial designs; for fixed, random and mixed models; for data collected from repeated observations on the same experimental unit. Next, we consider various techniques for the analysis of non-normal data, specifically: logistic regression for binary and proportion data; Poisson regression for count data; loglinear modelling for multi-way contingency tables; ordinal and nominal logistic regression for scores & ratings. The assignment is to design and analyse a 4th year experiment.

BIOM 3005 **Environmetrics 3**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Mick O'Neill. **Session:** Semester 1. **Classes:** (2 lee, 3 labs)/wk. **Prerequisites:** BIOM2001 orBIOM2002. **Prohibitions:** BIOM 3004. **Assessment:** 50% Assignments, 3 Hour Open Book Exam 50%.

This Unit is designed to give participants an opportunity to develop quantitative skills that are professionally relevant to the environmental sciences. Statistical computer packages, such as GenStat and Excel are used extensively to analyse environmental data sets. The unit commences with a revision of analysis of variance and regression; and an introduction to the ideas of sample size determination. Regression ideas are then extended to include the analysis of non-normal data via loglinear models and logistic regression. We next focus on environmental statistics, tackling the ideas of sampling strategies and environmental modeling. We also gain an introductory knowledge of matrix algebra before considering trends in time and space in environmental data. Next we extend the idea of trends and correlation to consider time series, repeated measures and spatial analyses techniques. The unit will be based around two environmental datasets which will be used in both the lectures and the practicals.
As part of the learning outcomes of this unit the students completing this unit will:
" Have developed an understanding of the theory and techniques needed for the analysis and manipulation of environmental data.
" Be able to develop a robust design for environmental sampling
" Have developed an understanding of the mathematics behind simulating processes in space and time
" Be able to use time series and spatial statistics to predict variables in time and space
Textbooks
No single text is recommended as extensive course notes are made available. Reference books:
Causton, D.R. (1977) A Biologist's Mathematics. Edward Arnold: London.
Healy, M.J.R. (2000) Matrices for Statistics, 2nd ed, Clarendon Press: Oxford.
Manly, B.F.J. (1992) The Design and Analysis of Research Studies. Cambridge University Press: Cambridge.
Manly, B.F.J. (1994) Multivariate Statistical Methods: A Primer, 2nd ed. Chapman & Hall: London.
Manly, B.F.J. (2001) Statistics for Environmental Science and Management. Chapman & Hall/CRC: Boca Raton FL.
McConway, K.J. Jones, M.C. and Taylor, PC. (1999). Statistical Modelling using GenStat. Arnold: London.

BIOM 4003 **Matrix Algebra and Linear Models**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Mick O'Neill. **Session:** Semester 1. **Classes:** 3 lec/wk; individual research 3 hr/wk. **Prerequisites:** BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent. **Assessment:** Assignment (50%), Theory/Prac Examination (50%). All open book.
So far in biometry, we have avoided the use of matrices in developing and explaining statistical and mathematical concepts. However, with more advanced work, it becomes far more convenient to express certain results in matrix notation. Matrices are not just used in statistics: they find use in mathematical models in biology (e.g. age structured population growth models), engineering (e.g. structural perturbation analysis), and economic models (e.g. decision analysis). There are two aims to this course. Firstly, we will cover the basics of matrix algebra: matrix operations, special matrices (symmetric, orthogonal, idempotent), rank, determinants, inverses, eigenvalues and eigenvectors. Secondly we will see how we can apply these techniques to linear model problems - regression and ANOVA type situations, maximum likelihood and residual maximum likelihood. The course will also provide background for the multivariate analysis unit of study.
Textbooks
Textbooks: None. Many reference books such as:
Draper, N.R., and Smith, H. (1981). Applied Regression Analysis. Second edition. N.Y.: Wiley.
Graybill, F.A. (1969). Introduction to Matrices with Applications in Statistics. Belmont: Wadsworth.
Harville, D.A. (1997). Matrix Algebra from a Statistician's Perspective. New York: Springer.
Healy, M.J.R. (1986). Matrices for Statistics. Oxford: Clarendon.
Mead, R. (1988). The Design of Experiments. Cambridge: Cambridge U.P
Neter, J., Wasserman, W., and Kutner, M.H. (1985). Applied Linear Statistical Models. Homewood, II.: Irwin.
Searle, S.R. (1982). Matrix Algebra Useful for Statistics. N.Y.: Wiley.

BIOM 4004 **Applied Multivariate Analysis**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Mick O'Neill. **Session:** Semester 1. **Classes:** 3 lec/wk; individual research 3 hr/wk. **Prerequisites:** BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent. **Assessment:** Assignment (50%), Theory/Prac Examination (50%). All open book.
This course will introduce you to the main multivariate statistical techniques in common usage. While there will be some theoretical development in the course, the main focus will be on interpreting the results of the analysis, particularly in terms of explaining complex multi-dimensional data in terms of fewer dimensions. Since multivariate analysis by definition involves a treatment of at least two variables, there will be heavy use of matrix theory. Topics covered include multivariate normality, the likelihood ratio tests for independence of data variables, principal component analysis, discriminant analysis and Hotelling's T2 for comparing two groups, multivariate analysis of variance (MANOVA), Canonical variate analysis, multivariate regression analysis, canonical correlations and correspondence analysis.

BIOM 4005 **Biometrical Methods**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Mick O'Neill. **Session:** Semester 1. **Classes:** 3 lec/wk; individual research 3 hr/wk. **Prerequisites:** BIOM 3002 or BIOM 3003 or BIOM 3004 or BIOM 3005 or equivalent. **Assessment:** Assignment (50%), Theory/Prac Examination (50%). All open book.
This course introduces students to essential statistical and mathematical theory that should be at the fingertips of practising statisticians. Topics include a comprehensive review of statistical distributions and their properties; moments and moment generating functions; order statistics; bivariate and multivariate distribution theory; maximum and residual maximum likelihood estimation of parameters of these distributions; likelihood ratio tests; Taylor expansions and large sample variances. The theory is extended to regression and design problems: the mathematics of ANOVA, partitioning sums of squares, the theory of split plots and linear mixed models in general; log-linear modeling; Binomial, Poisson, ordinal and nominal logistic regression; spatial and nearest neighbour designs, intercropping experiments; meta analyses.
Textbooks
None. Many reference books exist in various Libraries.

CHEM 1001 **Fundamentals of Chemistry 1A**

6 credit points. B A, B Anim Sc, B E, B Ed, B Sc (Psych), B Hort Sc, B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc Agr, UG Study Abroad Program. **Session:** Semester 1. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **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. **Prohibitions:** CHEM 1101 or 1901 or 1903 or 1909. **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).
The aim of the unit of study is to provide those students whose chemical background is weak (or non-existent) with a good grounding in fundamental chemical principles together with an overview of the relevance of chemistry. There is no prerequisite or assumed knowledge for entry to this unit of study.
Lectures: A series of 39 lectures, three per week throughout the semester.
Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM 1002 **Fundamentals of Chemistry IB**

6 credit points. B A, B Anim Sc, B E, B Ed, B Sc (Psych), B Hort Sc, B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc Agr, UG Study Abroad Program. **Session:** Semester 2. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **Prerequisites:** CHEM (1001 or 1101) or equivalent. **Prohibitions:** CHEM (1102 or 1902 or 1904 or 1908). **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).
CHEM1002 builds on CHEM1001 to provide a sound coverage of inorganic and organic chemistry.
Lectures: A series of 39 lectures, three per week throughout the semester.
Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM 1101 **Chemistry** 1A

6 credit points. B A, B App Sc (Ex &Sp Sc), B Sc (Nutr), B E, B Ed, B Sc (Psych), B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG Summer/Wint. **Session:** Semester 1, Semester 2, Summer. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **Assumed Knowledge:** HSC Chemistry and Mathematics. **Corequisites:** Recommended concurrent units of study: 6 credit points of Junior Mathematics. **Prohibitions:** CHEM (1001 or 1901 or 1903 or 1909). **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).
Chemistry 1A is built on a satisfactory prior knowledge of the HSC Chemistry course. A brief revision of basic concepts of the high school course is given. Chemistry 1A covers chemical theory and physical chemistry.
Lectures: A series of 39 lectures, three per week throughout the semester.
Textbooks
A booklist is contained in the booklet Junior Chemistry distributed at enrolment. Further information can be obtained from the School.

CHEM 1102 **Chemistry** IB

6 credit points. B A, B App Sc (Ex &Sp Sc), B Sc (Nutr), B E, B Ed, B Sc (Psych), B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Semester 2, Summer. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **Prerequisites:** CHEM (1101 or 1901) or a Distinction in CHEM 1001 or equivalent. **Corequisites:** Recommended concurrent units of study: 6 credit points of Junior Mathematics. **Prohibitions:** CHEM (1002 or 1902 or 1904 or 1908). **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).

Chemistry IB is built on a satisfactory prior knowledge of Chemistry 1A and covers inorganic and organic chemistry. Chemistry IB is an acceptable prerequisite for entry into Intermediate Chemistry units of study.

Lectures: A series of 39 lectures, three per week throughout the semester.

Textbooks

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

CHEM 1901 **Chemistry 1A (Advanced)**

6 credit points. B A, B Anim Sc, B E, B Ed, B Sc (Psych), B Hort Sc, B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. **Session:** Semester 1. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **Prerequisites:** UAI of at least 96.4 and HSC Chemistry result in band 5 or 6, or Distinction or better in a University level Chemistry unit, or by invitation. **Corequisites:** Recommended concurrent unit of study: 6 credit points of Junior Mathematics. **Prohibitions:** CHEM (1001 or 1101 or 1903 or 1909). **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).

NB: Department permission required for enrolment.

Chemistry 1A (Advanced) is available to students with a very good HSC performance as well as a very good school record in chemistry or science. Students in this category are expected to do Chemistry 1A (Advanced) rather than Chemistry 1A.

The theory and practical work syllabuses for Chemistry 1A and Chemistry 1A (Advanced) are similar, though the level of treatment in the latter unit of study is more advanced, presupposing a very good grounding in the subject at secondary level. Chemistry 1A (Advanced) covers chemical theory and physical chemistry.

Lectures: A series of about 39 lectures, three per week throughout the semester.

Textbooks

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

CHEM 1902 **Chemistry IB (Advanced)**

6 credit points. B A, B Anim Sc, B E, B Ed, B Sc (Psych), B Hort Sc, B L W Sc, B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. **Session:** Semester 2. **Classes:** 3 lee & 1 tut/wk & 3hrs prac/wk for 10 wks. **Prerequisites:** CHEM (1901 or 1903) or Distinction in CHEM 1101 or equivalent. **Corequisites:** Recommended concurrent unit of study: 6 credit points of Junior Mathematics. **Prohibitions:** CHEM (1002 or 1102 or 1904 or 1908). **Assessment:** Theory examination (75%), laboratory exercises and continuous assessment quizzes (25%).

NB: Department permission required for enrolment.

Chemistry IB (Advanced) is built on a satisfactory prior knowledge of Chemistry 1A (Advanced) and covers inorganic and organic chemistry. Chemistry IB (Advanced) is an acceptable prerequisite for entry into Intermediate Chemistry units of study.

Lectures: A series of about 39 lectures, three per week throughout the semester.

Textbooks

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

Commercial Law Units of Study

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

CLAW 1001 **Commercial Transactions A**

6 credit points. B A S, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1, Semester 2. **Classes:** Three lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.

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

CLAW 1002 **Commercial Transactions B**

6 credit points. B A S, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two hours of lectures and one tutorial per week. **Prerequisites:** CLAW 1001. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.

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

CROP 1001 **Agricultural Science 1A**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Anim Sc, B Res Ec, B Sc (Molecular Biotechnology), B Sc Agr, UG Study Abroad Program. Assoc. Prof Rose, Prof. Burgess, Prof. Nicholas. **Session:** Semester 1. **Classes:** (3 lee & 3 prac)/wk. **Assumed Knowledge:** HSC Chemistry. **Prohibitions:** HORT1001, LWSC1001. **Assessment:** One 2hr exam, prac, assignments.

This unit of study introduces the principles and practices of modern agriculture and examines the relationships between plants, animals and natural resources that make up agricultural production systems. The concepts of environmental and economic sustainability of agricultural systems will be introduced.

Topics covered include Australian farming systems, regional agricultural industries, farming operations and plant identification.

Textbooks

Reference books

V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)

C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)

M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

CROP 1002 **Agricultural Science IB**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Anim Sc, B Res Ec, B Sc (Molecular Biotechnology), B Sc Agr, UG Study Abroad Program. Assoc.Prof. Rose, Dr Sharma, DrCook. **Session:** Semester 2. **Classes:** (3 lee & 3 prac)/wk. **Corequisites: CROP** 1001. **Prohibitions:** HORT1002, LWSC1002. **Assessment:** One 2 hr exam, prac, assignments.

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

Textbooks

Reference books

V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)

C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)

M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

Econometrics Units of Study

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

ECMT 1010 **Business and Economic Statistics A**

6 credit points. B A, B Agr Ec, B C S T, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B IT, B Res Ec, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Semester 2. **Prohibitions:** ECMT1011, ECMT1012, ECMT1013, MATH1015, MATH1005, MATH1905, STAT1021. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.

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

ECMT 1020 **Business and Economic Statistics B**

6 credit points. B A, B Agr Ec, B C S T, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B IT, B Res Ec, UG Study Abroad Program, UG Summer/Winter School. **Session:**

Semester 2. **Corequisites: ECMT1010. Prohibitions:** ECMT1021, ECMT1022 and ECMT1023. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Other than in exceptional circumstances, it is strongly recommended that students do not undertake Business and Economic Statistics B before attempting Business and Economic Statistics A.
This unit broadens the knowledge gained in the unit, ECMT1010 Business and Economic Statistics A by introducing further tools (and their applications) for use in economics, finance, marketing and accounting. This unit features practical applications. Possible topics include: further aspects of hypothesis testing including goodness-of-fit models; regression analysis including a brief introduction to logit models, time series and its applications to economics and finance; input-output analysis; index numbers and mathematics of finance. The material is further complemented by mathematical topics including matrices and partial differentiation. In addition, students are expected to use data resources on the World Wide Web, retrieve data and analyse this data using Excel.

ECMT 2110 **Regression Modelling**
6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1. **Prerequisites: ECMT1010. Prohibitions:** ECMT2010. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
Students undertaking this unit have some background in basic statistics including an introduction to regression analysis. Using this knowledge as a base, an extensive discussion of basic regression theory and some of its extensions is provided. The unit covers how linear regression models can be applied to data to estimate relationships, to forecast, and to test hypotheses that arise in economics and business. Guidelines for using econometric techniques effectively are discussed and students are introduced to the process of model building. It is essential that the discussion of regression modelling be complemented with practice in analysing data. An important task is the computing component using econometric software.

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

ECON 1001 **Introductory Microeconomics**
6 credit points. B A, B Agr Ec, B Com, B E, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Summer. **Classes:** Two lectures and one tutorial per week. **Assumed Knowledge:** Mathematics. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
Introductory Microeconomics addresses the economic decisions of individual firms and households and how these interact in markets. It is a compulsory core unit for the Bachelor of Economics and Bachelor of Commerce and an alternative core unit for the 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.

ECON 1002 **Introductory Macroeconomics**
6 credit points. B A, B Agr Ec, B Com, B E, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 2, Summer. **Classes:** Two lectures and one tutorial per week. **Assumed Knowledge:** Mathematics. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
Introductory Macroeconomics addresses the analysis of the level of employment and economic activity in the economy as a whole. It is a compulsory core unit for the Bachelor of Economics (BEc) and for the Bachelor of Commerce and an alternative core unit for the Bachelor of Economic and Social Science. Introductory Macroeconomics examines the main factors that determine the overall levels of production and employment in the economy, including the influence of government policy and international trade. This analysis enables an exploration of money, interest rates and financial markets, and a deeper examination of inflation, unemployment and economic policy.

ECOS 2001 **Intermediate Microeconomics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1, Semester 2. **Classes:** Two lectures and one tutorial per week. **Prerequisites: ECON1001. Corequisites: ECMT1010. Prohibitions:** ECON2001, ECOS2901 (or ECON2901). **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.
The aim of Intermediate Microeconomics is the development of theoretical and applied skills in economics. It covers applications and extensions of the theory of consumer choice, firm behaviour and market structure. Emphasis is given to the economics of information and choice under uncertainty; industry structures other than monopoly and perfect competition; markets for factors of production; general equilibrium and economic efficiency; market failure and the role of government. This unit provides a basis for the more specialised options that comprise third Year economics.

ECOS 2002 **Intermediate Macroeconomics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1, Semester 2. **Classes:** Two lectures and one tutorial per week. **Prerequisites: ECON1002. Corequisites:** ECMT1020. **Prohibitions:** ECON2002, ECOS2902 (or ECON2902). **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Certain combinations of Maths/Stats may substitute for Econometrics - consult the Chair of the Discipline of Economics.
This unit of study develops models of the goods, money and labour markets, examines issues in macroeconomic policy. Macroeconomic relationships, covering consumption, investment, money and employment, are explored in detail. Macro-dynamic relationships, especially those linking inflation and unemployment, are also considered. Exchange rates and open economy macroeconomics are also addressed. In the last part of the unit, topics include the determinants and theories of economic growth, productivity and technology, the dynamics of the business cycle, counter-cyclical policy and the relationship between micro and macro policy in the context of recent Australian experience.

ECOS 2901 **Intermediate Microeconomics Honours**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec. **Session:** Semester 1. **Classes:** Three lectures and one tutorial per week. **Prerequisites:** ECON1001 and ECON1002 with a Credit average or better in the two units combined. **Corequisites:** ECOS2903 andECMTlOlO. **Prohibitions:** ECON2901, ECOS2001 (or ECON2001). **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.
This unit is comprised of lectures based upon the curriculum for ECOS2001 Intermediate Microeconomics, supported by a seminar for one hour a week. The content of lectures reflect a more analytical and critical treatment of the topics than ECOS2001. The topics, which build on the theory of consumer and firm behaviour and market structure, include game theory, oligopoly, general equilibrium and welfare, externalities and public goods and the economics of information.

ECOS 2902 **Intermediate Macroeconomics Honours**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec. **Session:** Semester 2. **Classes:** Three lectures and one tutorial per week. **Prerequisites:** ECOS2901. **Corequisites:** ECMT1020. **Prohibitions:** ECON2902, ECOS2002 (or ECON2002). **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Certain combinations of Maths/Stats may substitute for Econometrics. Consult the Chair of the Discipline of Economics.
This unit is comprised of lectures based upon the curriculum for ECOS2002 Intermediate Macroeconomics, supported by a seminar for one hour a week. The content of lectures reflects a more intensive treatment of the topics than ECOS2002. Topics covered include: models of the goods, money and labour markets; macro-economic relationships such as consumption, investment, demand for money and labour demand and supply; macro-dynamic relationships, especially those linking inflation and unemployment; exchange rates and open economy macroeconomics; theories of economic growth; productivity and technological change; the dynamics of the business cycle; and the relationship between micro- and macro-economic policy.

ECOS 3002 **Development Economics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** One of ECOS2001 (or ECON2001), ECOS2002 (or ECON2002), ECOS2901 (or ECON2901), ECOS2902 (or ECON2902). **Prohibitions:** ECON3002.

Assessment: May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit 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.

ECOS 3003 **Hierarchies, Incentives & Firm Structure**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1. **Classes:** Two lectures per week. **Prerequisites:** Either ECOS2001 (or ECON2001) or ECOS2901(or ECON2901). **Prohibitions:** ECON3003. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit deals with the coordination and motivation problems faced by firms. More specifically this unit examines: whether firms use price or command mechanisms to allocate resources within firms; the problems associated with designing incentive contracts; the principles of efficient contract design and; the real world applications of those principles. The final section deals with the manner in which the coordination and motivation problems faced by firms determines their financial, vertical and horizontal structure.

ECOS 3005 **Industrial Organisation**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** One of ECOS2001 (or ECON2001), or ECOS2901 (or ECON2901). **Prohibitions:** ECON3005, ECOS2201. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
his unit of study examines the nature of inter-firm rivalry in industries with market power. It explores the various ways in which firms can increase their market power by: extracting more surplus from consumers, by colluding with rivals or by excluding entrants. The unit also analyses the international competitiveness of industries in the context of industry assistance and the prevalence of foreign multinationals. Competition policy is also discussed.

ECOS 3006 **International Trade**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1. **Classes:** Two lectures per week. **Prerequisites:** Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901). **Prohibitions: ECON3006. Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit 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.

ECOS 3007 **International Macroeconomics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** One of ECOS2002 (or ECON2002) or ECOS2902 (or ECON2902). **Prohibitions:** ECON3007. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit studies macroeconomic theory and policy in a global trading world. The microfoundations of the various sectors are examined in the context of an open economy. The evolution of international money and capital markets is described, the operation of the foreign exchange market is examined, showing how its microstructure affects its macro performance. Theories and tests of the efficiency of international capital markets are surveyed, as well as core theories and tests of exchange rate and asset price determination. The unit develops the macroeconomic implications of monetary and fiscal policies for small and large open economies for different regimes.

ECOS 3009 **Markets, Regulation & Government Policy**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** One of ECOS2001 (or ECON2001), ECOS2901 (or ECON2901), ECOP2011 (or ECOP2001), plus one of ECOS2002 (or ECON2002), ECOS2902 (or ECON2902), ECOP2012 (or ECOP2002). **Prohibitions: ECON3009. Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: Department permission required for enrolment.
This unit addresses contemporary economic issues drawn from a particular area. The focus of the unit varies from year to year. Examples include housing economics, health economics, trade practices or economies in transition. The unit shows how economic analysis is used to provide an understanding of particular markets, emphasising the institutional setting and the economic rationales for government intervention.

ECOS 3010 **Monetary Economics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 1. **Classes:** Two lectures per week. **Prerequisites:** one of ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901) or ECOS2002 (or ECON2002) or ECOS2902 (or ECON2902). **Prohibitions: ECON3010. Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit studies the crucial role that money plays in an economy and examines theory, policy and empirical testing. It analyses why money is used, why it differs from other goods and assets. The microfoundations of money demand and supply are developed. Theories of interest rates and the transmission mechanism are developed. The role and operation of banks in the financial intermediation process and the control and supervision of financial institutions by the Central Bank are also considered. Monetary Policy is intensively analysed.

ECOS 3011 **Public Finance**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901). **Prohibitions: ECON3011. Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
Public Finance is about the taxing and spending decisions of governments. The unit covers a wide range of public finance topics. After an introduction to welfare economics and the role of government in the economy, the unit focuses on the revenue side of the budget: tax incidence, efficient and equitable taxation, the Australian system of revenue raising, issues of tax reform and the theory and practice of public utility pricing. It then focuses on the expenditure side of the government budget: public goods, externalities, and programs aimed at redistribution. It also introduces techniques of policy evaluation.

ECOS 3012 **Strategic Behaviour**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Res Ec, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures per week. **Prerequisites:** Either ECOS2001 (or ECON2001) or ECOS2901 (or ECON2901). **Prohibitions:** ECON3012. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
To think and act strategically, one needs to evaluate the effect of one's actions on the actions of others. As most economic decisions are strategic, such as the decision to lower a price or introduce a new tax, economics, if it is to avoid simplistic models, requires a theoretical framework capable of illuminating strategic behaviour. This unit offers a comprehensive, critical introduction to the theory which purports, not only to satisfy this theoretical need, but also potentially to unify the social sciences: game theory. After examining important concepts of game theory, the unit investigates the repercussions for the theory of bargaining and for the evolution of social institutions.

ENTO 2001 **Entomology**
6 credit points. B Hort Sc, B Sc, B Sc Agr, UG Study Abroad Program. Dr Sarah Mansfield. **Session:** Semester 2. **Classes:** 21ec & 3 prac/wk, individual insect collection 1 hr/wk. **Assessment:** Theory, prac quizzes and test, insect collection.
This unit provides an introduction to insects and related animals. Lectures include physiology, ecology, medical entomology, insect conservation, and principles of insect control, pest management and crop/plant protection. Practicals deal briefly with insect morphology and taxonomy including some information on economically important insect pests. Also included are sessions on quarantine, spray application and spray equipment. Students must make a small but representative insect collection.

ENTO 4003 **Applied Entomology (Crops)**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Sarah Mansfield. **Session:** Semester 2. **Classes:** 12 Lectures and approx. 50 hr of independent field work. **Assumed Knowledge: ENTO 2001. Assessment:** One 2 hr theory exam, project, practical examination/insect identification and insect collection.

This unit is for 4th year BAgSc or BHort students. It recognises the need for graduates to be able to recognize pests in the field, the damage they cause and to be able to develop a strategy of management. The topic is addressed by both insect and crop centered investigation. The unit consists of formal lectures, tutorials and a farm-based project. The student may also be required to make a small insect collection.

ENTO 4004 **Insect Taxonomy**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Sarah Mansfield. **Session:** Semester 1. **Classes:** 12 Lectures and approx. 50 hrs of independent museum practice. **Assumed Knowledge:** ENTO 2001. **Assessment:** One 2 hr theory exam, project, practical examination/insect identification and insect collection.
This unit is for 4th year BAgSc, BHort or 3rd year BSc students. It is an advanced addition to 2nd year Entomology and emphasizes the importance of identification and nomenclature that underpins applied entomology, quarantine, ecology and biodiversity studies. The second half of the course covers methodologies of modern classification that uses specialist computer programs. The unit consists of formal lectures, tutorials and a museum-based project. The student will also be required to make a small insect collection.

ENVI1002 **Geomorphic Environments**
6 credit points. B L W Sc, B Sc (Environmental), UG Study Abroad Program. Dr Stephen Gale. **Session:** Semester 1. **Classes:** 3 lee & prac/tut/wk. **Assessment:** One 2hr exam, class work.
NB: This unit of study is available to students in the Bachelor of Science (Environmental) and the Bachelor of Land & Water Science only.
This unit of study introduces Earth's geophysical environments, from the origin and development of the planet through to its evolution and structure. Following this, the unit investigates the evolution of the physical environment, with particular examination given to the hydrosphere and landforms.

ENVI 3111 **Environmental Law and Ethics**
6 credit points. B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Environmental), B Sc (Marine Science), B Sc Agr, UG Study Abroad Program. Dr Gerry Bates
Dr Rachel Ankeny. **Session:** Semester 1. **Classes:** 4 lec/wk. **Assumed Knowledge:** Intermediate Environmental Science. **Prerequisites:** 12 credit points of Intermediate Science or Agriculture units. **Prohibitions:** ENVI3001, ENVI3003.. **Assessment:** Essays, tutorial papers.
This unit of study covers topics in environmental law and ethics. The environmental law component provides an overview of all laws in Australia pertaining to environmental matters and looks at a number of environmental issues at the various levels of analysis, policy making, implementation of policy, enforcement, and dispute resolution. It also provides a broad background to the political and economical issues as they relate to the legal issues involved. It also examines international environmental law, particularly examining how these influence and affect our local policies. The ethics component helps students develop thoughtful and informed positions on issues in environmental ethics using arguments derived from traditional ethics as well as environmentally specific theories. Ethical conflicts are often inevitable and difficult to resolve but using the resources of philosophical ethics and regular reference to case studies, students can learn to recognize the values and considerations at stake in such conflicts, acknowledge differing viewpoints and defend their own well considered positions.

ENVI 3112 **Environmental Assessment**
6 credit points. B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Environmental), B Sc (Marine Science), B Sc Agr, UG Study Abroad Program. Dr John Dee
Dr Scott Kable. **Session:** Semester 2. **Classes:** 4 lec/wk. **Assumed Knowledge:** Intermediate Environmental Science. **Prerequisites:** 12 credit points of Intermediate Science or Agriculture units. **Prohibitions:** ENVI3002, ENVI3004.. **Assessment:** Essays, tutorial papers, report.
This unit of study is composed of two components: environmental impact assessment and risk assessment. The former is generally concerned with issues related to environmental impact assessment and builds toward the process of producing an EIS/EIA. Moor specifically it seeks to establish a critical understanding of the theory and practice of environmental impact studies/statements (EIS) and environmental impact assessment processes (EIA) from both the positive (scientific) and normative (value) perspectives. Emphasis is placed on gaining skills in writing and producing an assessment report, which contains logically ordered and tightly structured argumentation that can stand rigorous scrutiny by political processes, the judiciary, the public and the media.

The risk assessment component considers a more chemical approach to the assessment of risk and issues of safety with respect to chemicals, ecotoxicology and the environment.

GENE 2001 **Agricultural Genetics 2**
6 credit points. B An Vet Bio Sc, B Anim Sc, B Hort Sc, B Sc Agr, UG Study Abroad Program. Dr Sharp, Dr Darvey, Prof. Moran, Assoc. Prof. Nicholas. **Session:** Semester 1. **Classes:** (3 lee, 1 tut & 2 prac)/wk. **Prerequisites:** BIOL1001 and BIOL1002 or BIOL (1101 or 1901) and BIOL 1902, BIOM1001 or BIOM1003. **Assessment:** One 3hr exam, tests, assignments.
This lecture and practical unit of study provides an introduction to the genetics and breeding of plants and animals. It provides an understanding for parallel and following courses. Lectures cover the basics of gene transmission and interaction, cytogenetics, molecular genetics, population and quantitative genetics, as well as the more applied aspects of plant and animal breeding and biotechnology. Practicals emphasise, with agricultural examples, the procedures of genetic and cytogenetic analysis, and the use of computers in simulation procedures in population genetics, quantitative inheritance and selection programs, and provide exposure to current plant and animal breeding and biotechnology.

GENE 4011 **Plant Cytogenetics**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Norm Darvey. **Session:** Semester 2. **Classes:** (2 lee, 2 seminars/workshops, 1 lab)/wk. **Prerequisites:** BIOM 2001, GENE 2001. **Assessment:** 2hr exam, assignments, practical reports, presentation.
Lectures in cytology and cytogenetics, with special emphasis on cereals and the application of chromosome enginerring to plant breeding. The laboratory unit includes routine cytological procedures and tissue culture technology.

GENE 4012 **Plant Breeding**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Norm Darvey. **Session:** Semester 1. **Classes:** (2 lee, 2 seminars/workshops, 1 lab)/wk. **Prerequisites:** BIOM 2001, GENE 2001. **Assessment:** 2hr exam, assignments, practical reports, presentation.
Lectures and practical work devoted to the theory, philosophy and practice of plant breeding, screening techniques conservation of genetic variability, breeding for disease resistance, the use of tissue culture in breeding, with examples from both field and horticultural crops.

GENE 4013 **Molecular Genetics and Breeding**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Professor Peter Sharp. **Session:** Semester 1. **Prerequisites:** BIOM 2001, GENE 2001, AGCH 3016. **Assessment:** 3hr exam, assignments, practical reports, presentation.
Lectures and laboratory work covering the structure and function of plant genomes and genes, the technology and results of DNA transformation and the analysis of plant traits by molecular techniques including by genetic mapping using molecular and other genetic markers.

GENE 4014 **Population and Quantative Genetics**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Professor Chris Moran. **Session:** Semester 1. **Classes:** (3 lee, 2 labs)/wk. **Prerequisites:** BIOM 2001, GENE 2001. **Corequisites:** GENE 4012. **Assessment:** 2hr exam, assignments, practical reports, presentation.
Lectures and practical periods dealing with population genetic, quantitative inheritance and animal breeding given by the Faculty of Veterinary Science.

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

GEOG 1001 **Biophysical Environments**
6 credit points. B A, B Agr Ec, B Ec (Soc Sc), B Res Ec, B Sc, B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), UG Study Abroad Program. Dr Gale & Dr Melissa Neave. **Session:** Semester 1. **Classes:** 3 lee & 3hr prac/wk. **Assessment:** One 2hr exam, 1500w report, prac assignments.
This unit of study provides an introductory explanation of the evolution of the physical world. It begins by considering the earth's place in the universe, its origin and its development, and the nature and evolution of the earth's structure. This is followed by an investigation of the evolution of the earth's physical environment and its development to its present stage over time. With this background, the unit of study goes on to examine the earth's hydrosphere and atmosphere and the major landforms produced by the interaction of atmospheric and ocean processes with the earth's surface, including fluvial, arid, coastal and glacial systems.

GEOG 1002 **Human Environments**
6 credit points. B A, B Agr Ec, B Ec (Soc Sc), B Res Ec, B Sc, B Sc (Marine Science), B Sc (Molecular Biology & Genetics), UG Study Abroad Program. Prof. Connell & Dr W Pritchard. **Session:** Semester 2. **Classes:** 3 lee & 3hr prac/wk. **Assessment:** One 2hr exam, 2000w essay, prac exercises.

This unit of study examines the political, cultural and economic processes that create the contemporary global society. The subject matter includes questions about the evolution of cities and regional economies, the social, economic and environmental consequences of globalisation, and the uneven development of countries across the globe. Examples of these issues are drawn from Australia and overseas, with a particular focus on the Asia-Pacific. This unit of study is designed to attract and interest students who wish to pursue geography as a major within their undergraduate career, but also has relevance to students wishing to understand the way geographers seek to understand the contemporary world. It includes a half day field trip to suburbs adjacent to the university, in order to observe processes of social and cultural change within Sydney's inner urban environments.

GEOG 2311 **Landscape Processes**
6 credit points. B A, B Agr Ec, B Ec (Soc Sc), B Res Ec, B Sc, B Sc (Environmental), B Sc (Marine Science), UG Study Abroad Program. A/Prof Deirdre Dragovich, Professor Andy Short. **Session:** Semester 1. **Classes:** 2 lee, 2hr prac/wk, fieldwork. **Prerequisites:** 36cp of Junior units of study, including GEOG1001 or ENVI (1001 or 1002), or GEOL (1001 or 1002). Students enrolled in the Bachelor of Resource Economics should have 36cp from Junior units of study in Biology (or Land and Water Science), Chemistry and Mathematics. **Prohibitions:** GEOG2001. **Assessment:** One 2hr exam; prac reports; 2000w assignment.
This unit of study is concerned with the morphology and evolution of landscapes and the processes that have formed them. Attention will be directed towards slopes, the basic units of landscapes, and the processes leading to slope development and change in different environments. Landscape features will be examined in relation to evidence of past and present process regimes, especially the way in which these regimes are influenced by climate. Field and practical work will involve interpreting landscapes in the Sydney Region. Other geomorphological environments to be considered are glacial landscapes, periglacial landscapes, karst landscapes, and aeolian (desert) landscapes.

GEOG 2321 **Fluvial and Groundwater Geomorphology**
6 credit points. B A, B Agr Ec, B Ec (Soc Sc), B L W Sc, B Res Ec, B Sc, B Sc (Environmental), UG Study Abroad Program. Dr Melissa Neave. **Session:** Semester 2. **Classes:** 2 lee & 2 hour prac/week. **Prerequisites:** GEOG(2311 or 2001) or 36 credit points of Junior study including GEOG1001 or ENVI (1001 or 1002) or GEOL (1001 or 1002 or 1501). Students in the Bachelor of Resource Economics should have 36 credit points of study in Biology (or Land and Water Science), Chemistry and Mathematics. Students in the Bachelor of Land and Water Science should have ENVU002, 12 credit points of Chemistry, 6 credit points of Biology, BIOM1002. **Prohibitions:** GEOG (2002 or 2302 or 2303) or MARS2002 or MARS2006. **Assessment:** One 2 hr exam, one quiz, one field report, practical exercises.
This unit of study provides an introduction to the fundamentals of fluvial geomorphology (the study of surface water as an agent of landscape change) and groundwater hydrology. The fluvial geomorphology section of the unit will describe the movement of water in stream channels and investigate the landscape change associated with that movement. Topics to be covered will include open channel flow hydraulics, sediment transport processes and stream channel morphology. Practical work will focus on the collection and analysis of field data. The quantity and quality of the groundwater resources are closely linked to geology and fluvial geomorphology. The groundwater section of this unit is based around four common groundwater issues: contamination, extraction, dryland salinity and groundwater-surface water interaction. In the practical component, common groundwater computer models such as FLOWTUBE and MODFLOW will be used to further explore these problems.
Textbooks
Recommended Textbooks: Fetter (2001) & Knighton (1998)

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

GEOL 1002 **Earth Processes and Resources**
6 credit points. B A, B E, B Res Ec, B Sc, B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), UG Study Abroad Program. Dr Tom Hubble (Co-ordinator). **Session:** Semester 2. **Classes:** 3 lee & prac or tut/wk. **Assumed Knowledge:** No previous knowledge of Geology assumed. **Prohibitions:** GEOL 1501. **Assessment:** One 2hr exam, class and field work.
This unit of study examines the chemical and physical processes involved in mineral formation, volcanoes, and metamorphism. Lectures and laboratory sessions on mountain building processes and the formation of ore deposits will lead to an understanding of the driving forces in geology that originate deep within the Earth's interior. 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 weekend field excursion to Lithgow. Students will be required to pay hostel accommodation for one night on the Lithgow excursion. Continuing students may also enrol in an optional post-semester field excursion to volcanic terranes of New Zealand (North Island).

GEOS 3108 **Rivers: Science, Policy and Managem**
***** No info available for 2006. *****

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

GOVT 1101 **Australian Politics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1. **Classes:** Two lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit introduces students to 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?

GOVT 1104 **Power in Society**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit provides an introduction to the study of politics through a focus on the key organising principle of political science: power. Different ways in which power is theorised and structured are considered, not with the intention of presenting a universal theory or theories, but rather to find some connections and extensions amongst a wide variety of experiences of political power. In particular this unit considers the way power operates in Australian society in relation to political decision making. The unit draws on case studies in order to combine the study of key political ideas and concepts with practical examples from our daily lives (e.g. diet, transport, drugs, clothing etc.).

GOVT 1105 **Geopolitics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Int S, UG Study Abroad Program. **Session:** Semester 1. **Classes:** Two lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit 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.

GOVT 1202 **World Politics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, B Int S, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 2. **Classes:** Two lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit introduces 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.

GOVT 1406 **International Business and Politics**
6 credit points. B A, B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program. **Session:** Semester 2. **Classes:** Two lectures and one tutorial per week. **Assessment:** May include one or more of the following: Mid-semester examin-

ation; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit introduces students to the international business environment, particularly those forces that shape international business relations and markets: international political relations, international trade, international financial markets, and the global economic and political architecture. The unit surveys issues associated with global marketplaces, trade and investment, culture, internationalisation, the international monetary system, foreign exchange, trade agreements, markets in Asia, international investment risk, risk analysis for international business, and risk mitigation. The unit is especially concerned with international business as it relates to international business and politics in Asia.

HORT 1001 **Horticultural Science 1A**

6 credit points. B Agr Ec, B Hort Sc, UG Study Abroad Program. Prof. Burgess, Assoc. Prof. Maxwell, Dr McConchie. **Session:** Semester 1. **Classes:** (3 lee & 3 prac)/wk, excursion. **Assumed Knowledge:** HSC 2 unit Chemistry. **Prohibitions:** CROP1001, LWSC1001. **Assessment:** One 2hr exam, prac,assignments.
This unit of study introduces the principles and practices of modern horticulture and agriculture and examines the relationships between the plants, animals and natural resources which make up production systems. The concepts of environmental and economic sustainability of horticultural and agricultural systems will be introduced.
Topics covered include Australian farming systems, regional horticultural and agricultural industries, farming operations and plant identification.
Textbooks
Reference books
V. Squires and P. Tow (eds) Dryland Farming: a Systems Approach (Sydney University Press, 1992)
C.J. Pearson et al. A Plain English Guide to Agricultural Plants (Longman Cheshire, 1993)
M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press, 1993)

HORT 1002 **Horticultural Science IB**

6 credit points. B Agr Ec, B Hort Sc, UG Study Abroad Program. Dr Sharma, Dr Cook. **Session:** Semester 2. **Classes:** (3 lee & 3 prac)/wk. **Corequisites:** HORT1001. **Prohibitions:** CROP1002, LWSC1002. **Assessment:** Assessment one 2 hr exam, prac, assignments.
This unit of study develops the theme of environmental sustainability of horticultural and agricultural production, and examines the physical principles which underpin these production systems and the broad ecological relationships between plants, animals and natural resources used in horticulture and agriculture. Current and future ecological issues facing horticulture and agriculture are discussed. In addition, the static and dynamic forces involved in horticultural and agricultural structures and equipment, the behaviour and properties of water, and the physical aspects of weather and the Australian climate will be discussed.
Textbooks
See HORT1001 Horticultural Science 1A

HORT 2002 **Horticultural Science 2**

6 credit points. B Agr Ec, B Hort Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc Agr. Dr Jenny Jobling. **Session:** Semester 2. **Classes:** 2 lec/wk, 3hr lab/wk. **Assumed Knowledge:** HORT1001, HORT 1002. **Prerequisites:** Two of BIOL 1001, BIOL 1101, BIOL 1901, BIOL 1002, BIOL 1003, BIOL 1903. **Assessment:** Exam 3 hr (55%), Assignments (45%).
The unit of study covers topics on perennial fruit production, nursery management and plant identification. Topics in fruit production cover crop physiology and growth with special emphasis on management activities during winter/spring. Nursery management includes a discussion of the major aspects of pot plant production, including protected cropping and environmental auditing. Plant identification will provide students with a detailed foundation of plant use in ornamental horticulture, based around plant families.

HORT 3004 **Postharvest Biology and Technology**

6 credit points. B Hort Sc, B L W Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc Agr, UG Study Abroad Program. Dr Robyn McConchie. **Session:** Semester 1. **Classes:** (2 lee, 3-4 labs/seminars/workshops)/wk. **Assumed Knowledge:** HORT 1001, HORT 1002 and HORT 2002. **Prerequisites:** Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903. **Assessment:** Exam 2 hr (60%), Laboratory Reports (25%), Assignment (10%), Seminar (5%).
The unit develops understanding and skills relevant to the maintenance of quality during the harvesting, handling, storage and marketing of fresh plants and plant parts. The subject integrates the postharvest physiology of products that are handled or marketed in a living state, with the technological and economic challenges associated with delivering them from the field to the consumer. Supply chain analysis of crops will be examined via case study examples, drawn from fruits, vegetables, cut flowers, nursery and foliage crops, turf and edible fungi. Students will study all operations from harvesting to consumer evaluation.
Textbooks
Wills, R., McGlasson, B., Graham, D. and Joyce, D. "Postharvest: An Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals." UNSW Press 4th Edition

HORT 3005 **Production Horticulture**

6 credit points. B Hort Sc, B L W Sc, B Sc, B Sc Agr, UG Study Abroad Program. Dr Jenny Jobling. **Session:** Semester 1. **Classes:** (2 lee, 3 labs/seminars/workshops)/wk. **Assumed Knowledge:** HORT 1001, HORT 1002 and HORT 2002. **Prerequisites:** Two of PLNT 2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903. **Assessment:** One 3 hr exam (55%), Assignments (45%) ie Fruit crops 15%, Vegetables 15%, Tropical and Environmental
Horticulture 15%.
Emphasis is given to the scientific basis for fruit and winegrape production and to sustainable vegetable crop production and tropical horticultural crops. Concepts underlying the establishment of and management of urban plants and use are addressed. The unit develops skills in the evaluation of technical and environmental status of established orchards, vineyards, vegetable crops and urban plantings.

HORT 4004 **Issues in Horticultural Science 4A**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Robyn McConchie. **Session:** Semester 1. **Classes:** 2 lectures per week for 13 weeks & 6 prac per 13 weeks. **Prerequisites:** HORT3001 or HORT3004. **Assessment:** Exam (2 hr) (25%), Plant ID Practical Quizzes (15%), Consulting Report (45%), Seminar Presentation (15%).
Students attend a series of discussion workshops on minimising the environmental impact of horticultural enterprises. It introduces students to current themes and thinking in sustainable practices in horticultural science, covering issues such as efficient water management, sustainable use of fertilizers, salinity, heavy metal pollution, disposal of plastics, integrated pest management and organic practices. Students also undertake an industry based case study analysis of a horticultural supply chain, designed to provide them with skills in data analysis and interpretation, problem identification and problem solving. In addition, students will add to their general knowledge of important horticultural plants and their uses through plant identification workshops.

HORT 4005 **Research and Practice in Hort Science 4B**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof David Guest. **Session:** Semester 2. **Classes:** 2 lectures per week for 13 weeks & 6 prac per 13 weeks. **Prerequisites:** HORT3001 or HORT3004; HORT4004. **Assessment:** Critical essay and presentation 40%, Journal presentation 10%, Other reports 20%, Plant ID Exam 30%.
This unit introduces students to current themes and thinking in horticultural science research and practice. Through prescribed readings, seminar attendance presentations, discussion workshops, excursions and practicals, students will integrate the knowledge they have acquired during their undergraduate course, and develop critical analysis skills essential for a professional career in horticultural science research and management. Emphasis will be placed on identifying sustainable horticultural practices that meet the environmental, human and financial challenges facing horticulture. Issues to be covered include sustainable water and soil management, organic horticulture, the impact of methyl bromide withdrawal, biosecurity, biotechnology, agroforestry, intellectual property, WTO and trade, urban horticulture and quality of life, horticulture and human nutrition, food safety, supply chain analysis.

Information Systems Units of Study

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

INFS 1000 **Business Information Systems Foundations**

6 credit points. B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, BIT, UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 2, Semester 1, Summer. **Classes:** 3 hours per week. **Prohibitions:** ISYS1003 or INFO1000 or INFO1003 or INFO 1903. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
The Information Age, with its focus on information as a key business resource, has changed the way Business Information Systems (BIS) are viewed in organisations. In previous years, people approached BIS primarily as a tool to increase fficiency, either by cutting costs, time or energy spent. In the information age, however, the role of BIS is different it is an
enabler of innovation and a tool for getting the right information into the hands of the right people at the right time. This unit focuses on how businesses operate and shows how business information systems support business operations and management. Students are provided with an introduction to BIS theories, frameworks and

models to assist in understanding the nature and contribution of BIS in a range of organisational contexts including private, public and not for profit.

LWSC 1001 **Land and Water Science 1A**

6 credit points. B Agr Ec, B L W Sc, B Res Ec, UG Study Abroad Program. Prof Lester Burgess. **Session:** Semester 1. **Prohibitions:** CROP 1001 and HORT1001. **Assessment:** One 2 hr exam, assignments, weekly class practical tests.

This unit of study introduces the principles and practices of modern primary industries and examines the relationships between the plants, animals and natural resources that make up production systems. The concepts of environmental and economic sustainability of production systems will be introduced.

Topics covered include introduction to ecological systems, regional resources and primary industries, technology and ecosystem disturbance and plant identification.

Textbooks

V Squires and P Tow (eds) Dryland farming: a systems approach (Sydney University Press), 1992

SCARM (1998) Sustainable agriculture: assessing Australia's recent performance (CSIRO)

LWSC 1002 **Land and Water Science IB**

6 credit points. B Agr Ec, B L W Sc, B Res Ec, UG Study Abroad Program. Dr Sharma, Dr Cook. **Session:** Semester 2. **Corequisites:** LWSC1001 Land and Water Science 1 A. **Prohibitions:** CROP1002 and HORT1002. **Assessment:** One 2 hr exam, assignments, weekly class practical tests.

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

Topics covered include climatology, environmental physics, ecosystems management, global issues of ecological significance and plant identification.

Textbooks

Reference Books

V.Squires and PTow (eds) Dryland farming: a systems approach (Sydney University Press), 1992

SCARM (1998) Sustainable agriculture;assessing Australia's recent performance (CSIRO)

M.W. Denny Air and Water: The Biology and Physics of Life's Media (Princeton University Press), 1993

LWSC 2002 **Sustainable Land and Water Management**

6 credit points. B Agr Ec, B L W Sc, UG Study Abroad Program. Dr D Al Bakri (coordinator), Dr RW Vervoort. **Session:** Semester 2. **Classes:** 2 hrs lectures, 4 hrs (practical/fieldwork)/wk. **Prerequisites:** LWSC1001, LWSC1002. **Assessment:** Practical reports 20%, Field report 30%, 3hr exam 50%.

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

Textbooks

Al Bakri D 2002. Geoscience and sustainable catchment and resource management: The Ben Chifley Catchment case study, Environmental Geology, 42, 588-596.

Al Bakri D 2001. Towards developing a geoscientific approach to sustainable agricultural and rural development, Journal of Environmental Geology ,40 (4-5), 543-556.

Heathcote IW 1998. Integrated watershed management, principles and practices, John Wiley and Sons, New York.

LWSC 3004 **Limnology and Water Quality**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Dhia Al-Bakri. **Session:** Semester 1. **Classes:** (2 lee, 4 labs, 2hr fieldwork)/wk. **Assumed Knowledge:** GEOG2303 or GEOG2321. **Prerequisites:** LWSC2001 or LWSC2002. **Prohibitions:** AGCH3030. **Assessment:** Practical reports 30%, Field report 20%, 3hr Exam 50%.

This unit of study is designed to provide students a thorough understanding of the main water quality problems and related limnological issues in Australia and the underlying causes and processes. The unit builds on the knowledge gained in LWSC2001 and GEOG 2303. It concentrates on sources and pathways of pollutants reaching streams, lakes and reservoirs, the interactions between runoff and water quality, and pollution control within the context of integrated catchment management (ICM). The unit also covers aspects of freshwater ecology with particular emphasis on wetlands ecosystem, riparian vegetation, macrophytes, phytoplanktonic communities, cyanobacteria and microbiological pollution. On completion of this unit of study, the students should be able to: identify the different water quality issues and pollution problems in Australian water bodies, explain underlying causes and processes; relate the interaction between flow and water quality and evaluate their implications on catchment management. The students will also be able to employ limnological modeling to predict heat budget distribution; catchment loading and mass balance of given pollutants, describe stream flow duration and frequency, and select appropriate pollution control and management strategies.

Textbooks

Wetzel R G 2001. Limnology: Lake and reservoir ecosystems, 3rd edn, Academic Press London.

Goldman C R and Home A J 1983. Limnology. McGraw-Hill Book Company, New York.

LWSC 4003 **Landscape Hydrology and Management**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Willem Vervoort. **Session:** Semester 1. **Classes:** (2 hrs lee and 4 hrs practical/fieldwork)/wk. **Prerequisites:** GEOG 2321 or LWSC 3001. **Assessment:** Practical reports 35%, Presentation 15%, 2hr Exam 50%.

This unit of study is designed to give students insight into the problems related to catchment-scale hydrological modeling, freshwater management and river restoration and policy making at the catchment level. The unit builds on the theoretical knowledge gained in LWSC 3001 and GEOG 2321. In the first part, the unit explores several ways to simulate catchment hydrological processes and how risk assessment in natural resource management takes places. In particular the unit tries to stimulate discussion on the possibilities and impossibilities of assessing the impact of management and policies in a catchment. The second part of the unit will focus on discussing and applying a range of techniques, models and management options used in improving quality of water resources, combating pollution and restoring degraded aquatic ecosystems. By the end of this unit the students should be able to apply salinity and groundwater risk assessment tools, apply catchment-scale simulation models to predict management and policy impact, and identify and employ appropriate technological solutions and management practices to control water quality problems and remediate stressed streams, lakes and reservoirs.

Textbooks

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

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

Mathematics Units of Study

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

MATH 1001 **Differential Calculus**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Summer. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 1. **Prohibitions:** MATH 1011 or 1901 or 1906 or 1111. **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1001 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.

MATH 1002 **Linear Algebra**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG SummerAVinter School. **Session:** Semester 1, Summer. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 1. **Prohibitions:** MATH 1902 or 1012 or 1014. **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1002 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

MATH 1003 **Integral Calculus and Modelling**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG SummerAVinter School. **Session:** Semester 2, Summer. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 2 or MATH 1001 or MATH 1111. **Prohibitions:** MATH 1013 or 1903 or 1907. **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1003 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering.This unit of study first develops the idea of the definite integral from Riemann sums, leading to the Fundamental Theorem of Calculus. Various forms of integration are considered, such as integration by parts.The second part is an introduction to the use of first and second order differential equations to model a variety of scientific phenomena.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1005 **Statistics**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Pharm (Rural), B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG SummerAVinter School. **Session:** Semester 2, Summer. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics. **Prohibitions:** MATH (1905 or 1015) or ECMT Junior units of study or STAT (1021 or 1022). **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1005 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

MATH 1011 **Life Sciences Calculus**

3 credit points. B A, B Agr Ec, B App Sc (Ex, SS and Nut), B App Sc (Ex &Sp Sc), B Sc (Nutr), B Com, B Ed, B Sc (Psych), B Med Sc, B Pharm (Rural), B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG. **Session:** Semester 1, Summer. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics. **Prohibitions:** MATH (1111 or 1001 or 1901 or 1906).. **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1011 is designed to provide calculus for students of the life sciences who do not intend to undertake higher year mathematics and statistics.

This unit of study looks at the fitting of data to various functions, introduces finite difference methods, and demonstrates the use of calculus in optimisation problems. It extends differential calculus to functions of two variables and develops integral calculus, including the definite integral and multiple integrals.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1012

***** No info available for 2006. *****

MATH 1013 **Differential and Difference Equations**

3 credit points. B A, B Agr Ec, B Com, B Ed, B Sc (Psych), B Med Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program. **Session:** Semester 2. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics or MATH 1111. **Prohibitions:** MATH (1003 or 1903 or 1907).. **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1013 is designed to provide the theory of difference and differential equations for students of the life sciences who do not intend to undertake higher year mathematics and statistics.

This unit of study looks at the solution of equations by bisection and iteration, first and second order difference equations where chaos is met, and examples of modelling using simple first and second order differential equations.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1901 **Differential Calculus (Advanced)**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program. **Session:** Semester 1. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 2. **Prohibitions:** MATH (1111 or 1011 or 1001 or 1906). **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1901 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study parallels the normal unit MATH 1001 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1902 **Linear Algebra (Advanced)**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program. **Session:** Semester 1. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 2. **Prohibitions:** MATH (1002 or 1012 or 1014). **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1902 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study parallels the normal unit MATH 1002 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1903 **Integral Calculus and Modelling Advanced**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program. **Session:** Semester 2. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 2 or Credit or better in MATH (1001 or 1901). **Prohibitions:** MATH (1003 or 1013 or 1907). **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1903 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This unit of study parallels the normal unit MATH 1003 but goes more deeply into the subject matter and requires more mathematical sophisticaton.

Textbooks

As set out in the Junior Mathematics Handbook

MATH 1905 **Statistics (Advanced)**

3 credit points. B A, B Com, B E, B Ed, B Sc (Psych), B Med Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program. **Session:** Semester 2. **Classes:** 2 lee & 1 tut/wk. **Assumed Knowledge:** HSC Mathematics Extension 2. **Prohibitions:** MATH (1005 or 1015) or ECMT Junior units of study or STAT (1021 or 1022). **Assessment:** One 1.5 hour examination, assignments and quizzes.

MATH 1905 is designed to provide a thorough preparation for further study in mathematics and statistics. It is a core unit of study providing three of the twelve credit points required by the Faculty of Science as well as a Junior level requirement in the Faculty of Engineering. This Advanced level unit of study parallels the normal unit MATH 1005 but goes more deeply into the subject matter and requires more mathematical sophistication.

Textbooks

As set out in the Junior Mathematics Handbook

MICR 2022 **Applied Microbiology**

6 credit points. B An Vet Bio Sc, B E, B Hort Sc, B L W Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. **Session:** Semester 2. **Classes:** 2.5 lee, 0.5 tut or prac & 2.0 prac/wk. **Assumed Knowledge:** MICR (2021 or 2921 or 2024). **Prerequisites:** (6 credit points of Junior Biology or MBLG1001) and 6 credit points of Junior Chemistry. **Prohibitions:** MICR (2922 or 2002 or 2902 or 2004 or 2008 or 2012 or 2909). **Assessment:** One 2hr exam, continuous assessment in prac, 2 assignments, prac exam.

NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling inMICR2022 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).

This unit of study is designed to expand the understanding of, and technical competence in, microbiology, building on the knowledge and skills acquired in Microbiology 2021 or 2921.
The lectures cover two broad topics: molecular microbiology of the organism and microbial biotechnology and applications. The molecular microbiology section covers aspects of microbial genetics and the structure and functioning of procaryotic cells.
The microbial biotechnology section covers food and agricultural microbiology (production, spoilage and preparation, as well as the safety of foods) and aspects of public health and medical microbiology (host parasite relationships, host defences, epidemiology of selected diseases, prevention of disease). Industrial microbiology deals with large scale production, traditional products, recombinant DNA products, biosensors and biocontrol agents, biodeterioration and bioremediation.
Practical classes enable the study of material which both complements and supplements the lecture topics.
Work experience
On completion of MICR 2022 or 2922, students who have successfully completed MICR2021 and are enrolled in the BSc or BSc (Advanced) may be offered the opportunity to undertake work experience for approximately one month in a microbiology laboratory of choice (hospital, food, research, environmental, etc.), subject to availability of places.
Textbooks
Prescott L M et al. Microbiology. 6th edn, WCB/McGraw-Hill, 2005

MICR 2024 **Microbes in the Environment**
6 credit points. B Hort Sc, B L W Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biotechnology), B Sc Agr. Dr Andrew Holmes. **Session:** Semester 2. **Classes:** 2 lectures and 3 prac/week. **Prerequisites:** 30 credit points of Junior Science or Faculty of Agriculture, Food and Natural Resource units including 6 credit points of Junior Biology. **Prohibitions:** MICR (2021 or 2921 or 2001 or 2901 or 2003 or 2007 or 2011 or 2909).. **Assessment:** One 2hr exam, weekly on-line quiz, project report and seminar.
NB: Students are very strongly recommended to complete MICR (2021 or 2921 or 2024) before enrolling in MICR2922 in Semester 2. For progression on to Senior Microbiology units, students must also complete MBLG1001 or PLNT (2001 or 2901).
This unit introduces the diversity of microbes found in soil, water, air, plants and animal environments. Through an examination of their physiology and genetics it explores their interactions with plants, animals and each other, and their roles as decomposers and recyclers in the environment. The soil is a rich microbial environment, and the concept of soil health and its relationship to plant growth is discussed. Practical classes introduce techniques and skills in isolating, quantifying and culturing microbes, designing and interpreting experiments to study microbial growth, and in preparing and presenting data.
Textbooks
Atlas RM and Bartha R (1997) Microbial Ecology: Fundamentals and applications. 4th Edition. Benjamin/Cummings Scientific Publishing, Menlo Park, CA

MICR 3022 **Microbial Biotechnology**
6 credit points. B Hort Sc, B L W Sc, B Med Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc Agr, UG Study Abroad Program. Dr A Holmes. **Session:** Semester 2. **Classes:** 2 hrs of lectures & 3hr prac/wk. **Prerequisites:** At least 6 credit points of MBLG units and 6 credit points of Intermediate MICR units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED (2802 and 2807). For BScAgr students: PLNT (2001 or 2901) and MICR2024. **Prohibitions:** MICR3922, MICR3002, MICR3902. **Assessment:** One 2hr exam, continuous assessment, practical work, practical reports.
This unit of study will cover both traditional microbial biotechnologies and the impact of new technologies on the emergence of new industries. Existing applications are based on empirical management of a remarkably small proportion of microbial diversity. The past ten years have seen dramatic advances in the capacity to explore microbial diversity and actively manage microbial communities. This course will focus on how these new techniques are creating new opportunities in biotechnology. General applications to be covered include human health (managing diseases that do not have a single causative agent), environmental health (waste treatment and using microorganisms as indicators of sustainability), and production of bioactive compounds (enzymes, antibiotics). Specific techniques covered will include gene discovery via environmental metagenomics; microarrays for real-time monitoring of microbial communities; high throughput screening for isolation and recovery of producers of novel bioactive compounds.
Textbooks
To be advised

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

MKTG 1001 **Marketing Principles**
6 credit points. B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program, UG Summer/Winter School. TBA. **Session:** Semester 1, Semester 2. **Classes:** One lecture and one tutorial per week. **Prohibitions:** MKTG2001. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
This unit 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.

MKTG 1002 **Marketing Research 1**
6 credit points. B Agr Ec, B Com, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program. Iain Black. **Session:** Semester 2. **Classes:** One lecture and one tutorial per week. **Prerequisites:** MKTG1001 (or MKTG2001). **Prohibitions:** MKTG2003. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
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.

PLNT 2001 **Plant Biochemistry and Molecular Biology**
6 credit points. B A, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Prof Les Copeland (Coordinator), Dr Rosanne Quinnell. **Session:** Semester 1. **Classes:** 2 hr lee, 3 hr practical/wk. **Prerequisites:** 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202). **Prohibitions:** PLNT2901, AGCH200L. **Assessment:** quizzes + theory of prac test (25%), laboratory reports (25%), final examination (50%).
This unit of study explores the fundamentals of plant biochemistry, from what plants are made of to how plants regulate their metabolic processes. The specialised nature of these metabolic processes, which enable plants to respond to different biotic and abiotic environmental influences, is featured as is their relationship to food, feed and fibres. The unit covers basic chemistry and metabolic reactions of the main plant constituents, how storage reserves are mobilized to provide energy and substrates for growth and development, and how metabolic pathways are controlled and respond to influences from the plant environment. Special attention is given to these processes in economic plants, and their relevance to foods and fibres. The unit of study complements intermediate units of study in plant science, molecular and cell biology, genetics and biotechnology, and leads on to senior plant modules offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources. Learning in the unit is by lectures and laboratory work, augmented by self-directed learning related to the lecture and practical classes and discussions to provide insights into how molecular and biochemical approaches lead to understanding of plant functions. Students will be expected to access the WebCT site regularly for information.
Textbooks
A Study Guide for the unit will be available for purchase from the Copy Centre at a cost of $10 during the first week of Semester.

PLNT 2002 **Aust Flora: Ecology and Conservation**
6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad. Dr Glenda Wardle & Dr Murray Henwood. **Session:** Semester 1. **Classes:** (2 lee & 3 prac)/wk, audiovisual. **Prerequisites:** One of BIOL1001, BIOL1101, BIOL1901; One of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002. (With the Dean's permission BIOL1201 and BIOL1202 may be substituted for the above.). **Prohibitions:** PLNT2902, BIOL2004 or BIOL2904.. **Assessment:** One 2-hr exam (40%), laboratory reports (20%) herbarium (20%), one 2-hr practical exam (20%).

This unit provides a broad understanding of the evolution, classification and diversity of terrestrial plants and the principles of plant ecology in an Australian context. The major types of Australian vegetation are discussed across a range of temporal and spatial scales, and their current distribution related to their environment and origins. Selected contemporary issues in plant conservation from Australian natural and managed systems are explored. There is a strong emphasis on practical skills such as phylogenetic inference, plant identification and the collection and analysis of ecological data. The practical component of the unit of study uses examples taken from the Australian flora (including plants of horticultural significance) and major crop plants. Important elements of this unit are half-day field trips to the Royal National Park (or production systems at Camden), the Royal Botanic Gardens Sydney and the construction of student herbaria. The unit of study complements intermediate units of study in plant science, zoology, molecular and cell biology, genetics and biotechnology, and leads on to advanced plant and ecology modules offered through the School of Biological Sciences and the Faculty of Agriculture, Food and Natural Resources.

Textbooks

A Laboratory Manual for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT 2003 **Plant Form and Function**

6 credit points. B A, B Agr Ec, B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad. A/Prof Bruce Sutton, A/Prof Robyn Overall. **Session:** Semester 2. **Classes:** 2 lectures, lhr tutorial and 1 prac, A/V session (2-3hr) or field trip (6hr) per wk. **Assumed Knowledge:** The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. **Prerequisites:** 12 credit points of Junior Biology (or with the Dean's permission), BIOL1201 and BIOL1202 or BIOL1001 and ENVI1002. **Prohibitions:** PLNT2903, BIOL2003, BIOL2903, CROP2001.. **Assessment:** One 2hr theory exam (40%), prac exam (20%), anatomy project (10%), quizzes (5%), physiology report (10%), field report (15%).

This unit of study investigates the structure of cells, tissues and organs of flowering plants and relates them to function. Topics include; how photosynthesis, translocation, water transport and nutrition relate to the structures that carry out these processes. Most of the information on plant structure will be provided in self-instructional audiovisual sessions augmented by small group discussions. This is integrated with experiments carried out in the laboratory or on field excursions to investigate the physiological aspects of plant structures. There is a focus on recent advances in plant molecular biology where they have been critical in enhancing our understanding of the form and function of plants. The physiological and anatomical responses of plants to extreme environments such as drought and salinity will also be addressed. Attention will be paid to the anatomy and physiology of crop, horticultural and Australian native plants. This unit of study complements Applied Plant Biochemistry, Australian Flora: ecology and conservation and Cell Biology and leads onto senior units of study in plant sciences, including Plant Growth and Development. It is essential for those seeking a career in plant molecular biology.

Textbooks

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

Recommended reading:

Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.

Buchanan BB, Gmissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland

A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT 2901 **Plant Biochem & Molecular Biology (Adv)**

6 credit points. B A, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Prof Les Copeland (Coordinator), Dr Rosanne Quinnell. **Session:** Semester 1. **Classes:** (3 lee or tut; 3 prac or sem)/wk. **Prerequisites:** A Distinction average in 12 credit points of Junior Chemistry and 12 credit points of Junior Biology (or with the Dean's permission BIOL1201 and BIOL1202). **Prohibitions:** PLNT2001, AGCH2001. **Assessment:** One 2-hr exam (50%), laboratory reports (10%) independent research project presentation and report (25%), self-directed learning exercises (15%).

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

Textbooks

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

PLNT 2902 **Aust Flora: Ecology** & **Conservation (Adv)**

6 credit points. B A, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Dr Glenda Wardle & Dr Murray Henwood. **Session:** Semester 1. **Classes:** (2 lee & 3 prac)/wk, audiovisual. **Prerequisites:** Distinction average in (one of BIOL1001, BIOL1101, BIOL1901) and (one of BIOL1002, BIOL1003, BIOL1902, BIOL1903, LWSC1002) (or with the Dean's permission BIOL1201 and BIOL1202). **Prohibitions:** PLNT2002, BIOL2004, BIOL2904.. **Assessment:** One 2-hr exam (40%), laboratory reports (20%) research project (20%), one 2-hr practical exam (20%).

Qualifed students will participate in alternative components of PLNT2002. The content and nature of these components may vary from year to year. See prerequisites for Senior units of study in Biology.

Textbooks

A Laboratory Manual for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT 2903 **Plant Form and Function (Advanced)**

6 credit points. B A, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biology & Genetics), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. A/Prof Bruce Sutton and A/Prof Robyn Overall. **Session:** Semester 2. **Classes:** 2 lectures, lhr tutorial and 1 prac, A/V session (2-3hr) or field trip **(6hr)** per wk. **Assumed Knowledge:** The content of BIOL (1002 or 1902) is assumed knowledge and students entering from BIOL (1003 or 1903) will need to do some preparatory reading. **Prerequisites:** Distinction average in 12 credit points of Junior Biology or BIOL1001 and ENVI1002 (or with the Dean's permission, BIOL1201 and BIOL1202). **Prohibitions:** PLNT2003, BIOL2003, BIOL2903, CROP2001. **Assessment:** One 2hr theory exam (40%), prac exam (20%), research project oral and written presentation (25%), field report (15%).

The content will be based on PLNT2003 but qualified students will participate in alternative components at a more advanced level. The content and nature of these components may vary from year to year.

Textbooks

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

Recommended reading:

Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.

Buchanan BB, Gmissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland

A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT 3001 **Plant, Cell and Environment**

6 credit points. B A, B Hort Sc, B L W Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Dr Rosanne Quinnell and A/Prof Bruce Sutton. **Session:** Semester 2. **Classes:** (2-3 workshops, 2-3 prac)/wk. **Prerequisites:** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. **Prohibitions:** PLNT 3901. **Assessment:** One 2hr exam (50%), 2 lab reports (50%).

This unit of study of comprises workshops and practical sessions that will be guided largely by current directions in plant science research in Australia. Theme areas will be identified and used to direct the workshops and discussions conducted throughout the semester. We expect students to be able to span levels of plant organisation: molecular, cellular, tissues, organs, whole organism physiology and ecology. Theme areas for discussion will consider the Australian flora and the areas currently under investigation at the University of Sydney. Students will need to draw on knowledge from Intermediate units of study and will be expected to explore the published literature in order to successfully integrate information and participate in workshops and discussions. The practical component of this unit of study has sufficient flexibility for students to design their own group experiments to answer questions raised during the workshops. A range of equipment for student experiments will be available including: pulse amplitude modulated (PAM) fluorometer; oxygen electrodes; Scholander bomb, gel electrophoresis (PAGE).

PLNT 3002 **Plant Growth and Development**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Robyn Overall. **Session:** Semester 2. **Classes:** (3 lee, 0-3 hr prac)/wk. **Prerequisites:** 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. **Prohibitions:** PLNT 3902, BIOL 3021, BIOL 3931.. **Assessment:** One 2 hr exam (60%), project presentation and report (20%), laboratory quizzes, report and book (20%).

This unit explores the mechanisms underlying plant growth and development from seed to maturity. It covers the process of building the plant body from embryogenesis, development and operation of meristems, polarity, patterning, controls of flowering and fruit development to programmed cell death and senescence. It includes the role of signals such as plant hormones in coordinating plant growth and development and the molecular and cellular mechanisms underlying plant responses to environmental signals such as gravity and light. There is a focus on recent plant molecular biology that has been critical in enhancing our current understanding of plant growth and development. The unit uses examples from crop, horticultural and native plants as well as the model plant Arabidopsis. Lectures are augmented by experimental work, including and independent research project. The laboratory work will include plant tissue culture, protoplast production and modern cell biological techniques used to study plant development. This unit of study complements

other senior units of study in the Plant Science Major and is essential for those seeking a career in plant molecular biology.
Textbooks
Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer
Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PLNT 3901 **Plant, Cell and Environment (Advanced)**
6 credit points. B A, B Hort Sc, B L W Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Marine Science), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Dr Rosanne Quinnell and A/Prof Bruce Sutton. **Session:** Semester 2. **Classes:** (2 -3 workshops; 2 - 3 prac)/wk. **Prerequisites:** 12 credit points of Intermediate Biology, Plant Science, Molecular Biology and Genetics or equivalent. **Prohibitions:** PLNT3001. **Assessment:** One 2-hr exam (50%), 1 research report (50%).
NB: Department permission required for enrolment. Entry is restricted and is based on a combination of a high WAM and student motivation.
The purpose of this unit of study is to develop an understanding of current directions in Plant Science. The unit of study of comprises workshops and an advanced research project; these will be guided by current directions in plant science research in Australia. Theme areas will be identified and used to direct the workshops to be conducted throughout the semester. We expect students to be able to span levels of plant organisation: molecular, cellular, tissues, organs, whole organism physiology and ecology. Theme areas for discussion will consider the Australian landscape and the areas currently under investigation at the University of Sydney. Students will need to draw on knowledge from Intermediate units of study and will be expected to explore the published literature in order to successfully integrate information and participate in workshop discussions. The research project of this unit of study has sufficient flexibility for students to design their own experiments to answer questions and the research project will align closely with work being undertaken at the University of Sydney. A range of equipment for advanced experiments will be available including: pulse amplitude modulated (PAM) fluorometer; oxygen electrodes; Scholander bomb, gel electrophoresis (PAGE), specialised equipment housed in research laboratories.

PLNT 3902 **Plant Growth and Development (Advanced)**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. A/Prof Robyn Overall. **Session:** Semester 2. **Classes:** (3 lee, 0-3 hr prac)/wk. **Prerequisites:** Distinction average in 12 credit points of intermediate PLNT, BIOL, AGCH or CROP units of study including at least one of PLNT 2001, PLNT 2901, PLNT 2003, PLNT 2903, BIOL 2016, BIOL 2916, BIOL 2003, BIOL 2903, BIOL 2006, BIOL 2906, CROP 2001, AGCH 2002 or equivalent. These requirements may be varied and students with lower averages should consult the unit coordinator. **Prohibitions:** PLNT 3002, BIOL 3021, BIOL 3931.. **Assessment:** One 2 hr exam (60%), project presentation and report (30%), laboratory quizzes and book (10%).
Qualified students will participate in alternative components of PLNT 3002 Plant Growth and Development, representing 30% of the total assessment. The students will be exempt from one standard laboratory report and the standard independent group project. Instead, the students will conduct an advanced independent individual practical or theoretical research project under the supervision of a member of the academic staff. The program includes a formal presentation of the results of the project in verbal and written reports.
Textbooks
Taiz L, Zeiger E (2002) Plant Physiology 3rd ed. Sunderland, Mass Sinauer
Recommended reading:
Atwell B, Kriedemann P, Turnbull C (1999) Plants in Action. Macmillan, South Yarra.
Buchanan BB, Gruissem W, Jones RL (2000) Biochemistry and Molecular Biology of Plants, ASPP, Rockvill, Maryland
A Study Guide for the unit will be available for purchase from the Copy Centre during the first week of Semester.

PPAT 3003 **Plant Disease**
6 credit points. B Hort Sc, B L W Sc, B Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess and Prof David Guest. **Session:** Semester 1. **Classes:** (2 lee, 3 hr practical classes)/wk. **Prerequisites:** Two of PLNT2001, PLNT 2901, PLNT 2002, PLNT 2902, PLNT 2003, PLNT 2903, MICR 2024 or MICR 2026. **Assessment:** Written exam 2 hr (60%), 12 Quizzes (15%), Group project report (25%).
This unit introduces fungi and other microbes as causes of plant disease that limit agricultural and horticultural production. The practical component introduces techniques used in handling and identifying fungi, and in studying plant disease. Emphasis is placed on the design of experiments and interpretation of experimental data. Topics include symptoms and diagnosis of plant disease; the biology, epidemiology and management of fungi and other microbes that cause plant disease; breeding for disease resistance; plant-parasite relationships; and disease resistance in plants.
Textbooks
Brown JF and Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications.

PPAT 4003 **Molecular & Physiological Plant Path'ogy**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess, Dr Edward Liew. **Session:** Semester 1. **Classes:** 34 hr lectures/tutorials, 10 hr laboratory. **Prerequisites:** PPAT 3003 or equivalent. **Assessment:** One 2 hr theory exam and 3 assignments.
This course focuses on various aspects of plant pathology and mycology involving cellular biology and molecular technologies. Students are introduced to fundamental concepts in molecular techniques in plant pathology, plant-pathogen interactions, pathogen populations, molecular diagnostics and molecular phylogenetics. The practical classes cover basic molecular techniques commonly used in studying plant pathogens and complement the theoretical and conceptual understanding of some of the lecture topics.
Textbooks
Agrios G.N. 1997. Plant Pathology (4th ed.). Academic Press, London.
Brown JF & Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications. Chapters 16 & 17
Forey PL., Humphries, C.J., Kitching, I.L., Scotland, R.W., Siebert, D.J. and Williams, D.M. 1992. Cladistics: A Practical Course in Systematics. Clarendon Press, Oxford.
Hoelzel, AR & Dover, GA. 1991. Molecular Genetic Ecology. IRL Press, Oxford.
Lewin, B. 1997. Genes VI. Oxford University Press, Oxford. (Or later editions)
McDonald, BA. 1997. The Population Genetics of Fungi: tools and techniques. Phytopathology 87:448-453
Taylor, J.W. Jacobson, D.J. Kroken, S. Kasuga, T. Geiser, D.M. Hibbett, D.S. Fisher, M.C. 2000. Phylogenetic species recognition and species concepts in fungi. Fungal Genetics & Biology: 31:21-32

PPAT 4004 **Adv Mycology & Diagnostic Plant Path'ogy**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess, Dr Edward Liew. **Session:** Semester 1. **Classes:** (1 lect/tut, 1 lab, 1 seminar)/wk. **Prerequisites:** PPAT 3003 or equivalent. **Assessment:** One 2hr theory exam, lab and fieldwork reports, two essay assignments.
Mycology Module - includes lectures, tutorials and seminars in taxonomic mycology, fungal biology and sexual compatibility studies. Students learn to use morphological keys for identification and their limitations.
Diagnostic Plant Pathology Module - this module is concerned with the diagnosis of plant disease in crops and natural ecosystems. It will include at least one excursion as well as laboratory classes.
Both modules run in parallel and involve integrated programs
Textbooks
Kendrick, B. (2001). The Fifth Kingdom. www.mycolog.com.MycologuePublication, Ontario 3rd Edition.
Carlile, M.J. et al. (2001). The Fungi (2nd Ed) Academic Press.

PPAT 4005 **Soil Biology and Biodiversity**
6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Lester Burgess. **Session:** Semester 1. **Classes:** 23 Lectures/tutorial, 24 hr of labs, 9 hr of fieldwork. **Assessment:** One 2 hr theory exam, lab and field reports, essay assignment and oral presentation.
An introduction to the diversity of organisms found in the soil, and the ecological principles governing their activities and interactions. Practical applications are illustrated with particular reference to soilborne plant diseases. Topics covered include the nature of the soil biota; isolation, identification and quantification of soil organisms; pathogenic and mutualistic interactions between fungi and roots; mycorrhizae; food webs and soil health; the nature and control of soilborne plant diseases; effects of water potential and temperature on the activity and survival of soil fungi; temporal and spatial distribution of soil fungi and soilborne diseases; and the soil biology of conservation farming. Practical classes demonstrate important concepts as well as techniques for working with soil organisms and soilborne diseases, and for controlling the soil environment, especially soil water, to manipulate biological activity.
Textbooks
Burgess, L. et al. (2000). Biology of Diseases Caused by Soilborne Fungal Plant Pathogens.
Crawford Fund Master Class Lecture Series.
University of Sydney/Royal Botanic Gardens and Domain Trust.
Schjonning, P. et al. (2004). Managing Soil Quality CAB International
Summerell, B.A. et al. (2001). Fusarium: Paul E. Nelson Memorial Symposium, APS Press, St Paul, Minnesota
Erwin, D.C. and Ribeiro, O.K.(1996). Phytophthora Diseases Worldwide. APS Press, St Paul, Minnesota.

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

PSYC 1001 **Psychology 1001**
6 credit points. B A, B Agr Ec, B E, B Ec (Soc Sc), B Ed, B A (Psych), B Ed, B Sc (Psych), B Med Sc, B Sc, B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 1, Summer. **Classes:** 3 lee & a tutorial of lhr/wk and lhr/wk of additional web-based (self-paced) material related to the tutorial (lhr/wk practical/demonstration). **Assessment:** One 2.5hr exam, one lOOOw essay, multiple tutorial tests, experimental participation.
Psychology 1001 is a general introduction to the main topics and methods of psychology, and is the basis for advanced work as well

as being of use to those not proceeding with the subject. Psychology 1001 covers the following areas: subject matter and methods of psychology; basic statistics and measurement; behavioural neuroscience; applied psychology; social psychology; personality theory.
This unit is offered in the Sydney Summer School. Consult the web site:
http://www.usyd.edu.au/summerschool/
for more information.
Textbooks
Psychology 1001 Handbook,
Gray, P. (2002). Psychology (4th Edition). New York: Worth Publishers.
Burton, L.J. (2002). An Interactive Approach to Writing Essays and Research Reports in Psychology. Milton, Queensland: John Wiley & Sons.

PSYC 1002 **Psychology 1002**

6 credit points. B A, B Agr Ec, B E, B Ec (Soc Sc), B Ed, B A (Psych), B Ed, B Sc (Psych), B Med Sc, B Sc, B Sc (Molecular Biology & Genetics), B Sc (Nutrition), UG Study Abroad Program, UG Summer/Winter School. **Session:** Semester 2, Summer. **Classes:** 3 lectures & a tutorial of lhr/wk and lhr/wk of additional web-based (self-paced) material related to the tutorial (lhr/wk practical/demonstration). **Assessment:** One 2.5hr exam, one 1000 word essay, multiple tutorial tests, experimental participation.
Psychology 1002 is a further general introduction to the main topics and methods of psychology, and it is the basis for advanced work as well as being of use to those not proceeding with the subject. Psychology 1002 covers the following areas: human development; human mental abilities; learning, motivation and emotion; visual perception; cognitive processes.
This unit is offered in the Sydney Summer School. Consult the web site:
http://www.usyd.edu.au/summerschool/
for more information.
Textbooks
Psychology 1002 Handbook
Gray, P. (2002). Psychology (4th Edition). New York: Worth Publishers.
Burton, L.J. (2002). An Interactive Approach to Writing Essays and Research Reports in Psychology. Milton, Queensland: John Wiley & Sons.

RSEC 1031 **Resource Economics 1**

6 credit points. B Com, B Ec, B Ec Soc Sc, B L W Sc, B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi Esfahani. **Session:** Semester 2. **Classes:** (2 lee & 1 tut)/wk. **Prohibitions:** AGEC 1031. **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), tutorial papers, assignments.
This unit provides a comprehensive introduction to resource and environmental economics, and how particular concepts in economics are used to provide insights into efficient and sustainable natural resource management. Some descriptive content regarding Australia's natural resource assets and industries is included, but the primary focus is analytical. Emphasis is placed on the importance of property rights structures, cost-effective regulations and dynamic considerations in managing natural resource stocks and environmental assets. Some material on economic valuation of environmental assets and benefit-cost analysis is included.
Textbooks
Barry C. Field and Martha K. Field, Environmental Economics: An Introduction, McGraw-Hill Irwin, 2001.
Barry C. Field, Natural Resource Economics: An Introduction, 3rd ed., McGraw-Hill Irwin, 2002.
N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

RSEC 4131 **Benefit-Cost Analysis**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 lee & 1 tut)/wk. **Prerequisites:** ECON 2001, AGEC 2103 or AGEC 2003. **Prohibitions:** AGEC4037.
This unit provides a detailed treatment of benefit-cost analysis and its use in public sector decision making and project evaluation. The underpinning concepts in welfare economics are analysed in detail, such as economic efficiency, criteria for assessing social welfare improvements, and economic surplus measures. Procedures of undertaking a benefit-cost analysis are presented, and tools of non-market valuation for environmental assets are covered in detail. These techniques include both stated and revealed preference techniques, including contingent valuation, choice modeling, hedonic pricing and travel cost methods.
Textbooks
J. Sinden and D. Thampapillai, Introduction to Benefit Cost Analysis, Longman, 1995.
Campbell, H.C. and R. Brown, Benefit-Cost Analysis: Financial and Economic Appraisal Using Spreadsheets, Cambridge University Press, 2003.
N.B. Students are advised not to buy the textbooks before lectures commence in case there are any changes.

RSEC 4132 **Environmental Economics**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. Dr Tihomir Ancev. **Session:** Semester 1. **Classes:** (2 lee & 1 tut)/wk. **Assumed Knowledge:** ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). **Prerequisites:** ECON 2001, AGEC 2103 or AGEC 2003. **Prohibitions:** ECON 3013. **Assessment:** One lhr midterm exam, an essay paper, one 2 hr end of semester exam.
NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RESC1031 or ENVI3013 with permission from the unit coordinator.
The unit provides theoretical and empirical background related to economic aspects of a range of environmental issues. The unit exemplifies the studied concepts with environmental problems related to agriculture (soil salinity, algal blooms, overgrazing etc.) as well as with environmental problems typical to Australia. The guiding economic themes are externalities, market failure, the importance of property rights, optimal allocation of pollution abatement, technical issues (e.g. measuring benefits without commodities [e.g. existence values]), and the processes for making choices relating to non-market goods. Some social issues related to environmental impacts are studied through exploration of the problems of population size and distribution, economic growth, and environmental regulation.
Textbooks
Dodo Thampapillai, Environmental Economics: Concepts, Methods and Policies, Oxford University Press, 2002.
Perman, R., Y. Ma, J. McGilvray and M. Common, Natural Resource and Environmental Economics. Pearson, 3rd Ed. 2003.
Charles D. Kolstad, Environmental Economics, Oxford University Press, 2000.
Tom Tietenberg, Environmental and Natural Resource Economics, 6th Edition, Addison-Wesley, 2003.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC 4133 **Economics of Mineral & Energy Industries**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Res Ec, UG Study Abroad Program. Dr Tihomir Ancev. **Session:** Semester 2. **Classes:** (2 lee & 1 tut)/wk. **Assumed Knowledge:** ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). **Prerequisites:** ECON 2001, AGEC 2103 or AGEC 2003. **Prohibitions:** ECON 3013. **Assessment:** One lhr midterm exam, an essay paper, one 2 hr end of semester exam.
NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.
The unit provides theoretical and empirical background in the economics of minerals exploration, extraction and marketing and in the economics of energy generation, distribution and use. The economics of the minerals and energy commodity markets will be discussed and analyzed. The interactions of mineral extraction and energy generation activities with other natural resources and the environment will be of particular interest (e.g. mine site remediation, land use conflicts). Sustainability and prospects for long term efficient use of these resources, as well as the development and use of alternative technologies will also be discussed. In addition, institutional and policy issues (e.g. regulatory reform), will be analyzed. The unit will discuss the main aspects of the markets for minerals and energy, market structure, business environment and price movements. The unit will also provide an introductory discussion on the markets for derivatives (options, futures, forward, swaps) on minerals and energy commodities.
Textbooks
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.

RSEC 4134 **Economics of Water & Bio-resources**

6 credit points. B Agr Ec, B Com, B Ec, B Ec Soc Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc Agr, UG Study Abroad Program. Dr. Tihomir Ancev. **Session:** Semester 2. **Classes:** (2 lee & 1 tut)/wk. **Assumed Knowledge:** ECON 2002, AGEC 3001, AGEC 2101 and (AGEC 2105 or AGEC 2005 or ECMT 2010 or ECMT 2110). **Prerequisites:** ECON 2001, AGEC 2103 or AGEC 2003. **Prohibitions:** ECON3013. **Assessment:** One lhr midterm exam, an essay paper, one 2 hr end of semester exam.
NB: Only available to 4th year students in the FAFNR. Available to 3rd year students in the FEB. Available to students that have completed RSEC 1031 or ENVI 3013 with permission from the unit coordinator.
The main objective of the economics of biological resources will be to introduce students to the bio-economic modeling of the resources that experience biological growth. The unit consists of two complementary parts: water economics and economics of biological resources (fisheries, forestry, other wildlife). The main objective of the water economic component is to investigate the economic aspects of water use and water quality. In particular approaches toward efficient use of the water resource over time, optimal allocation of water among competing uses and achievement of the socially optimal level of water quality will be discussed. The demand for water from various sectors will be analysed in both static and dynamic settings.

Issues considered include the selection and construction of water storages, aquifer water extraction and alternative water sources. The issues of waste water disposal and water quality, changing water technologies, and water pollution will be also discussed. The unit will also discuss the economics of wildlife preservation and protection, as well as the economics of biodiversity. Particular attention will be devoted to the economic mechanisms for managing the water resources including property rights, water allocation and water markets. The key policy instruments (taxes, quotas, standards) in these areas are analyzed and discussed. The institutional and policy aspects will also be considered through analysis of water policy reform in Australia and elsewhere.

Textbooks

Bergstrom, Boule and Poe (Eds.), The Economic Value of Water Quality, Edward Elgar Pub., 2001.
Easter, Rosegrant and Dinar (Eds.), Markets for Water: Potential and Performance, Kluwer Academic Pub., 1998.
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.

RSEC 4141 **Resource Economics Project A**

9 credit points. B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** (2 hr sem)/wk. **Prerequisites:** AGEC3104 or AGEC3004 or AGEC4041. **Corequisites:** RSEC4142. **Prohibitions:** AGEC4012; AGEC4112. **Assessment:** Research thesis; presentations.

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

Textbooks

Not applicable as this is a research unit.

RSEC 4142 **Resource Economics Project B**

9 credit points. B Res Ec, UG Study Abroad Program. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** (2 hr sem)/wk. **Prerequisites:** AGEC3104 or AGEC3004 or AGEC4041. **Corequisites: RSEC4141. Prohibitions:** AGEC4013; AGEC4113. **Assessment:** Research thesis; presentations.

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

Textbooks

Not applicable as this is a research unit.

SOIL 2003 **Soil Properties and Processes**

6 credit points. B Agr Ec, B An Vet Bio Sc, B Anim Sc, B Hort Sc, B L W Sc, B Res Ec, B Sc, B Sc (Environmental), B Sc Agr, UG Study Abroad Program. Dr Cattle, Prof McBratney, Dr Singh. **Session:** Semester 1. **Classes:** (3 lee & 3hr prac)/wk. **Assessment:** One 3hr theory exam, one 1hr prac exam, quizzes and prac book.

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

Textbooks

Reference books

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

SOIL 3004 **The Soil Resource**

6 credit points. B Anim Sc, B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Balwant Singh (Coordinator), Prof Alex McBratney, Dr Stephen Cattle. **Session:** Semester 2. **Classes:** (2 lectures and 2 hr prac)/wk. **Prerequisites:** SOIL2003 or GEOL1002 or GEOL2004 or GEOG1001 or ENVI2001. **Assessment:** Fieldtrip participation (5%), Soil mapping report (25%), Laboratory report (15%), Examination (55%).

The unit of study is designed to provide a detailed knowledge of the important features and problems of Australian soils. By the end of this unit of study, students will develop skills in describing and interpreting soil profile features in the field. They will become familiar with quantitative soil data handling procedures and be able do quantitative soil mapping; and measure common soil properties in the laboratory. They will also learn to work in a team environment and write a report on soil mapping and laboratory analysis.

The lecture topics include- Features, geography and management of Australian soils; Digital soil mapping - concepts and spatial prediction of soil classes; Soil quality, soil health and soil function - physical, biological and chemical indicators of soil sustainability; Soil structure: The elements of soil structure and methods of their assessment; The degradation and amelioration of soil structure and its effect on agriculture; Soil water erosion - detachment, entrapment, runoff and deposition; Soil acidification: effects of soil acidity in soils, forms of soil acidity, sources of soil acidity, buffering mechanisms in soils, soil pH and Al availability, extent of soil acidity in Australia and remediation of soil acidity; Soil salinity: causes, sources of salts, nature of soil salinity, salinity parameters in soil and water, effects of salinity on plant growth, management of soil salinity; Soil contamination: concepts/definitions, sources of contaminants, effects of contaminants, major contaminants in soil, remediation of contaminated soils.; soil carbon accounting.

Textbooks

A laboratory manual will made be available to the students.
Brady NC & Weil Rather Nature and Properties of Soils. 13th ed. (or any later edition) Prentice Hall, New Jersey, 2002
Isbell RF McDonald WS & Ashton LJ, Concepts and Rationale of the Australian Soil Classification. Australian Collaborative Land Evaluation Program, CSIRO Publishing, Canberra, 1997
White RE, Principles and Practice of Soil Science: the Soil as a Natural Resource. 3rd ed., Blackwell Science, Oxford, 1997
McKenzie N, Jacquier D, Isbell, R & Brown K, Australian Soils and Landscapes: An Illustrated Compendium. CSIRO publishing, Melbourne, 2004
A more comprehensive reading list will be provided in the laboratory manual

SOIL 3008 **Rural Spatial Information Systems**

6 credit points. B Agr Ec, B Hort Sc, B L W Sc, B Sc, B Sc (Environmental), B Sc Agr, UG Study Abroad Program. Dr Odeh. **Session:** Semester 2. **Classes:** 2 lee & 2hr prac/wk (wks 1-13), four-day field trip in AVCC common break. **Assessment:** One 2 hr exam, field excursion and lab prac reports, presentation and essay topic.

The lecture material will present several themes: i) Principles of Geographical Information Science (GISc): brief history of GISc, ontology and epistemology of spatial phenomena, basic Geographical Information Systems (GIS) structure, coordinate systems and map projections and datums; ii) Fundamentals of remote sensing and geo-image analysis; iii) Geospatial data sources and acquisition methods, including existing maps and their digitisation, remote sensing images, digital elevation models (DEM) and global positioning systems (GPSs); iv) Processing of geospatial data: spatial data in the computer, building and accessing an entity in the database and continuous fields, data analysis using entities and continuous fields for decision support, etc.; v) Spatial statistics: quality of spatial data, spatial analysis of geospatial data, geostatistics, introduction to spatial-temporal modelling. Software packages for geographical information systems will be reviewed.

Practical exercises will focus on applications to land-cover assessment, subcatchment and regional hydrology, and soil quality assessment for decisions regarding sustainable rural land use planning and management. Two of the 4 days of the mid-Semester field excursion will be spent in Canberra visiting various government agencies which research and maintain GIS coverages of major rural environments. The remaining fieldwork will be at University farms at Camden or Arthursleigh, and will involve training in the field use of low and high- resolution GPS for geo-rectification, for ground truthing satellite-derived land cover maps and for the creation of digital elevation models and landform attributes.

Textbooks

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

SOIL 4005 **Field and Laboratory Soil Physics**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Prof Alex McBratney. **Session:** Semester 1. **Classes:** (3 lee & 5hr prac)/6 wks (wksl-6), 5 days in the field (prior to beginning of February semester). **Prerequisites:** SOIL 3004. **Assessment:** One 2hr exam, field report in form of webpage, lab report, presentation.

The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area.

The emphasis is to examine the quantitative aspects of soil physics particularly in relation to the transfer of energy, gas, water, solids and solutes in soil. Lecture and lab topics include heat flow, gas

movement, soil water energetics, saturated and unsaturated flow of soil water, infiltration, solute movement, water and wind erosion as well as the electrical properties of soil and fundamentals of numerical computer modelling of soil physical processes.
Five days' field-work, in the week prior to the beginning of February Semester, involves field measurement of soil physical properties such as shear and compressive strength, electrical conductivity, temperature, evaporation, hydraulic conductivity and infiltration rates and moisture content.
Textbooks
Reference books
Hillel D. Environmental Soil Physics : Fundamentals, Applications, and Environmental Considerations. Academic Press, 1998
Jury WA & Horton R. Soil Physics. John Wiley, 2004
Warrick AW. Soil Water Dynamics. Oxford, 2003

SOIL 4006 **Field and Laboratory Pedology**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Stephen Cattle. **Session:** Semester 1. **Classes:** (3 lee, 5hr prac)/6 wks (wks8-13), 5 days in the field (prior to beginning of February semester). **Prerequisites:** SOIL 3004. **Assessment:** One 3hr exam, field report, lab report, presentation.
The main part of this unit of study is the pedological characterization of a number of contrasting soil profiles sampled during the pre-semester field trip. This 5 day field-trip begins 10 days before the beginning of the February semester and involves the study and sampling of soil through central and northern NSW. Students become acquainted with soil types in a variety of landscape, geologic, climatic and landuse settings and develop an understanding of the importance of different soil parent materials. Linkages are made between soil formation processes and resultant soil properties, and the role of soil in various environmental and agricultural ecosystems. Field skills acquired during this trip include a proficiency in soil profile description and an ability to classify soil type according to the Australian Soil Classification scheme. Laboratory analyses of soil samples collected during the field trip include particle-size analysis and extraction of fine-sand fraction for optical identification and quantification of the mineral species present. X-Ray diffraction is used to identify the clay minerals and elucidate mineralogical transformations in these samples. Scanning electron microscopy is also used to examine surface features and mineral composition. Thin sections of some typical NSW soil types are examined and the main features are identified and quantified. The data from these micromorphological investigations are used to provide an understanding of the pedogenesis of soil profiles in specific locations. The lecture series for this unit of study focuses on the main soil-forming (pedogenetic) processes operating both in Australia and abroad. Rock and soil mineral transformations and mechanisms for soil horizon development are addressed. Case studies and recent pedological research publications are used to highlight these topics. A detailed study, including exercises, is also made of two main international soil classification schemes, Soil Taxonomy and the World Reference Base for Soil Resources (WRB), and the Australian Soil Classification system.
Textbooks
Reference books
Buol S, Walker M, Southard R. Soil Genesis and Classification. Iowa State University. 2003
Isbell R. The Australian Soil Classification. CSIRO, 1996
Jenny H. Factors of Soil Formation: A System of Quantitative Pedology. Dover. 1994
McKenzie N, Jacquier D, Isbell R & Brown K. Australian Soils and Landscapes. CSIRO, 2004
Van Breeman, N & Buurman, P. Soil Formation. 2nd Edition. Kluwer Academic, 2002
Young A & Young R. Soils in the Australian Landscape. Oxford University Press, 2001.

SOIL 4007 **Environmental Soil Chemistry**

6 credit points. B Hort Sc, B L W Sc, B Sc Agr, UG Study Abroad Program. Dr Balwant Singh. **Session:** Semester 2. **Classes:** (2 lec,l tut & 3 hr prac)/wk(wksl-13). **Prerequisites:** SOIL 3004. **Assessment:** One 3hr exam, 4 lab reports and one oral presentation on a given topic.
The main objective of the unit is to develop an understanding of the common chemical properties and processes in soil environment. By the end of this unit of study, students will become familiar with soil chemical composition and develop skills in describing chemical processes in soil environment. They will be able to measure various chemical properties of soil and soil solution in the laboratory; and perform chemical speciation of ions in soil solution. Students will also learn to work in a team environment and develop communication and writing skills.
Syllabus summary: The lecture topics include- the structure and chemistry of inorganic components in soil, surface charge of soilminerals, chemistry and general properties of soil organic matter, important functional groups of soil organic matter, role of organic matter in soil, cation exchange in soil, selectivity of cations on soilcolloids, cation exchange reactions and selectivity coefficients, ad-sorption reactions of environmentally important ions, surface func-tional groups, adsorption isotherms, equilibrium based adsorptionmodels, point of zero charge, diffuse double layer-theory and models, surf ace complexation models, soil solution-importance, methods of obtaining soil solutions, models to determine activity coefficients, speciation, dissolution and solubility processes in soil environment, soil chemical equilibria, geochemical speciation models and redox chemistry of soil.
Textbooks
Evangelou VP, Environmental Soil and Water Chemistry: John Wiley & Sons, New York, 1998
Lindsay WL, Chemical Equilibria in Soils. John Wiley & Sons, New York, 1979
McBride MB, Environmental Chemistry of Soils. Oxford University Press, New York, 1994.
Sparks DL, Environmental Soil Chemistry. Second Edition, Academic Press, San Diego, 2003
Sposito G, The Chemistry of Soils. Oxford University Press, New York, 1989

VIRO 3001 **Virology**

6 credit points. B Hort Sc, B L W Sc, B Med Sc, B Sc, B Sc (Bioinformatics), B Sc (Environmental), B Sc (Molecular Biotechnology), B Sc (Nutrition), B Sc Agr, UG Study Abroad Program. Mrs Helen Agus. **Session:** Semester 1. **Classes:** 2hr lec/wk, 5 x 2hr tut & 6 x 4hr prac. **Assumed Knowledge:** MICR (2021 or 2921 or 2022 or 2922). **Prerequisites:** At least 6 credit points of MBLG units and at least 6 credit points in Intermediate MICR or BCHM or BIOL or IMMU or PCOL or PHSI or PLNT units. For BMedSc students: 42 credit points of Intermediate BMED units including BMED2802. For BScAgr students: PLNT (2001 or 2901) and MICR2024. **Prohibitions:** VIRO3901. **Assessment:** One 2hr exam, practical work, group presentations.
NB: Students are very strongly advised to complete VIRO (3001 or 3901) before enrolling in VIRO3002 Medical and Applied Virology in Session 2.
This unit of study is designed to introduce students who have a basic understanding of molecular biology to the field of virology. Through an examination of virus structure, genomes, replication and gene expression, viral infection in plant and animal cells is covered, progressing to examine host-virus interactions, pathogenesis, cell injury and prevention and control of infection in both eukaryotic and prokaryotic cells. Bacteriophage structure and infection of prokaryotic cells is also covered. The structure and replication of sub-viral agents: viroids and prions, and their role in disease and significance in the context of transmission via blood products are discussed. Detection of viral illness by serology and molecular techniques such as ELISA, Western blotting, PCR and sequencing will also be covered.
The hands-on practical component is designed to enhance students' practical skills and to complement the lecture series by introducing students to cell culture, cytopathic effect, serology and molecular detection techniques. Tutorials and case studies will cover specific themes and problems.
Textbooks
To be advised

Industrial Relations and Human Resource Management Units of Study

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

WORK 1003 **Foundations of Work and Employment**

6 credit points. B A, B Agr Ec, B Com, B E, B Ec, B Ec (Soc Sc), B Ec Soc Sc, UG Study Abroad Program. **Session:** Semester 1, Semester 2. **Classes:** Two lectures and one seminar per week. **Assessment:** May include one or more of the following: Mid-semester examination; Tutorial work/participation; Case study; Group/individual project; Presentation; Assignment; Report; Essay; Final examination.
NB: 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.

4. Postgraduate course requirements

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

The higher degrees in the Faculty of Agriculture, Food and Natural Resources are:

DAgrEc: Doctor of Agricultural Economics
DScAgr: Doctor of Science in Agriculture
PhD: Doctor of Philosophy
MAgrEc: Master of Agricultural Economics
MScAgr: Master of Science in Agriculture
MAgr: Master of Agriculture

The regulations governing the award of these degrees are printed in the Calendar and in this Handbook. Prospective candidates should consult with the Discipline Leader concerned before submitting an application for admission to candidature.

All candidates would normally begin in Semester 1 (near the end of February). In some cases candidates may be able to commence in Semester 2 (late July).
Teaching in postgraduate courses in the Faculty develops skills and graduate attributes. A Statement of Generic Graduate Attributes can be found in this Handbook at Section 7 (Other Faculty information).

The following statements summarise part only of the regulations governing the award of these degrees.

Doctor of Agricultural Economics and Doctor of Science in Agriculture

The degrees of Doctor of Agricultural Economics and Doctor of Science in Agriculture shall not be conferred until the candidate is a graduate of eight years' standing from the degree which qualified him or her for candidature. The degree may be awarded for published work which, in the opinion of the examiners, has been generally recognised by scholars in the field concerned as a distinguished contribution to knowledge.

Doctor of Philosophy

The degree of Doctor of Philosophy is a research degree awarded for a thesis considered to be a substantially original contribution to the subject concerned. Some coursework may be required (mainly in the form of seminars) but in no case is it a major component.

Applicants should normally hold a master's degree or a bachelor's degree with first or high second class honours of the University of Sydney, or an equivalent qualification from another university or institution.

The degree may be taken on either a full-time or part-time basis.

In the case of full-time candidates, the minimum period of candidature is two years for candidates holding a master's degree or equivalent, or three years in the case of candidates holding a bachelor's degree with first class or second class honours; the maximum period of candidature is normally four years. The first 12 months of candidature is normally on probation.

Part-time candidature may be approved for applicants who can demonstrate that they are engaged in an occupation or other activity which leaves them substantially free to pursue their candidature for the degree. They should be able to devote at least 20 hours per week to candidature including at least one day per week during each year of candidature or an equivalent annual period made up in blocks. Normally the minimum period of candidature will be determined on the recommendation of the Faculty but in any case will not be less than three years; the maximum period of candidature is normally eight years.

Master of Agricultural Economics and Master of Science in Agriculture

Graduates of the University of Sydney who have completed units of study acceptable to the Faculty of Agriculture, Food and Natural Resources or persons who, in the opinion of the Faculty, have qualifications equivalent to those required of a graduate of the University of Sydney, may apply for admission as candidates for the degree of master.

Candidates engage in research culminating in a thesis for two to three years full-time or pro rata part-time. Some honours graduates (or equivalent) may be eligible for a minimum candidature of one year full-time. A candidate may be required to serve a period of probation for not more than one year and to complete such work during the period as may be prescribed.

Master of Agriculture and Graduate Diplomas

Postgraduate studies are available towards a Graduate Diploma in Agricultural Economics, a Graduate Diploma in Agricultural Science or a Master of Agriculture.

Admission requirements
Admission requirements for the graduate diplomas and master's are normally a bachelor's degree in an appropriate discipline or an equivalent qualification supported by the completion of studies viewed as relevant by the Faculty. In some cases relevant experience may be required. In some instances the admission requirements for a graduate certificate, graduate diploma or master's may be met by appropriate work experience or other forms of evidence of general or professional qualifications and experience, which satisfies the Faculty that the applicant possesses the academic preparation and capacity to complete the course in question.

With the approval of the Dean, students may be granted admission with advanced standing if they have completed relevant prior learning at an equivalent level elsewhere.

Students may transfer between programs and receive credit for any completed units, provided they have not taken out the award from which they are transferring.

The Graduate Diploma of Agricultural Economics, the Graduate Diploma of Agricultural Science and the Master of Agriculture testamur shall specify the subject area of study: Agribusiness; Agricultural Economics; Agricultural Technologies; Natural Resource Management; Resource Economics; Sustainable Agriculture; Turf Management.

To achieve the objectives of the courses, especially for students seeking training in a new discipline, some classes may be taught in conjunction with advanced undergraduate units. However, postgraduate coursework students will engage in additional consultation and more advanced assignment work than their undergraduate counterparts.

They will also be assessed against a higher standard. Some students may need to acquire basic knowledge and skills in subject areas before they are able to undertake postgraduate coursework. A postgraduate studies preparation program of one semester is offered by the Faculty for such students.

In this program, students may select any of the Faculty's undergraduate units, subject to timetabling.

Graduate Diploma of Agriculture

Candidates complete a total of 36 credit points made up of core units as specified in Table A for the respective program, and the balance from elective units chosen from any other units listed in Table C (subject to meeting prior learning requirements and timetabling); students may also chose, with the Dean's approval, one appropriate 6 credit point unit offered from outside the Faculty. Students who have completed relevant prior learning at an equivalent level elsewhere may be given up to 12 credit points advanced standing with the approval of the Dean.

Table A

Program	Core units
Agribusiness	At least three of AGEC5301, AGEC5401, AGEC5403, AGEC5404
Agricultural Economics	At least three AGEC54XX units
Agricultural Technologies	At least three AFNR51XX, AFNR52XX, AFNR53XX, AFNR55XX units
Natural Resource Management	At least three of RSEC5431, RSEC5432, AFNR5501, AFNR5502, AFNR5503, AFNR5504, AFNR5505, AFNR5506, AFNR5507
Resource Economics	At least three of RSEC5431, RSEC5432, RSEC5433, RSEC5434
Sustainable Agriculture	At least three of RSEC5431, RSEC5432, AFNR5201, AFNR5202, AFNR5203, AFNR5204, AFNR5205, AFNR5206, AFNR5207, AFNR5208
Turf Management	At least three AFNR56XX units

Master of Agriculture

Candidates complete a total of 48 credit points made up of core units as specified in Table B for the respective program, and the balance from elective units chosen from any other units listed in Table C (subject to meeting prior learning requirements and timetabling); students may also chose, with the Dean's approval, two appropriate 6 credit point units offered from outside the Faculty. Students who have completed relevant prior learning at an equivalent level elsewhere may be given up to 12 credit points advanced standing with the approval of the Dean.

Table B

Program	Core units
Agribusiness	AGEC5301, AGEC5401, AGEC5403, AGEC5404
Agricultural Economics	At least four AGEC54XX units
Agricultural Technologies	At least four AFNR51XX, AFNR52XX, AFNR53XX, AFNR55XX units
Natural Resource Management	At least four of RSEC5431, RSEC5432, AFNR5501, AFNR5502, AFNR5503, AFNR5504, AFNR5505, AFNR5506, AFNR5507
Resource Economics	RSEC5431, RSEC5432, RSEC5433, RSEC5434
Sustainable Agriculture	At least four of RSEC5431, RSEC5432, AFNR5201, AFNR5202, AFNR5203, AFNR5204, AFNR5205, AFNR5206, AFNR5207, AFNR5208
Turf Management	All four AFNR56XX units

Table C

Code	Unit	Semester
AFNR5003	Biometry	1
AFNR5101	Plant Agricultural Biotechnology	2
AFNR5102	Food Science A	1
AFNR5103	Food Science B	1
AFNR5104	Environmental Chemistry A	1
AFNR5105	Environmental Chemistry B	2
AFNR5106	Food Science C	2
AFNR5107	Analytical Chemistry A	1
AFNR5108	Plant Cytogenetics	2
AFNR5109	Plant Breeding	1
AFNR5201	Crop Agronomy	1
AFNR5202	Professional Practice in Agronomy	1
AFNR5203	Sustainable Grazing Systems	2
AFNR5204	Crop Water Management	2
AFNR5205	Production Horticulture	1
AFNR5206	Postharvest Biology and Technology	1
AFNR5207	Issues in Horticultural Science	1
AFNR5208	Research and Practice in Horticultural Science	2
AFNR5209	Sustainable Cropping Systems	1
AFNR5301	Plant Disease	2
AFNR5302	Molecular & Physiological Plant Path	1
AFNR5303	Adv Mycology & Diagnostic Plant Path	1
AFNR5304	Soil Biology and Biodiversity	1
AFNR5305	Applied Entomology (Crops)	1
AFNR5306	Insect Taxonomy	1
AFNR5501	The Soil Resource	2
AFNR5502	Rural Spatial Information Systems	2
AFNR5503	Field and Laboratory Soil Physics	1
AFNR5504	Field and Laboratory Pedology	1
AFNR5505	Environmental Soil Chemistry	2
AFNR5506	Limnology and Water Quality	1
AFNR5507	Catchment Hydrology and Management	1
AFNR5601	Turf Management	1
AFNR5602	Advanced Turf Management	2
AFNR5603	Turf Species and Varieties	1
AFNR5604	Diagnostic Methods in Turf Management	1
AFNR5605	Applied Plant Ecology	2
AFNR5901*	Research Review	1 or 2
AFNR5902*	Research Study (12 credit points)	1 or 2
AFNR5903*	Research Project (24 credit points)	1 or 2
AGEC5300**	Business Topics in Amenity Horticulture	1
AGEC5301	Agribusiness Management	1
AGEC5302	Agricultural and Resource Policy	2
AGEC5303	Applied Optimisation	1
AGEC5304	Research Methods	1
AGEC5401	Agricultural Marketing Analysis	2
AGEC5402	Agricultural Development Economics	2
AGEC5403	International Agricultural Trade	1
AGEC5404	Agribusiness Analysis	1
AGEC5405	Quantitative Planning Methods	1
AGEC5406	Agricultural Finance and Risk	2
AGEC5407	Professional Skills (3 credit points)	1
AGEC5408	Contemporary Issues (3 credit points)	2
RSEC5431	Benefit-Cost Analysis	1

RSEC5432	Environmental Economics	1
RSEC5433	Economics of Mineral & Energy Industries	2
RSEC5434	Economics of Water and Bio-resources	2

* AFNR5901, AFNR5902 and AFNR5903 are mutually exclusive
** AGEC5300 is not available in the Agribusiness, Agricultural Economics or Resource Economics streams

5. Advanced units of study

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Units of Advanced Study

AFNR 5003 **Biometry**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Mick O'Neill. **Session:** Semester 1. **Classes:** 5 hrs workshops/wk; individual consultation & research 1 hr/wk. **Assumed Knowledge:** BIOM 2001 or equivalent. **Assessment:** Reports (25%), Assignment (20%), Presentation (5%), Examination (50%). All open book.
This unit is an elective available to students enrolled in either the GradCertAgr, GradDipAgr or MAgr degrees. It is designed for students who are interested in research and is intended to further develop your skills in experimental design and statistical modeling. It builds on the topics introduced in the undergraduate unit Biometry 2, and aims to give students sufficient skills and confidence to complete the analysis of their own research data. As such it is particularly useful for MAgr students completing the Research Project, AFNR5903. We start by learning how to determine the number of replicates to use in an experiment. We revise multiple regression and extend the linear model to a time series system. We then examine how normally distributed data from designed experiments can be analysed in a general linear model framework, and hence how to cope with missing or incomplete data. The difference between maximum likelihood and residual maximum likelihood (REML) is studied for a single sample. A REML analysis is obtained for complete and incomplete factorial designs; for fixed, random and mixed models; for data collected from repeated observations on the same experimental unit. Next, we consider various techniques for the analysis of non-normal data, specifically: logistic regression for binary and proportion data; Poisson regression for count data; log-linear modelling for multi-way contingency tables; ordinal and nominal logistic regression for scores & ratings. The assignment is to design and analyse data from either an undergraduate 4th year or postgraduate coursework student research project.
Textbooks
Clewer, A.G. and Scarisbrick, D.H. (2001). Practical Statistics and Experimental Design for Plant and Crop Science. West Sussex: John Wiley & Sons.
Dytham, C. (2003). Choosing and Using Statistics: A Biologist's Guide. Oxford: Blackwell.
Mead, R., Curnow, R.N. and Hasted, A.M. (2003). Statistical Methods in Agriculture and Experimental Biology, 3rd ed. Boca Raton: Chapman & Hall/CRC.

AFNR 5101 **Plant Agricultural Biotechnology**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Peter Sharp, Dr Neil Howes. **Session:** Semester 2. **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars). **Prohibitions:** GENE 4013. **Assessment:** 3hr exam, reports, assignment.
Lectures and other work covering the structure and function of plant genomes and genes, the technology and results of DNA transformation and the analysis of plant traits by molecular techniques including by genetic mapping using molecular and other genetic markers.

AFNR 5102 **Food Science A**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robert Caldwell, (Coordinator) Dr Meredith Wilkes, A/Professor Neil Howes, Professor Les Copeland. **Session:** Semester 1. **Classes:** 24 hrs of lectures and 36 hrs of laboratory during the semester. **Prohibitions:** AGCH 3025. **Assessment:** One 2hr exam, laboratory reports, assignment, theory of laboratory test.
This unit of study aims to give students an understanding of the constituents of foods and fibres.
The lecture topics cover:
o the chemistry, biochemistry and processing behaviour of major food constituents - oligosaccharides, polysaccharides, lipids and proteins
o the relationship between molecular structure of constituents and their functionality in foods
o anti-nutritional and toxic constituents of plants and foods
o chemistry of dietary fibre
o wheat flour doughs and protein chemistry during baking and cooking
o foams and emulsions, thickening agents
o enzymes in foods and food processing
The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include:
o analysis of carbohydrates including starch,
o wheat flour swelling volume and the RVA
o analysis of edible oils
o spectroscopic and enzymic methods

AFNR 5103 **Food Science B**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robert Caldwell, (Coordinator) Dr Meredith Wilkes, A/Professor Neil Howes, Professor Les Copeland. **Session:** Semester 1. **Classes:** 18 hrs of lectures and 25 hrs of laboratory during the semester. **Prohibitions:** AGCH 3026. **Assessment:** Essays, laboratory reports, poster and oral presentation; theory of laboratory test.
This unit of study aims to give students an understanding of global food systems and global food security. In the lecture/seminar/workshop component topics covered will include the sustainable production of major food crops; the role of genetically modified crops in food sustainability and quality; principles and methods in food quality control and assessment; chemical and biochemical aspects of food quality in relation to food processing and nutritional values. The laboratory exercises aim to give students an understanding of the methods used in the analysis of foods and other biological materials, and will include:
o analysis and examination of protein functionality in foods,
o spectroscopic, enzymic, and chromatographic methods

AFNR 5104 **Environmental Chemistry A**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Ivan Kennedy (Coordinator), Dr Robert Caldwell, Professor Les Copeland. **Session:** Semester 1. **Classes:** 18 hrs of lectures/tutorials and 18 hrs of laboratory during the semester, 6 day field trip. **Prohibitions:** AGCH 3030. **Assessment:** One 2hr exam, field trip reports, laboratory reports and special exercises.
This unit commences with a field trip to the Namoi and the Macquarie Valleys, where agriculture largely based on irrigation has developed. Environmental impacts on soil and water of agricultural enterprises such as cotton farming and human settlement will be assessed. Field observations on pH, nutrient and salt content, pesticide and heavy metal content will be made on water, sediment, soils and in constructed wetlands, with samples returned for more detailed laboratory analysis at the University. Lectures will complement the field trip, including topics such as environmental chemistry of heavy metals, their effects on organisms, 2; mechanisms of tolerance and phytoremediation, 2; risk assessment of pesticides including herbicides, their mode of action and environmental fate, 4; analysis and monitoring of pesticide residues by GC, GC-MS and immunoassay (ELISA), 3; maximum residue limits (MRLs) and residue surveys, 2; remediation of pesticides in ecosystems, 2; design of new pesticides and means of pest control, 3. Laboratory sessions will be related to these lecture topics, including six sessions on atomic absorption analysis for nutrients and heavy metals, mercury analysis, pesticide analysis by GLC, GC-MS, HPLC and ELISA.

AFNR 5105 **Environmental Chemistry B**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Ivan Kennedy (Coordinator), Dr Robert Caldwell, Professor Les Copeland. **Session:** Semester 2. **Classes:** 5-day field trip in AVCC common break; 18 hr lectures/tutorials; 24 hr laboratory classes and project during semester. **Prohibitions:** AGCH 3031. **Assessment:** One 2 hr exam, field trip report and presentation, prac and project reports.
This is a field-oriented unit in the environmental chemistry relevant to global warming/climate change to (i) provide students with an understanding of chemical and biochemical processes in rural ecosystems and their sustainability, using case studies of causes and possible remedies for environmental impacts (ii) to undertake a field trip to illustrate case studies related to climate change, including work at research centres and field sites in eastern Australia (Canberra, Snowy Mountains, and the Murray and Murrumbidgee catchments) (iii) laboratory sessions and one group research project selected to study such a problem and to recommend solutions in a professional setting. This unit of study will focus on chemical and biological factors involved in the generation of the enhanced greenhouse effect and its impact on rural ecosystems. Practical solutions will be sought by students, based on a field theory relating the generation of molecular and biological action in ecosystems to the dissipation of solar energy to outer space. Lectures will include the environmental car-

bon cycle, nitrogen and sulphur cycles, covering bioenergetics and production of greenhouse gases; detailed pH and charge balancing on nutrient uptake; acidification of ecosystems and effects on plants and animals; remediation and control of greenhouse emissions; remediation of acidification and salinisation in rural environments. The laboratory sessions and the group project will illustrate these environmental processes, including measurement of greenhouse gas production, NOx, photosynthesis and nitrogen fixation, monitoring of endocrine-disrupting compounds using GLC, HPLC and ELIS A.

AFNR 5106 **Food Science C**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robert Caldwell, (Coordinator) Dr Meredith Wilkes, Professor Les Copeland. **Session:** Semester 2. **Classes:** 24 hrs of lectures and 36 hrs of laboratory during the semester. **Prohibitions:** AGCH 4006. **Assessment:** One 2-hr exam, laboratory reports, major assignment.

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

AFNR 5107 **Analytical Chemistry A**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robert Caldwell, (Coordinator). **Session:** Semester 1. **Classes:** 22 hrs of lectures and 32 hrs of laboratory during the semester. **Prohibitions:** AGCH 4007. **Assessment:** One 2-hr exam (30%), laboratory reports (30%), major assignment (40%).

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

AFNR 5108 **Plant Cytogenetics**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Norm Darvey. **Session:** Semester 2. **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars). **Prohibitions:** GENE 4011. **Assessment:** 3hr exam, reports, assignment.

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

AFNR 5109 **Plant Breeding**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Norm Darvey. **Session:** Semester 1. **Classes:** 24hrs lectures and 36 hours of other work (practicals, computer database examination, seminars). **Prohibitions:** GENE 4012. **Assessment:** 3hr exam, reports, assignment.

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

AFNR 5201 **Crop Agronomy**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Lindsay Campbell. **Session:** Semester 1. **Classes:** Block intensives/workshops, excursion. **Assumed Knowledge:** (AGRO3001 Agronomy 3 or AGRO3002 Agronomy 3) and (PLNT2003 Plant Form and Function or PLNT2903 Plant Form and Function (Advanced)). **Assessment:** Report, oral presentations and exam.

This unit examines agronomy as the discipline that underpins agricultural production. Two industries are studied to gain appreciation of the main agronomic principles of crop production. Most principles can be applied to dryland crops even though the emphasis in this unit is on irrigated crops. As a case study, the cotton industry is examined in detail to understand the end-user and social demands on agricultural production, the technical issues that challenge the farmer and the diversity of other specialist information from relevant disciplines such as entomology, pathology and soil science that must be integrated into the farming system. Likewise the rice industry provides a contrasting farming system as another case study. The unit includes a one-week excursion to cotton growing areas in northern NSW, specialist intensive instruction provided by the Cotton CRC and a series of workshops) tutorials that provides analysis and synthesis of the major farming systems in this industry.

AFNR 5202 **Professional Practice in Agronomy**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Lindsay Campbell. **Session:** Semester 1. **Classes:** Pracs, workshops as advised, field work. **Assumed Knowledge:** Equivalent of BIOM2001 Biometry 2 and (AGRO3001 Agronomy 3 or AGRO3002 Agronomy 3). Students should have a grasp of experimental design and analysis. **Assessment:** Reports.

This unit provides training in the professional skills specific to the practice of agronomy. Students will design and execute field experiments for a sustainable agricultural system. A challenge is to undertake experiments within the field constraints eg soil, previous cropping history etc. Several case studies involving client-driven experimental or R&D projects both in the field and laboratory will be used to illuminate sound professional practice, including budget management, in field and laboratory experimental design and methodology, data acquisition and assimilation and compilation of professional reports. Assessment will be based on professional involvement in the case studies and on the final reports. Students participate in a long-term experiment that involves planning, decision making and management of a farming system.

AFNR 5203 **Sustainable Grazing Systems**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Bruce Sutton, Dr Campbell. **Session:** Semester 2. **Classes:** (2 t/w, 2hr prac)/wk, excursion. **Assumed Knowledge:** PLNT 2003 or PLNT 2903. **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%).

This unit of study provides a scientific understanding and practical working knowledge of sustainable grazing systems in both dryland and intensively managed and irrigated pastoral systems. Understanding the demands of herbivores and of the soil-plant-rhizospherre ecosystem and of the grazier will be used as the basis of developing scientific principles of sustainable grazing management in different socio-economic and environmental conditions. The specific attributes of typical pastoral species for diverse environments will be examined. Postgraduate students will be expected to understand the details of the scientific concepts that underpin this unit at a greater depth than undergraduates pursuing AGRO 4005 and should be able to reflect this in a more sophisticated and richer and hence significantly longer consultancy report and a demonstration of greater grasp of knowledge in the examination.

AFNR 5204 **Crop Water Management**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Bruce Sutton. **Session:** Semester 2. **Classes:** (3 t/w, 2hr prac)/wk. **Assumed Knowledge:** PLNT 2003 or PLNT 2903. **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%).

This unit of study provides a scientific understanding and practical working knowledge of water management in dryland and irrigated agricultural systems, with most of the emphasis at the field scale. The first section of the unit examines the mechanisms underlying a crop water balance, its calculation and measurement and management options for using rainfall as effectively as possible. The second section examines the major forms of irrigation, the scientific principles involved in each, their benefits and shortcomings and management to maximize water use efficiency. The practical classes will develop key skills appropriate to irrigation system management and use of current decision support systems. Postgraduate students will be expected to understand the details of the scientific concepts that underpin this unit at a greater depth than undergraduates pursuing AGRO 4005 and should be able to reflect this in a more sophisticated and richer and hence significantly longer consultancy report and a demonstration of greater grasp of knowledge in the examination.

Textbooks

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

AFNR 5205 **Production Horticulture**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Jenny Jobling. **Session:** Semester 1. **Classes:** (2 lee, 4 hr prac)/wk or a field trip. **Assumed Knowledge:** HORT 1001, HORT 1002, HORT 2002 or equivalent. **Assessment:** 3hr exam (55%), Assignments x 3 (45%).

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

AFNR 5206 **Postharvest Biology and Technology**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robyn McConchie. **Session:** Semester 1. **Classes:** 2 lee & 4 prac/wk. **Assumed Knowledge:** HORT 1001, HORT 1002, HORT 2002. **Assessment:** Exam 2 hr (60%), Laboratory Reports (25%), Assignment (10%), Seminar (5%).
The unit develops understanding and skills relevant to the maintenance of quality during the harvesting, handling, storage and marketing of fresh plants and plant parts. The subject integrates the postharvest physiology of products that are handled or marketed in a living state, with the technological and economic challenges associated with delivering them from the field to the consumer. Supply chain analysis of crops will be examined via case study examples, drawn from fruits, vegetables, cut flowers, nursery and foliage crops, turf and edible fungi. Students will study all operations from harvesting to consumer evaluation.
Textbooks
Wills, R., McGlasson, B., Graham, D. and Joyce, D. "Postharvest: An Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals." UNSW Press 4th Edition

AFNR 5207 **Issues in Horticultural Science**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Robyn McConchie. **Session:** Semester 1. **Classes:** 2 lectures per week for 13 weeks & 6 prac per 13 weeks. **Assumed Knowledge:** HORT 3004 or equivalent. **Assessment:** Exam (2 hr) (25%), Plant ID Practical Quizzes (15%), Consulting Report (45%), Seminar Presentation (15%).
Students attend a series of discussion workshops on minimising the environmental impact of horticultural enterprises. It introduces students to current themes and thinking in sustainable practices in horticultural science, covering issues such as efficient water management, sustainable use of fertilizers, salinity, heavy metal pollution, disposal of plastics, integrated pest management and organic practices. Students also undertake an industry based case study analysis of a horticultural supply chain, designed to provide them with skills in data analysis and interpretation, problem identification and problem solving. In addition, students will add to their general knowledge of important horticultural plants and their uses through plant identification workshops.

AFNR 5208 **Research and Practice in Hort Science**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor David Guest. **Session:** Semester 2. **Classes:** 2 lec/wk for 6 weeks, 6 x 3 hour practical classes and a 5-day excursion. **Assumed Knowledge:** HORT 4004, HORT 4005 or equivalent. **Assessment:** Critical essay and presentation 40%, Journal presentation 10%, Plant ID Quizzes 20%, Plant ID Exam 30%.
This unit introduces students to current themes and thinking in horticultural science research and practice. Through prescribed readings, seminar attendance presentations, discussion workshops, excursions and practicals, students will integrate the knowledge they have acquired during their undergraduate course, and develop critical analysis skills essential for a professional career in horticultural science research and management. Emphasis will be placed on identifying sustainable horticultural practices that meet the environmental, human and financial challenges facing horticulture. Issues to be covered include sustainable water and soil management, organic horticulture, the impact of methyl bromide withdrawal, biosecurity, biotechnology, agroforestry, intellectual property, WTO and trade, urban horticulture and quality of life, horticulture and human nutrition, food safety, supply chain analysis.

AFNR 5209 **Sustainable Cropping Systems**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Bruce Sutton, Dr Daniel Tan, Dr Brett Whelan. **Session:** Semester 1. **Classes:** (3 t/w, 2hr prac)/wk. **Assumed Knowledge:** PLNT 2003 or PLNT 2903 or equivalent. **Assessment:** One 2 hr exam (45%), consultancy report (45%), practical reports (10%).
Agronomy studies the practices and underlying concepts of sustainable crop and pasture production. The scientific basis of modern practices used in crop production, particularly those relevant to New South Wales, is explored. This knowledge is used to appreciate the scale of future problems such as climate change, soil degradation and increased costs of petrochemical-based inputs like fuel and fertilizer. Possible responses to these problems that will help maintain productivity will be examined. The relationship between agricultural production and natural resource management is also considered as part of a modern production environment, with the impact of recent legislation supporting Ecologically Sustainable Development on agriculture and the agricultural response to it as the focus of discussion. The practical classes will develop key skills appropriate to precision agriculture and use of current decision support systems. Postgraduate students will be expected to understand the details of the scientific concepts that underpin this unit at a greater depth than undergraduates pursuing AGRO 4005 and should be able to reflect this in a more sophisticated and richer and hence significantly longer consultancy report and a demonstration of greater grasp of knowledge in the examination.

AFNR 5301 **Plant Disease**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee, 3 labs)/wk. **Assumed Knowledge:** MICR 2024 or equivalent. **Assessment:** Weekly quiz (15%), Group research project (30%), Assignment (20%) two hour written exam at the end of semester (35%).
This unit introduces fungi and other microbes as causes of plant disease that limit agricultural and horticultural production. The practical component introduces techniques used in handling and identifying fungi, and in studying plant disease. Emphasis is placed on the design of experiments and interpretation of experimental data. Topics include symptoms and diagnosis of plant disease; the biology, epidemiology and management of fungi and other microbes that cause plant disease; breeding for disease resistance; plant-parasite relationships; and disease resistance in plants.

AFNR 5302 **Molecular and Physiological Plant Path**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Coordinators: Professor Lester Burgess, Dr Edward Liew. Other teaching staff: Professor David Guest, Dr Jillian Smith-White, Dr Robyn McConchie, Dr Kerrie McDonald. **Session:** Semester 1. **Classes:** 34 hr lectures/tutorials, 20 hr laboratory. **Assumed Knowledge:** PPAT 3002 or equivalent. **Assessment:** One 2 hr theory exam and 3 assignments.
This course focuses on various aspects of plant pathology and mycology involving cellular biology and molecular technologies. Students are introduced to fundamental concepts in molecular techniques in plant pathology, plant-pathogen interactions, pathogen populations, molecular diagnostics and molecular phylogenetics. The practical classes cover basic molecular techniques commonly used in studying plant pathogens and complement the theoretical and conceptual understanding of some of the lecture topics.
Textbooks
Agrios G.N. 1997. Plant Pathology (4th ed.). Academic Press, London.
Brown JF & Ogle HJ. 1997. Plant Pathogens and Plant Diseases. Rockvale Publications. Chapters 16 & 17
Forey PL., Humphries, C.J., Kitching, I.L., Scotland, R.W., Siebert, D.J. and Williams, D.M. 1992. Cladistics: A Practical Course in Systematics. Clarendon Press, Oxford.
Hoelzel, AR & Dover, GA. 1991. Molecular Genetic Ecology. IRL Press, Oxford.
Lewin, B. 1997. Genes VI. Oxford University Press, Oxford. (Or later editions)
McDonald, BA. 1997. The Population Genetics of Fungi: tools and techniques. Phytopathology 87:448-453
Taylor, J.W. Jacobson, D.J. Kroken, S. Kasuga, T. Geiser, D.M. Hibbett, D.S. Fisher, M.C. 2000. Phylogenetic species recognition and species concepts in fungi. Fungal Genetics & Biology: 31:21-32

AFNR 5303 **Adv Mycology and Diagnostic Plant Path**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Coordinator: Professor Lester Burgess. Other teaching staff: Dr Edward Liew, Dr Brett Summerell, Professor David Guest, Dr Peter McGee, Mr Len Tesoriero. **Session:** Semester 1. **Classes:** (2 lecture/tutorial, 3 labs, 1 seminar)/wk. **Assumed Knowledge:** PPAT 3002 or equivalent. **Assessment:** One 2hr theory exam, lab and fieldwork reports, two essay assignments.
Mycology Module - includes lectures, tutorials and seminars in taxonomic mycology, fungal biology and sexual compatibility studies. Students learn to use morphological keys for identification and their limitations.
Diagnostic Plant Pathology Module - this module is concerned with the diagnosis of plant disease in crops and natural ecosystems. It will include at least one excursion as well as laboratory classes.
Both modules run in parallel and involve integrated programs.
Textbooks
Kendrick, B. (2001). The Fifth Kingdom. www.mycolog.com.MycologuePublication, Ontario 3rd Edition.
Carlile, M.J. et al. (2001). The Fungi (2nd Ed) Academic Press.

AFNR 5304 **Soil Biology and Biodiversity**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Coordinator: Professor Lester Burgess. Other teaching staff: Dr Edward Liew, Professor David Guest, Adj Professor Brett Summerell, Dr Peter McGee, Dr Nerida Donovan, Mr Len Tesoriero, Dr Jillian Smith-White. **Session:** Semester 1. **Classes:** 26 lectures/tutorials, 30 hr of labs, 9 hr of fieldwork. **Assumed Knowledge:** PPAT 3002 or equivalent. Soil Physics and Chemistry; Agronomy; Microbial diversity in Plants and Soil; Basic understanding of the nature and cause of plant disease. **Assessment:** One 2 hr theory exam, lab and field reports, essay assignment and oral presentation.
An introduction to the diversity of organisms found in the soil, and the ecological principles governing their activities and interactions. Practical applications are illustrated with particular reference to soilborne plant diseases. Topics covered include the nature of the soil biota; isolation, identification and quantification of soil organisms; pathogenic and mutualistic interactions between fungi and roots; mycorrhizae; food webs and soil health; the nature and control of soilborne plant diseases; effects of water potential and temperature on the activity and survival of soil fungi; temporal and spatial distribution of soil fungi and soilborne diseases; and the soil biology of conservation farming. Practical classes demonstrate important concepts as well as techniques for working with soil organisms and

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

AFNR 5305 **Applied Entomology (Crops)**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Lester Burgess. **Session:** Semester 1. **Classes:** 12 Lectures and approx. 50 hr of independent field work. **Assumed Knowledge:** ENTO 2001 or equivalent. **Assessment:** One 2 hr theory exam, project, practical examination/insect identification and insect collection.
This unit recognises the need for graduates to be able to recognize pests in the field, the damage they cause and to be able to develop a strategy of management. The topic is addressed by both insect and crop centered investigation. The unit consists of formal lectures, tutorials and a farm-based project. The student may also be required to make a small insect collection.

AFNR 5306 **Insect Taxonomy**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Lester Burgess. **Session:** Semester 1. **Classes:** 12 Lectures and approx. 50 hrs of independent museum practice. **Assumed Knowledge:** ENTO 2001 or equivalent. **Assessment:** One 2 hr theory exam, project, practical examination/insect identification and insect collection.
This unit emphasizes the importance of identification and nomenclature that underpins applied entomology, quarantine, ecology and biodiversity studies. The second half of the course covers methodologies of modern classification that uses specialist computer programs. The unit consists of formal lectures, tutorials and a museum-based project. The student will also be required to make a small insect collection.

AFNR 5501 **The Soil Resource**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Balwant Singh (Coordinator), Professor Alex McBratney, Dr Stephen Cattle. **Session:** Semester 2. **Classes:** (2 lee, 2 hr prac)/wk. **Assessment:** Fieldtrip participation (5%), Soil mapping report (25%), Laboratory report (15%), Essay (10%), Examination (45%).
The unit of study is designed to provide a detailed knowledge of the important features and problems of Australian soils. By the end of this unit of study, students will develop skills in describing and interpreting soil profile features in the field. They will become familiar with quantitative soil data handling procedures and be able do quantitative soil mapping; and measure common soil properties in the laboratory. They will also learn to work in a team environment and write a report on soil mapping and laboratory analysis.
The lecture topics include- Features, geography and management of Australian soils; Digital soil mapping - concepts and spatial prediction of soil classes; Soil quality, soil health and soil function - physical, biological and chemical indicators of soil sustainability; Soil structure: The elements of soil structure and methods of their assessment; The degradation and amelioration of soil structure and its effect on agriculture; Soil water erosion - detachment, entrapment, runoff and deposition; Soil acidification: effects of soil acidity in soils, forms of soil acidity, sources of soil acidity, buffering mechanisms in soils, soil pH and Al availability, extent of soil acidity in Australia and remediation of soil acidity; Soil salinity: causes, sources of salts, nature of soil salinity, salinity parameters in soil and water, effects of salinity on plant growth, management of soil salinity; Soil contamination: concepts/definitions, sources of contaminants, effects of contaminants, major contaminants in soil, remediation of contaminated soils.; soil carbon accounting.

AFNR 5502 **Rural Spatial Information Systems**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Inakwu Odeh (Coordinator), Dr James Taylor, Dr Raphael Viscarra Rossel, Professor Alex McBratney. **Session:** Semester 2. **Classes:** (2 lee, 2hr prac)/wk (wks 1-13), one and half day field-trip prior to beginning of Semester 2, four-day field trip in AVCC common break. **Assessment:** One 2 hr exam, field excursion and lab prac reports, presentation and essay topic, second essay topic.
This unit explores the application of Geographic information Systems (GIS) to rural environments. The lecture material will present several themes: i) Principles of Geographical Information Science (GISc): brief history of GISc, ontology and epistemology of spatial phenomena, basic Geographical Information Systems (GIS) structure, coordinate systems and map projections and datums; ii) Fundamentals of remote sensing and geo-image analysis; hi) Geospatial data sources and acquisition methods, including existing maps and their digitisation, remote sensing images, digital elevation models (DEM) and global positioning systems (GPSs); iv) Processing of geospatial data: spatial data in the computer, building and accessing an entity in the database and continuous fields, data analysis using entities and continuous fields for decision support, etc.; v) Spatial statistics: quality of spatial data, spatial analysis of geospatial data, geostatistics, introduction to spatial-temporal modelling. Software packages for geographical information systems will be reviewed.
Practical exercises will focus on applications to land-cover assessment, subcatchment and regional hydrology, and soil quality assessment for decisions regarding sustainable rural land use planning and management. Two of the 4 days of the mid-Semester field excursion will be spent in Canberra visiting various government agencies which research and maintain GIS coverages of major rural environments. The remaining fieldwork will be at University farms at Camden or Arthursleigh, and will involve training in the field use of low and high- resolution GPS for geo-rectification, for ground truthing satellite-derived land cover maps and for the creation of digital elevation models and landform attributes.
Textbooks
Reference books:
Burrough PA, McDonnell RA. Principles of Geographic Information Systems. Oxford University Press, 2000
Clarke KC. Getting started with geographic information systems. Prentice Hall, 2003.
Lillesand T, Kiefer RW. Remote Sensing and Image Interpretation. John Wiley & Sons Inc. 1999.

AFNR 5503 **Field and Laboratory Soil Physics**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Professor Alex McBratney (Coordinator), Dr Budiman Minasny. **Session:** Semester 1. **Classes:** (2 lee, 2hr prac)/wk, 5 days in the field (prior to beginning of February semester). **Assessment:** 2hr exam, field report in form of webpage, lab report, presentation, essay.
The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area.
The emphasis is to examine the quantitative aspects of soil physics particularly in relation to the transfer of energy, gas, water, solids and solutes in soil. Lecture and lab topics include heat flow, gas movement, soil water energetics, saturated and unsaturated flow of soil water, infiltration, solute movement, water and wind erosion as well as the electrical properties of soil and fundamentals of numerical computer modelling of soil physical processes.
Five days' field-work, in the week prior to the beginning of February Semester, involves field measurement of soil physical properties such as shear and compressive strength, electrical conductivity, temperature, evaporation, hydraulic conductivity and infiltration rates and moisture content.
Textbooks
Reference books:
Hillel D. Environmental Soil Physics: Fundamentals, Applications, and Environmental Considerations. Academic Press, 1998
Jury WA & Horton R. Soil Physics. John Wiley, 2004
Warrick AW. Soil Water Dynamics. Oxford, 2003

AFNR 5504 **Field and Laboratory Pedology**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Stephen Cattle (Coordinator), Dr Damien Field. **Session:** Semester 1. **Classes:** (2 lee, 2 hr prac)/ wk, 5 days in the field (prior to beginning of February semester). **Assessment:** 3hr exam, field report, lab report, presentation, essay.
The soil science specialisation trains people for careers in professional soil science and extension. It provides an excellent background for entry into all aspects of soil science research ranging from physics through mineralogy and chemistry to pedology. Increasing emphasis is being given to aspects of soil sustainability and environmental soil science in order that graduates can meet the growing national demands in this area.
The main part of this unit of study is the pedological characterization of a number of contrasting soil profiles sampled during the pre-semester field trip. This 5 day field-trip begins 10 days before the beginning of the February semester and involves the study and sampling of soil through central and northern NSW. Students become acquainted with soil types in a variety of landscape, geologic, climatic and landuse settings and develop an understanding of the importance of different soil parent materials. Linkages are made between soil formation processes and resultant soil properties, and the role of soil in various environmental and agricultural ecosystems. Field skills acquired during this trip include a proficiency in soil profile description and an ability to classify soil type according to the Australian Soil Classification scheme. Laboratory analyses of soil samples collected during the field trip include particle-size analysis and ex-

traction of fine-sand fraction for optical identification and quantification of the mineral species present. X-Ray diffraction is used to identify the clay minerals and elucidate mineralogical transformations in these samples. Scanning electron microscopy is also used to examine surface features and mineral composition. Thin sections of some typical NSW soil types are examined and the main features are identified and quantified. The data from these micromorphological investigations are used to provide an understanding of the pedogenesis of soil profiles in specific locations. The lecture series for this unit of study focuses on the main soil-forming (pedogenetic) processes operating both in Australia and abroad. Rock and soil mineral transformations and mechanisms for soil horizon development are addressed. Case studies and recent pedological research publications are used to highlight these topics. A detailed study, including exercises, is also made of two main international soil classification schemes, Soil Taxonomy and the World Reference Base for Soil Resources (WRB), and the Australian Soil Classification system.

Textbooks

Reference books:

Buol S, Walker M, Southard R. Soil Genesis and Classification. Iowa State University. 2003

Isbell R. The Australian Soil Classification. CSIRO, 1996

Jenny H. Factors of Soil Formation: A System of Quantitative Pedology. Dover. 1994

McKenzie N, Jacquier D, Isbell R & Brown K. Australian Soils and Landscapes. CSIRO, 2004

Van Breeman, N & Buurman, P. Soil Formation. 2nd Edition. Kluwer Academic, 2002

Young A & Young R. Soils in the Australian Landscape. Oxford University Press, 2001

AFNR 5505 **Environmental Soil Chemistry**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Balwant Singh (Coordinator), Dr Markus Grafe. **Session:** Semester 2. **Classes:** (2 lee, 3 hr prac)/ wk (wksl-13). **Assessment:** 3hr exam, 4 labs. Reports and one oral presentation on a given topic, essay.

The main objective of the unit is to develop an understanding of the common chemical properties and processes in soil environment. By the end of this unit of study, students will become familiar with soil chemical composition and develop skills in describing chemical processes in soil environment. They will be able to measure various chemical properties of soil and soil solution in the laboratory; and perform chemical speciation of ions in soil solution. Students will also learn to work in a team environment and develop communication and writing skills.

Syllabus summary: The lecture topics include- the structure and chemistry of inorganic components in soil, surface charge of soil minerals, chemistry and general properties of soil organic matter, important functional groups of soil organic matter, role of organic matter in soil, cation exchange in soil, selectivity of cations on soil colloids, cation exchange reactions and selectivity coefficients, adsorption reactions of environmentally important ions, surface functional groups, adsorption isotherms, equilibrium based adsorption models, point of zero charge, diffuse double layer-theory and models, surface complexation models, soil solution-importance, methods of obtaining soil solutions, models to determine activity coefficients, speciation, dissolution and solubility processes in soil environment, soil chemical equilibria, geochemical speciation models and redox chemistry of soil.

Textbooks

Reference books

Evangelou VP, Environmental Soil and Water Chemistry: John Wiley & Sons, New York, 1998

Lindsay WL, Chemical Equilibria in Soils. John Wiley & Sons, New York, 1979

McBride MB, Environmental Chemistry of Soils. Oxford University Press, New York, 1994.

Sparks DL, Environmental Soil Chemistry. Second Edition, Academic Press, San Diego, 2003

Sposito G, The Chemistry of Soils. Oxford University Press, New York, 1989

AFNR 5506 **Limnology and Water Quality**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Dhia Al Bakri (Coordinator), Professor Ivan Kennedy and Dr Robert Caldwell. **Session:** Semester 1. **Classes:** 6-day field trip in orientation week, 26 hr lec/tut 20 hr prac. **Assumed Knowledge:** GEOG 2303, LWSC 2002, AGCH 2003 or equivalent. **Prohibitions:** AGCH 3030. **Assessment:** 2 hr exam (50%), laboratory reports (25%), field trip professional report (25%).

This unit of study will provide students with an understanding of the main Australian water quality problems, related limnological issues and the underlying causes and processes. The unit commences with a field trip module to the productive Namoi and the Macquarie Valleys, where agriculture based on irrigation, environmental impacts on vegetation, soil and water of agricultural enterprises such as cotton farming and human settlements will be assessed. Field observations on pH, nutrient and salt content, pesticide contamination, and microbial content will be made on water, sediment, soils and in constructed wetlands, with samples returned for more detailed laboratory analysis at the University. The unit will also investigate sources and pathways of pollutants reaching streams, lakes and reservoirs, determine the interactions between runoff and water quality, and identify pollution control measures within the context of integrated catchment management (ICM). The unit will cover aspects of freshwater ecology with particular emphasis on wetlands ecosystem, riparian vegetation, macrophytes, phytoplanktonic communities and cyanobacteria. At the completion of this unit, the students will be able to determine different water quality and pollution problems in Australian water bodies; explain underlying causes and processes, relate the interaction between flow and water quality and evaluate their implications on catchment management. The students will also be able to employ limnological modeling to predict heat budget distribution; catchment loading and mass balance of given pollutants, and select appropriate pollution control and management strategies.

Textbooks

Wetzel R G 2001. Limnology: Lake and reservoir ecosystems, 3rd edn, Academic Press London.

Dodson S. I. 2005. Introduction to Limnology. McGraw-Hill Book Company, New York.

AFNR 5507 **Catchment Hydrology and Management**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Willem Vervoort (Coordinator), Dr Dhia Al Bakri. **Session:** Semester 1. **Classes:** (2 hrs lee, 4 hrs practical/fieldwork)/wk. **Assumed Knowledge:** GEOG 2321, LWSC 3004, AFNR 5506 or equivalent. **Assessment:** Practical report (2000 words) 25%, discussion and justification (2000 words) 25%, 2hr Exam 50%.

This unit of study is designed to give students insight into the problems related to catchment-scale hydrological modeling, freshwater management and river restoration and policy making at the catchment level. The unit builds on the theoretical knowledge gained in LWSC 3004 and GEOG 2321. In the first part, the unit explores several ways to simulate catchment hydrological processes and how risk assessment in natural resource management takes places. In particular the unit tries to stimulate discussion on the possibilities and impossibilities of assessing the impact of management and policies in a catchment. The second part of the unit will focus on discussing and applying a range of techniques, models and management options used in improving quality of water resources, combating pollution and restoring degraded aquatic ecosystems. By the end of this unit the students should be able to apply salinity and groundwater risk assessment tools, apply catchment-scale simulation models to predict management and policy impact, and identify and employ appropriate technological solutions and management practices to control water quality problems and remediate stressed streams, lakes and reservoirs.

Textbooks

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

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

AFNR 5601 **Turf Management**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Peter Martin. **Session:** Semester 1. **Classes:** External studies and residential block. **Assumed Knowledge:** Practical knowledge of turf cultural practices; basic chemistry and basic biology. **Assessment:** One 3 hr examination, two 2,000 word assignments, tutorial papers and practical reports.

This unit examines the scientific basis of turf management for both warm climate and cool climate grasses. Topics include the history and economic importance of managed grass surfaces; the macro- and micro-environment of turf both above and below ground; the physiology of growth under turf conditions including the effects of water, traffic, mowing, cultivation and nutrition; establishment of turf by seed and vegetative methods; and the objective assessment of turf quality.

Textbooks

Beard, J.B. Turfgrass: Science and Culture (Prentice Hall)

Atwell, B., Kriedemann, P. and Turnbull, C. Plants in Action: adaptation in nature; performance in cultivation (Macmillan Australia)

Glendinning, J (ed.) Australian Soil Fertility Handbook (CSIRO Publications Collingwood)

AFNR 5602 **Advanced Turf Management**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Peter Martin. **Session:** Semester 2. **Classes:** External studies and residential block. **Assumed Knowledge:** Practical knowledge of turf cultural and construction practices; basic chemistry; basic biology. **Prerequisites:** AFNR 5601 Turf Management; AFNR 5603 Turf Species and Varieties. **Assessment:** One 3hr examination, one oral presentation, one 2,000 word assignment, tutorial papers and practical reports.

Readings, discussions and practical experiments to gain advanced expertise in laboratory and field aspects of selected areas of plant and soil sciences underlying turf management. Topics include germination and establishment, stress physiology, minimization of water use while maintaining acceptable turf quality, use of saline and downgrade waters for turf irrigation, root growth, growth analysis, fertilizer and pesticide management, environmental legislation relevant to turf facilities, turf construction materials and techniques,

design of turf facilities, quality assurance in turf construction and maintenance of turf constructions.
Textbooks
Adams, W. A. and Gibbs, R.J. Natural Turf for Sport and Amenity (CAB International, Wallingford).
Atwell, B., Kriedemann, P. and Turnbull, C. Plants in Action: adaptation in nature; performance in cultivation (Macmillan Australia)

AFNR 5603 **Turf Species and Varieties**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Peter Martin. **Session:** Semester 1. **Classes:** External studies and residential block. **Assumed Knowledge:** Practical knowledge of main turf species, basic biology. **Corequisites:** AFNR 5601 Turf Management. **Assessment:** One 3hr examination, one 2,000 word assignment, tutorial papers, practical report and plant collection.
This unit has three main aims: (a) to provide an overview of plant variation, ecotypic differentiation and
the principles of plant taxonomy, with special reference to grasses, (b) to teach skills in identification
of members of the grass family and related families including detailed morphological terminology and the use of conventional and vegetative taxonomic keys, and (c) to provide an introduction to the methods of development of new turf cultivars by breeding and/or selection. Information is also provided on biochemical methods of identifying grass varieties, comparative testing of turf grasses, plant breeders' rights and cultivar registration.
Textbooks
Hubbard, C.E. Grasses, 3rd Edition, (Penguin Books, London)
Wheeler, D.J.B., Jacobs, S.W.L. and Whalley, R.D.B., Grasses of New South Wales, 3rd. Edition, (University of New England Printery, Armidale)
Reference book: Briggs, D. and Walters, S.M. Plant Variation and Evolution, 3rd Edition (Cambridge University Press, Cambridge)

AFNR 5604 **Diagnostic Methods in Turf Management**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Peter Martin. **Session:** Semester 1. **Classes:** External studies and residential block. **Assessment:** One 3hr examination, one 2,000 word assignment, tutorial papers and a laboratory book.
Following an overview of the main chemical, physical and biological diagnostic tests used in the formulation of advice by turf consultants and in decision making by turf managers, the course will cover the theory and practice of sampling and of the conduct of tests (including interpretation guidelines) using selected methods in the three areas. Chemical testing will include the more important diagnostic methods for soils, irrigation and effluent waters and tissues; physical testing will cover particle size analysis, bulk density, pore space, moisture characteristic and infiltration rates for gravels, sands and soils used in turf construction; biological testing will cover the techniques used for the identiflcation of the major pests and diseases of turf grasses. The unit includes an extensive laboratory component. Reference will also be made to quality assurance procedures in sampling and laboratory practice and the importance of statistical procedures in the interpretation of results.
Textbooks
Rayment, G.E. and Higginson, F.R. Australian Laboratory Handbook of Soil and Water Chemical Methods (Inkata Press, Adelaide).
Peverill, K.I. et al., Soil Analysis: an Interpretation Manual (CSIRO publishing, Collingwood)
Smiley, R.W., Dernoeden, PH. and Clarke, B.B. Compendium of Turfgrass Diseases, 2nd Edition, (APS Press, St Paul)

AFNR 5605 **Applied Plant Ecology**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. Dr Peter Martin. **Session:** Semester 2. **Classes:** External studies and residential block. **Assumed Knowledge:** Practical awareness of pesticide use in the amenity horticulture industries. Basic chemistry, basic biology. **Prerequisites:** AFNR 5601 or equivalent AFNR foundation unit of study. **Assessment:** One 3hr examination, one 2,000 word assignment, one oral presentation, tutorial papers and practical reports.
Intended primarily for students in the amenity horticulture field, this unit explores the effects of the management practices used in the industry on the micro- and macro- environments, both biological and physical. Input factors such as water, nutrients, organic amendments and pesticides will be considered in relation to their modes of action and their effects on soil sustainability (including acidification and salinification), macro-and micro-biodiversity, contamination of runoff water and ground water, and safety for staff and members of the community. Issues such as the use of selective versus broad-spectrum pesticides, the development of resistance to pesticides and enhanced bio-degradation of pesticides will be considered from the ecological perspective. Physical management methods such as scarification and coring in turf management and canopy reduction in tree management will be evaluated in terms of the net ecological benefits of the practices. During the semester each student will be required to choose a topic in consultation with the lecturer and subsequently present a seminar to the class in the form of a case study or situation analysis.
Textbooks
Atwell, B., Kriedemann, P and Turnbull, C. Plants in Action: adaptation in nature, performance in cultivation. (Macmillan, Melbourne) (selected chapters)
Gibson, D.J. Methods in Comparative Plant Population Ecology. (Oxford University Press, Oxford).
Coleman, D.C. and Crossley, D. A. Fundamentals of Soil Ecology (Academic Press, London)
Smith, L.W. Notes on the Ecology of Weed Management (Plant Breeding Institute, Camden)

AFNR 5901 **Research Review***
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1, Semester 2. **Classes:** No scheduled classes. **Prohibitions:** AFNR 5902, AFNR 5903.. **Assessment:** 10,000 word review (100%).
Students complete a review of the research literature on a mutually agreed topic relevant to their program and write a report of approximately 10,000 words. Each student will be assigned an adviser. This unit aims to train students in the following generic attributes: information skills, critical thinking, technical writing.

AFNR 5902 **Research Study***
12 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1, Semester 2. **Classes:** No scheduled classes. **Prohibitions:** AFNR 5901, AFNR 5903.. **Assessment:** 15,000 word review (75%), Oral presentation (25%).
Students complete a review of the research literature and analyze predetermined data to test a hypothesis on a mutually agreed topic relevant to their program. The literature review and results of the analysis are presented in an oral presentation and a written report of approximately 15,000 words. Each student will be assigned supervisor. This unit aims to train students in the following generic attributes: information skills, critical thinking, hypothesis testing, oral presentation, data analysis and presentation, technical writing.

AFNR 5903 **Research Project***
24 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1, Semester 2. **Classes:** No scheduled classes. **Prohibitions:** AFNR 5901, AFNR 5902.. **Assessment:** 25,000 word thesis comprising a literature review (25%) and a research paper (45%), oral research proposal (10%), oral research presentation (20%).
Students complete a review of the research literature and conduct empirical research on a mutually agreed topic relevant to their program. Students present an oral research proposal, and the literature review and results of the research are presented in an oral presentation and a thesis of approximately 25,000 words. Each student will work closely with an assigned supervisor. This unit aims to train students in the following generic attributes: information skills, critical thinking, developing research proposals, hypothesis testing, data analysis and presentation, oral presentation, technical writing.

*** AFNR 5901, AFNR 5902 and AFNR 5903 are mutually exclusive**

AGEC 5300 **Business Topics in Amenity Horticulture**
6 credit points. Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Ross Drynan. **Session:** Semester 1. **Classes:** 26 lectures, intensive course. **Assessment:** 2 hr examination; 2assignments.
This unit is focussed on managerial economics of profit and non-profit organisations involved in providing turf-related, and more generally horticulture-based, products and services, such as active and passive recreation and amenity services. Market priced and non-priced goods and services are considered. Topics may include accounting concepts, budgeting, financial planning and control, capital management, resource management, demand assessment, marketing and pricing strategies, environmental externalities and other market failures, regulation and other forms of government intervention, and non-market valuation.

AGEC 5301 **Agribusiness Management**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (3 lee & 2 workshop)/wk. **Assessment:** One mid semester exam (1 hour) one final exam (2hr), assignments.
This unit of study deals with the application of economic principles and techniques of business management to agribusiness firms, with a particular focus on farms. The topics covered will include: management goals and objectives; budgeting; gross margins analysis; parametric budgeting; sources of management information and its analysis; simple systems simulation; applications of linear programming to farm and agribusiness planning; financial management; risk in planning and management; cash, credit, debt and taxation management; evaluation of investment and firm growth alternatives; acquisition and transfer of assets; the role of financial institutions in the agricultural credit market. Students develop skills in computer-based farm planning.

While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program.
Textbooks
J.B. Hardaker et al. Coping with Risk in Agriculture, 2nd edn (CABI, 2004)

AGEC 5302 **Agricultural and Resource Policy**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** 2 lectures, 1 tutorial per week. **Assessment:** One mid semester exam (1 hour); one final exam (2 hours); assignments; tutorial papers.
This unit is designed to cover basic theoretical and modelling frameworks for economic evaluation of policy formation (including Pareto welfare economics and public choice theory); market and government failure; the institutional structure of agricultural and resource policy formulation in Australia; micro and macroeconomic issues in agricultural and resource policy; and issues arising from linkages between agriculture and the resource industries and with the rest of the economy. Students will be expected to read widely.
While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program.
Textbooks
Godden, D. 1997, Agricultural and Resource Policy: Principles and Practice, Oxford University Press, Melbourne (currently out of print)
Stiglitz, J. 2000, Economics of the Public Sector, Norton, New York.

AGEC 5303 **Applied Optimisation**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee and 2 tut)/wk. Assessment: 1 mid semester exam (1 hour), one final exam (2 hours), assignments, computer assignments.
This unit of study deals with constrained optimization problems in which when one or more constraints are inequalities. Such problems are explored/solved by "mathematical programming" techniques. The focus of the unit is on linear programming (LP) problems, ie ones in which both the objective and the constraints are linear functions. Linear programming has wide application to farm planning, financial planning, and other planning contexts. Graphical and mathematical representations of linear programming problems are covered. Topics include solution methods, solution information, primal and dual formulations, stability of optimal solutions, and parametric programming. After covering the basics of LP, the focus shifts to modelling of real world scenarios in LP models. Special formulations (eg. transportation model), and extension to integer programming are examined. Students develop experience and confidence in the use of spreadsheet-based optimizer routines, and with specialised optimization packages (eg. LINDO).
While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program.
Textbooks
H.P.Williams Model Building in Mathematical Programming, 4th edn (Wiley, 1999).

AGEC 5304 **Research Methods**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee, 1 tut)/week. Assessment: One mid semester exam (1 hour), one final exam (2 hours), assignments, research proposal.
This unit deals with the nature of research and inquiry in applied economics. Topics covered will include: alternative philosophical perspectives on inquiry; scientific method; inductive thought and deductive logic; creativity; research as an orderly process of enquiry; preparation of research proposals; secondary data sources for agricultural and resource economists; collection of primary data; statistical design of sample surveys; questionnaire construction; interviewing techniques; and methods of analysis of survey data. Topics are illustrated with examples of research in theoretical economics, empirical discipline-advancing research, empirical exploratory research, and research using policy-evaluation modelling. Students are expected to read widely.
While the unit covers material dealt with at the third year level, additional workshops, seminars, tutorials, assignments and/or assessment will be provided as appropriate to the postgraduate program.
Textbooks
Sharp, J., Peters, J. and Howard, K. 2002, The Management of a Student Research Project, Gower, Alder shot
Trochim, W. 1999, The Research Methods Knowledge Base, Cornell University Press, Ithaca, New York.

AGEC 5401 **Agricultural Marketing Analysis**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee, 2 hr seminar)/wk. **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies.
Performance of the agricultural and resource marketing systems, marketing margins, transportation, storage, advertising, wholesaling, and retailing. The structure, conduct and performance of marketing firms, and government and public interest in the food system will also be addressed via a number of case studies. Extensive readings will be required. The unit is designed to focus on analysing applied strategic management problems facing marketing firms. Students will be required to read widely.
Textbooks
Collections of readings.

AGEC 5402 **Agricultural Development Economics**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee, 2hr seminar)/wk. **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies.
This unit is designed to expose students to issues of economic growth and development, and their policy and welfare impacts in developing countries. More specifically the unit will focus on agricultural development policies and outcomes. Linkages with other industries, environment, sustainability, globalisation and national and international development agencies will also be discussed. Extensive reading will be required.
Textbooks
Collections of readings.

AGEC 5403 **Agricultural Trade**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lec/2 hr seminar)/wk. **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies.
In this unit of study the basic economic principles underlying international trade in agricultural and resource commodities and the policies involved will be presented. Issues related to trade and development will also be considered. The main topics covered will include: trends in agricultural and resources trade; economics and politics of protection, economic integration and impacts on international commodity trade; international trade policy making. An understanding of globalisation, including foreign direct investment, will also be required. Extensive reading will be required.
Textbooks
Collections of readings.

AGEC 5404 **Agribusiness Analysis**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee, 2hr seminar)/wk. **Assessment:** One mid semester exam (1 hour) one final exam (2 hours), case studies.
This unit focuses on applications of economic theory and methods in agribusiness decision making. It provides advanced treatment of the industrial organisation of agribusiness firms. Case studies will be used to examine the economic complexities of global agribusiness systems. Extensive readings make up the central component of the unit.
Textbooks
Collections of readings.

AGEC 5405 **Quantitative Planning Methods**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee & 2 tut/lab session)/wk. **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), 2 assignments.
This unit examines the use of mathematical methods and models in planning at both the individual firm level and the sectoral level. While the principal focus is on formal optimization, simulation and Monte Carlo methods are briefly discussed. Topics include non-linear programming, elements of input-output analysis, computable general equilibrium analysis, dynamic problems and methods (eg. dynamic programming and optimal control). Sectoral level planning applications considered include transportation and plant location studies; spatial equilibrium; and resource utilization across time. Firm level applications include multi-period planning, queuing problems, inventory analysis, and replacement problems. Extensive use is made of computer-based optimization.
Textbooks
L.J. Moore et al. Management Science 4th edn (Allyn and Bacon, 1993)
L. Schrage LINDO: An Optimization Modeling System, 4th edn (Scientific Press, 1991)
[NB. Students are advised not to buy the textbooks prior to commencement of classes.]

AGEC 5406 **Agricultural Finance and Risk**
6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee & 2 tut/lab session)/wk. **Assessment:** One mid semester exam (1 hour), one final exam (2 hours), 2 assignments.
This unit has two related components. One component concerns risk and risk management in agriculture; the other deals with issues of agricultural producer finance. Risk topics include: risk measurement, subjective probability, adjusting beliefs as a result of new information; risk attitudes; decision making under risk; expected utility theory; valuing information; generalizations of expected utility

theory; E-V analysis; stochastic dominance; internal measures to cope with risk including diversification and flexibility; insurance, futures, options and other market instruments for managing risk. Finance topics include the implications of capital market imperfections and consequential differences between corporate and small business finance; financial relationships between debt/equity levels and risk, optimal debt levels; cost of capital; short term working capital management; and longer term capital (investment) budgeting. Techniques of valuation of projects in risk-free and risk situations are examined. Financial and risk management practices in Australian agriculture are reviewed.

Textbooks

P.J. Barry et al. Financial Management in Agriculture 6th edn (Interstate Press 2000)
J. Williams and W. Schroder Agricultural Price Risk Management (OUP, 1999)
[NB. Students are advised not to buy the textbooks prior to commencement of classes.]

AGEC 5407 **Professional Skills**

3 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 1. **Classes:** One 2 hour seminar/week. Assessment: Discussion papers.

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

AGEC 5408 **Contemporary Issues**

3 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. A/Professor Fredoun Ahmadi-Esfahani. **Session:** Semester 2. **Classes:** One 2 hour seminar/week. Assessment: Discussion papers, 2 hour examination.

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

Textbooks

Collection of readings.

RSEC 5431 **Benefit Cost Analysis**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee, 1 tut)/wk. Assessment: One 1 hr mid term exam, an essay paper, one 2 hr end of semester exam.

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

Textbooks

J. Sinden and D. Thampapillai, Introduction to Benefit Cost Analysis, Longman, 1995.
H. C. Campbell, andR. Brown, Benefit-Cost Analysis: Financial and Economic Appraisal Using Spreadsheets, Cambridge University Press, 2003.
N.B. Students are advised not to buy the textbook before lectures commence in case there are any changes.

RSEC 5432 **Environmental Economics**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 1. **Classes:** (2 lee, 1 tut)/wk. Assessment: 1hr midterm exam, an essay paper, 2 hr end of semester exam.

The unit provides theoretical and empirical background related to economic aspects of a range of environmental issues. The unit exemplifies the studied concepts with environmental problems related to agriculture (soil salinity, algal blooms, overgrazing etc.) as well as with environmental problems typical to Australia. The guiding economic themes are externalities, market failure, the importance of property rights, optimal allocation of pollution abatement, technical issues (e.g. measuring benefits without commodities [e.g. existence values]), and the processes for making choices relating to non-market goods. Some social issues related to environmental impacts are studied through exploration of the problems of population size and distribution, economic growth, and environmental regulation.

Textbooks

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

RSEC 5433 **Economics of Mineral & Energy Industries**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee, 1 tut)/wk. Assessment: 1hr midterm exam, an essay paper, 2 hr end of semester exam.

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

Textbooks

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

RSEC 5434 **Economics of Water and Bio-resources**

6 credit points. Grad Dip Agr Ec, Grad Dip Agr Sc, M Agr, M Agr (Turf Man), PG Coursework Exchange. **Session:** Semester 2. **Classes:** (2 lee, 1 tut)/wk. Assessment: 1hr midterm exam, an essay paper, 2 hr end of semester exam.

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

Textbooks

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

6. Postgraduate research and scholarships

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Postgraduate research institutes

Plant Breeding Institute

The Plant Breeding Institute associated with the Faculty promotes the science of plant breeding, and the improvement of crop plants available for cultivation in New South Wales. The Institute is advised by a council composed of the Vice-Chancellor, members of the NSW Wheat Research Foundation, members of the Faculty of Agriculture, Food and Natural Resources, and other relevant industry representatives. The Professor of Plant Breeding is the Director of the Institute.

Institute of Advanced Studies

The Institute of Advanced Studies was established within the Faculty of Agriculture, Food and Natural Resources in 1974 to advise the Senate regarding several bequests. The Institute will use the funds to further the development of postgraduate studies and research in the Faculty, and be responsible for the administration of the scholarship program of the Faculty. It is intended that the Institute shall promote the attraction of additional income.

The directors of the Institute are appointed from and by full-time permanent members of the Faculty of Agriculture, Food and Natural Resources. The Dean and Associate Dean (Postgraduate) are ex officio directors.

Postgraduate scholarships and prizes

The University of Sydney on the recommendation of the Faculty awards postgraduate scholarships to candidates proceeding by research and thesis to the degrees of Doctor of Philosophy, Master of Science in Agriculture and Master of Agricultural Economics. The terms and conditions for the Thomas Lawrance Pawlett Postgraduate Scholarship, the Christian Rowe Thornett Scholarship, the Alexander Hugh Thurburn Scholarship, the WC Turland Postgraduate Scholarship and the FH Loxton Studentship are listed below. They are normally offered annually, when available, as soon as possible after the award of the Australian Postgraduate Awards upon which value the stipend is based.

Summary of scholarships and prizes

The following table is a summary only; for full details concerning the conditions governing the awards of these prizes and scholarships contact the research Office.

Table 6.1: Summary of scholarships and prizes

Scholarship	Value $	Closing date	Other information
Tenable at the University of Sydney			
Australian Postgraduate Awards	18,837 in 2005	31 October	Graduates with Hons I. For research in any field
University of Sydney Postgraduate Awards	as for APA	31 October	Graduates with Hons I. For research in any field
Henry Bertie and Florence Mabel Gritton Postgraduate Research Scholarships	as for APA	January and July	For research in chemistry in relation to industry and agriculture
Richard Claude Mankin Scholarship - Postgraduate	as for APA	January	For research into water conservation.
James Vincent Scholarship in Microbiology	up to 1000	31 March	APA or similar scholarship holders working in applied microbiology
Awards restricted to candidates in Agriculture			
McCaughey Memorial Institute Scholarship	as for APA	as advertised	Graduates to conduct research in agricultural sciences with particular relevance to rice
Norman Scott Noble Scholarship	up to 1000	mid-May	Travel grant or grant-in-aid to candidates in the discipline of agricultural entomology
Irvine Armstrong Watson Scholarship	up to 500	mid-May	Travel grant or grant-in-aid to candidates in the disciplines of agricultural genetics, biometry, plant breeding or plant pathology
Faculty scholarships			
The following five are identical (except that the FH Loxton is restricted to males) and are awarded annually depending on the availability of funds.			
Thomas Lawrence Pawlett Postgraduate Scholarship	as for APA	31 October	Graduates for full-time research within Faculty (preference to Hons I or II Div. 1 or equivalent)
Christian Rowe Thornett Scholarship	as above	31 October	as above
Alexander Hugh Thurburn Scholarship	as above	31 October	as above
WC Turland Postgraduate Scholarship	as above	31 October	as above
FH Loxton Postgraduate Scholarship	as above	31 October	as above. Restricted to males

Common terms and conditions of award

The scholarships are awarded under the following general terms and conditions of award:

1. The object of the scholarships shall be the encouragement and promotion of the scientific study of agriculture within the Faculty.
2. The scholarships shall be awarded by the Faculty of Agriculture, Food and Natural Resources, to University graduates, graduands or persons holding equivalent qualifications who are eligible for admission to candidature for a higher degree by research and thesis and who enrol as full-time candidates.
3. In awarding the scholarships, consideration shall be given to the work of the applicants during their undergraduate courses, their postgraduate careers, if any, and their special aptitude and ability to carry out the object of the scholarship.
4. The annual value of the scholarship shall be equal to the value of the Australian Postgraduate Awards and shall provide the same allowances as those awards
5. The maximum tenure of the scholarships shall be, in the case of a candidate:
   (a) for the degree of Master, for up to two years, or
   (b) for the degree of Doctor of Philosophy, for three years and in exceptional circumstances may be extended by up to six months.
6. The tenure of the scholarships may be, in the case of a candidate:
   (a) who has been enrolled previously for a higher degree in the Faculty, reduced by the time credited towards the degree for which the candidate enrols, or
   (b) who is or has been enrolled for the same degree for which the scholarship is awarded, reduced by the time the candidate has been enrolled for that degree.
7. The scholar shall furnish progress reports to the Faculty annually at the end of the academic year and at other times if directed.
8. The scholar shall acknowledge the tenure of the scholarship in any thesis or other publication which shall result from such tenure.
9. No scholar shall, except with the approval of the Faculty, occupy any salaried position or hold any other award during the term of appointment. The scholar may undertake teaching assistance consistent with the University Postgraduate Research Award conditions.

Specific terms

The following specific terms and conditions of award apply:

Thomas Lawrance Pawlett Scholarships

Dr Thomas Lawrance Pawlett of Cremorne bequeathed the income from his residuary estate to the University for the purpose of encouraging and promoting the scientific study of agriculture in connection with the said University for the founding of a research or travelling scholarship or scholarships in agriculture, to be called the Thomas Lawrance Pawlett Scholarship.

There are three types of scholarship established under the foundation: the Thomas Lawrance Pawlett Postgraduate Scholarship, the Thomas Lawrance Pawlett Postdoctoral Scholarship and the Thomas Lawrance Pawlett Visiting Scholarship.

Thomas Lawrance Pawlett Postgraduate Scholarship

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Thomas Lawrance Pawlett Postgraduate Scholarship.

Christian Rowe Thornett Scholarship

The scholarship was established in 1975 by a bequest from Mrs Christian Rowe Thornett for the teaching and development of agricultural science.

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Christian Rowe Thornett Scholarship.

Alexander Hugh Thurburn Scholarship

In 1972 the Faculty of Agriculture received a bequest from Mary Esme Thurburn, who established a scholarship in memory of her husband.

The scholarship is awarded under the following specific condition:

1. The name of the scholarship shall be the Alexander Hugh Thurburn Scholarship.

WC Turland Postgraduate Scholarship

The scholarship was established in 1976 by a bequest from WC Turland.

It is awarded under the following condition:

1. The name of the scholarship shall be the WC Turland Postgraduate Scholarship.

FH Loxton Postgraduate Scholarship

Established in 1960 under the will of FH Loxton, who bequeathed a portion of the income of his residuary estate to the University for the purpose of establishing and maintaining studentships and or scholarships tenable in the Faculties of Veterinary Science, Agricultural Science and Engineering in particular in the Department of Chemical Engineering. These studentships and scholarships shall be awarded to male persons only by the Faculty of Veterinary Science, the Faculty of Agriculture, Food and Natural Resources or the Department of Chemical Engineering.

The scholarships shall be awarded in any of the following categories, at Faculty discretion:

- Postgraduate Research Scholarships
- Postgraduate Supplementary Scholarships
- Postgraduate Short term Research/Thesis Completion Scholarships
- Undergraduate Scholarships
- Postdoctoral Fellowships

1. The name of the scholarships shall be the FH Loxton Postgraduate Studentships.
2. The scholarships are for postgraduate research and shall be awarded on the basis of academic merit.
3. The scholarships are of the annual value of an Australian postgraduate award (APA). A relocation allowance and a thesis allowance are payable in line with APA entitlements.
4. The scholarships are tenable for up to two years for a master's degree and up to three years for a PhD degree subject to satisfactory annual progress judged by the Faculty concerned, or the Department in the case of Chemical Engineering. In exceptional circumstances, a further extension of six months may be granted to PhD candidates. Periods of study already undertaken towards the degree prior to the commencement of the award will be deducted from the maximum period of tenure.

Grants in Aid

Grants-in-aid are designed to provide supplementary living allowances, travel grants or grants-in-aid. Applicants must be:

1. enrolled full-time in a higher degree at the University of Sydney (some grants-in-aid are also open to part-time students and graduates); and
2. citizens or permanent residents of Australia.

Applicants are required to complete a single application form for the awards and they will be considered for the award(s) for which they are eligible.

If seeking one of the awards designed to support overseas travel, it is essential that applicants justify in their applications why support for overseas travel is being sought. Applicants should state whether

their research can be undertaken in Australia and, if not, why it is necessary for them to travel overseas for purposes of study. Applicants should provide an outline of their proposed travel plans, indicating the extent to which the period of overseas study is necessary and is regarded to be integral to their total research program, in addition to details of current financial support and the amount of funding sought from the scholarships. If necessary, a separate sheet should be attached to the application form.

Applications must be lodged no later than the closing date of mid May in each year.

These awards, details of which follow, are currently offered as grants-in-aid only in the Faculty of Agriculture, Food and Natural Resources:

Award	Maximum value $
Norman Scott Noble Scholarship	1000
Irvine Armstrong Watson Scholarship	500

Note: The selection committees reserve the right to share any of the above awards.

Norman Scott Noble Scholarship

Established in 1987 by a donation of $14,000 by Mrs Mabel Noble in memory of her husband, Dr Norman Scott Noble, a distinguished graduate of the Faculty of Agriculture.

The scholarship is awarded under the following conditions:

1. The name of the scholarship shall be the Norman Scott Noble Scholarship.
2. The objects of the scholarship shall be to further studies in agricultural entomology and to encourage and promote the discipline at the University of Sydney.
3. The scholarship shall be awarded by the Faculty of Agriculture, Food and Natural Resources on the recommendation of the Dean, who shall act on the advice of the appropriate professors, associate professors, readers and the candidate's supervisor in recommending the award and in determining the value of the scholarship.
4. The scholarship may only be awarded to a candidate enrolled in the Faculty of Agriculture, Food and Natural Resources for a higher degree or a diploma in the discipline of agricultural entomology.
5. The scholarship may be held in conjunction with any other postgraduate award and may be in the form of a travel grant or a grant-in-aid for the holder for expenses incurred in connection with the holder's research.
6. More than one scholarship may be awarded in any one year if sufficient funds are available. The maximum amount available for the award of the scholarships in any year shall be $1000.
7. A candidate may be awarded the scholarship more than once, provided that the total value of the awards to any one candidate does not exceed $3000.

Applications for the scholarship shall be lodged at the Research Office by mid-May each year.

Irvine Armstrong Watson Scholarship

The scholarship was established in 1987 by a donation of $5000 by Mrs Loloma Watson and family in memory of their husband and father, Emeritus Professor Irvine Armstrong Watson.

The scholarship is awarded under the following conditions:

1. The name of the scholarship shall be the Irvine Armstrong Watson Scholarship.
2. The object of the scholarship shall be to further studies in the disciplines of agricultural genetics, biometry, plant breeding or plant pathology.
3. The scholarship shall be awarded by the Faculty of Agriculture, Food and Natural Resources on the recommendation of the Dean, who shall act on the advice of the appropriate professors, associate professors, readers and the candidate's supervisor in recommending the award and in determining the value of the scholarship.
4. The scholarship may only be awarded to a candidate enrolled in the Faculty of Agriculture, Food and Natural Resources for a higher degree or a diploma in one of the disciplines of agricultural genetics, biometry, plant breeding or plant pathology.
5. The scholarship may be held in conjunction with any other postgraduate award and may be in the form of a travel grant or a grant-in-aid for the holder for expenses incurred in connection with the holder's research.
6. More than one scholarship may be awarded in any one year if sufficient funds are available. The maximum amount available for the award of the scholarships in any year shall be $500.
7. A candidate may be awarded the scholarship more than once, provided that the total value of the awards to any one candidate does not exceed $1000.

Applications for the scholarship shall be lodged at the Research Office by mid-May each year.

Awards not restricted to graduates in Agriculture

- Travelling scholarships
- Baillieu Research Scholarship*
- HS Carslaw Memorial Scholarship
- William and Catherine Mcllrath Scholarship
- The Rhodes Scholarship
- The Gowrie Postgraduate Research Scholarships
- The JB Watt Travelling Scholarship
- The James King of Irrawang Travelling Scholarship*
- The Charles Gilbert Heydon Travelling Fellowship in Biological Sciences
- The Eleanor Sophia Wood Travelling Fellowships
- The Herbert Johnson Travel Grants*
- The Commonwealth Scholarship and Fellowship Plan Awards

^Grants in aid

Other scholarships are available.

Enquires about scholarships should be made at the Research Office. International students should make their enquirues at the International Office. Enquires about scholarships offered by other universities should be addressed to the registrar of the university concerned. Scholarship conditions may change without notice.

7. Other Faculty information

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

This chapter of the handbook contains information specific to the Faculty and some general information. For further details about discontinuation and examinations, as well as general information about the organisation of the University, assistance for students with disabilities, child care facilities, accommodation, health, counselling, financial assistance, careers advice and a range of other matters go to www.usyd.edu.au

Enrolment

Students who do not satisfy the pre-enrolment conditions collect their enrolment forms from the Faculty Office in the McMillan Building.

Confirmation of enrolment

All the information provided when you enrol is added to the University's computerised student record system. This includes your degree, academic year and the units you are taking. It is important that this information be recorded correctly at the beginning of the year, and amended should a change occur in any of the details during the year. Any subject enrolment has a financial implication under the Higher Education Contribution Scheme (HECS).

To enable you to see what enrolment data has been recorded, you will be sent a "confirmation of enrolment" notice shortly after completion of enrolment. You should check this carefully. If the information is correct you should keep the notice as a record of your current enrolment. Should the notice be incorrect in any detail, you should apply at the Faculty Office immediately to have your record amended. A new confirmation will then be prepared and sent to you. You will also receive, about two months after the beginning of each semester, a statement showing your HECS/fee assessment for that semester. If there appears to be an error in this assessment, you should follow the directions for correction of the assessment which are included on the statement.

If you wish to:

- change a unit of study in which you are enrolled;
- discontinue a unit of study

you may do so on the Web within a limited range of dates, prior to and early in each semester. Outside those dates, you should apply at the Faculty Office using your confirmation of enrolment form to obtain approval. Your record at the University will not be correct unless you do this. It is not sufficient, for instance, to tell a professor or the lecturer, or even the Faculty Office that you discontinued a unit. Unless an enrolment change is approved on the Web or at the Faculty Office (both of which should generate a new confirmation of enrolment form) it will not be accepted by the University and in some cases you will still incur a financial liability under HECS.

If you wish to:

- discontinue enrolment totally

you must apply at the Faculty Office using your confirmation of enrolment form to provide written advice.

Examinations

There are two formal examination periods each year:

Period	Held	Approximate duration
Semester 1	June	2 weeks
Semester 2	November	2 weeks

In addition individual faculties and departments may examine at other times and by various methods of assessment, such as essays, assignments, viva voce, practical work. Some departments do not examine during the February semester.

The following information applies to the Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor of Science in Agriculture degrees.

Notification of examination results

The results of semester examinations are available on the Intranet, displayed on Faculty noticeboards and posted directly to you at the end of each semester.

Disclosure of **examination** marks

Final marks will appear on your semester result notice. Marks may also be obtained from the Faculty for the major components of assessment which make up the final marks. You are entitled to information about any details of the assessment procedures used to determine the final result.

Your examination scripts may be retrieved for up to 6 months after the completion of assessment in each unit. This does not apply to examination papers which involve the repeated use of the same material in successive examinations.

Examination grades

Each unit taken will be allotted one of the following grades at examinations:

Grade	Percent
High Distinction	85-100
Distinction	75-84
Credit	65-74
Pass	50-64
Fail	0-49

The need to seek early advice

Many students in need of advice fail to make full use of the assistance available to them. If you believe that your performance during a course, or your preparation for your examinations, has been adversely affected by medical, psychological or family circumstances, you should seek advice as early as possible. Members of the teaching staff, especially your degree coordinator, the University Counselling Service and the University Health Service are all available for consultation and can give advice on appropriate action to take. Students can seek initial guidance from the Faculty Office about available help.

Special Consideration Procedure

If you believe that your performance has been adversely affected by illness or other misadventure, you should submit a special consideration form to the Faculty Office. Only well-attested serious illness or misadventure during a semester or occurring at the time of an examination will warrant special consideration for academic performance. Occasional brief or trivial illness would not normally be regarded as sufficient to explain an absence or a poor performance and students are discouraged from submitting certificates for absences totalling less than one week, although frequent recurrent short absences would need documentation.

To apply for special consideration:

(a) Obtain a special consideration application pack from the Faculty Office, University or Faculty website or the Student Centre.
(b) Complete the special consideration forms:
  (i) For consideration due to serious illness have a registered medical practitioner or counselor, complete the Professional Practitioner's Certificate;
  (ii) For consideration due to misadventure attach the appropriate documentation.
(c) Lodge the form with the Faculty Office.
(d) Applications must be received within one week from the end of the period (i.e. assignment due date or date of examination) for which consideration is being sought.
(e) Retain the receipt that will be given on lodgement of the form.

Any application must be accompanied by appropriate medical certificates or other relevant documents. The Professional Practitioner Certificate must include:

(a) dates of consultation;
(b) an evaluation by the practitioner, psychologist etc, as to the severity, duration and effect on the student's ability to attend classes, learn or complete assessment requirements;
(c) a description of the nature and seriousness of the student's problems, within the limits of confidentiality, so that an academic assessment can be made of the possible effects of the illness or accident on the student's performance;
(d) any other relevant information relating to the student's illness, trauma etc;
(e) any other documentation that may be relevant; and
(f) the Practitioner authorises the University to contact them to confirm the authenticity of the certificate.

Statement of Generic Graduate Attributes

The University states that our graduates' attitude towards scholarship, global citizenship and lifelong learning will set them apart from other graduates. Further, these broad attributes can be understood as a combination of five overlapping clusters of skills and abilities. These skills and abilities (contextualised for FAFNR) are shown below.

1. Research and Inquiry. Graduates of the University will be able to create new knowledge and understanding through the process of research and inquiry.

- Recognise and master appropriate theories, concepts and principles from a range of disciplines
- Collect and integrate several lines of evidence and apply them in a balanced way in an argument
- Design an experiment, investigation, survey or other means to test an hypothesis or proposition
- Critically analyse information, synthesising and summarising the outcomes
- Be able to clearly identify problems
- Apply knowledge and understanding to address familiar and novel problems
- Demonstrate awareness of the provisional nature of the facts and principles associated with a field of study
- Appreciate the issues of sample selection, accuracy, precision and uncertainty during collection, recording and analysis of data
- Demonstrate ability to assess data quality
- Understand and manage the nature of risk and uncertainty in decision making
- Prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques and packages
- Solve numerical problems using computer-based and non-computer based techniques

2. Information Literacy. Graduates of the University will be able to use information effectively in a range of contexts.

- Collect and record electronic or non-electronic information or data in the library, laboratory or field and summarise it using appropriate qualitative and/or quantitative techniques
- Appreciate and analyse financial and other management information, both current and historical, and use it in decision making
- Appreciate the difficulties of having incomplete information on which to base decisions
- Identify, evaluate and respond to a variety of information sources (e.g. electronic, textual, numerical, verbal, graphical)
- Identify, evaluate and respond to a variety of data types (e.g. scientific, non-scientific, primary and secondary)
- Demonstrate competence in the use of computer-based information handling and data processing tools
- Appreciate the economic, legal, social, ethical and cultural issues in the gathering and use of information

3. Personal and Intellectual Autonomy. Graduates of the University will be able to work independently and sustainably, in a way that is informed by openness, curiosity and a desire to meet new challenges.

- To be intellectually curious
- To be open to new ideas, methods and ways of thinking
- Identify individual and collective goals and responsibilities
- Devise strategies to achieve goals
- Assume responsibility for one's actions
- Reflect on and evaluate own performance as an individual and as a team member, and identify areas for future improvement
- Identify and work towards targets for personal, academic and career development
- Develop an adaptable and flexible approach to study and work
- Develop the skills necessary for self-managed and lifelong learning (e.g. working independently, time management and organisational skills)
- Develop independent thinking

4. Ethical, Social and Professional Understanding. Graduates of the University will hold personal values and beliefs consistent with their role as responsible members of local, national, international and professional communities.

- Recognise the complementary roles of leadership and management in an organisation
- Recognise and respect the views, opinions and contributions of other team members
- Recognise moral and ethical issues related to the subject
- Appreciate the need for professional codes of conduct where applicable
- Display the potential for competence, behaviour and attitudes required in a professional working life including initiative, leadership, team skills, and professional responsibility
- Devise, plan and undertake investigations in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, legal requirements and sensitivity to the impact of investigation on the environment and stakeholders
- Understand the role of agriculture, food and natural resources within the Australian society and economy, as well as being aware of the opportunities for international contributions and collaboration
- Display the capacity to be informed, responsible and critically discriminating participants in academic, social, cultural and moral issues, in the community of scholars, in the workforce and as citizens of both Australia and the world

5. Communication. Graduates of the University will recognise and value communication as a tool for negotiating and creating new understanding, interacting with others, and furthering their own learning.

- Communicate accurately, clearly, concisely, confidently and appropriately to a variety of audiences in written, verbal and graphical forms
- Contribute constructively to group discussions
- Listen to, appreciate and evaluate the views of others
- Use the internet critically and exhaustively as a means of communication and a source of information
- Use computer packages to create effective ways to communicate information

Faculty Computer Laboratories

The Faculty currently has four computer Laboratories. They are used by undergraduate and postgraduate students undertaking units given by the Faculty of Agriculture, Food and Natural Resources. They can be used by arrangement with the Faculty's Network Manager, Mr Kyle Kiefer (+61 2 9351 3947). Please consult the timetable on the entrance doors before proceeding into the laboratory. During some small classes casual access may be permitted, but please check with supervising staff first.

(a) Watt Computer Laboratory
- located in room 307 of the Watt Building A04. This laboratory has 27 PCs and is opened automatically at 7am and closed automatically at 7pm Monday to Friday (except for public holidays). There are a limited number of swipe cards available from the University Security Office for weekend access - please consult the undergraduate intranet for a list of eligible students.

(b) Ross Street Computer Laboratory
- located on the ground floor of the Ross St Building A03, and consisting of 30 PCs. This laboratory is not opened automatically, but is generally available Monday to Friday.

(c) Woolley Computer Laboratory
- located on the ground floor of the Woolley Building A20, and consisting of 10 PCs. This laboratory is not opened automatically, but fourth year and postgraduate students can be given a code for out of hours use.

(d) GIS Computer Laboratory
- located in Room 303 of the Macmillan Building A05. This laboratory is not opened automatically and is generally restricted to students in certain disciplines.

Summer School

Most faculties at the University offer units of study from degree programs during January/February. As the University uses all of its HECS quota in first and second semester, these units are full fee-paying and entirely voluntary. However, Summer School units enable students to accelerate their degree progress, make up for a failed unit or fit in a unit which otherwise would not suit their timetables. New students may also gain a head start by completing requisite subjects before they commence their degrees. Units start in January and run for up to six weeks (followed by an examination week). Notice of the units available is contained in the various Faculty Handbooks and is usually circulated to students with their results notices. Fee waiver scholarships are available. See www.summer.usyd.edu.au for further details.

Ancillary fees and charges

The following fees and charges from 2005 can be a guide for similar charges in 2006.

Printing Charges

All students have free access to the Ross Street, Watt, McMillan and Woolley computer laboratories of the Faculty and a printing allocation to cover what may be expected by way of assignments and computer output from practical classes. Currently the limits are 125 pages per year for first to third year undergraduate students and 500 for fourth year students. Students may top up their limit ($10 per 125 pages). For postgraduate students no limit to printing is set.

Manuals and Notes

Students are usually provided with unit of study material in class, via the Faculty intranet or through WebCT. Some manuals and lecture notes are sold and students are advised of charges at the beginning of the respective unit.

Excursions

Students are required to "pay a fee" towards the cost of "excursions" in some elective Year 3 and 4 units. Fees are determined by taking into account the cost of basic accommodation, adequate meals and transport costs. Fees for these units of study can be ascertained from the unit of study coordinator.

Libraries

University of Sydney Library

Web: www.library.usyd.edu.au
The University of Sydney Library is a network of 19 libraries across 9 campuses. The specialist libraries for research in Agriculture are:

Badham Library www.library.usyd.edu.au/libraries/badham/
Camden Library www.library.usyd.edu.au/libraries/camden/

Your student card will allow you to borrow from any of the Libraries in the system. Location maps for these Libraries, opening hours and contacts are listed at the URLs above. Many of the other Libraries will have information of interest to you too. Please check the Library website for a complete list of Libraries (www.library.usyd.edu.au/libraries).

The Library provides access to services including the Library catalogue (see opac.library.usyd.edu.au) and a range of databases, used to find references to journal articles (seewww.library.usyd.edu.au/databases/).
It is possible to access many of these databases from off campus, please check www.library.usyd.edu.au/databases/wam.html for more information, or contact your Faculty Liaison Librarian.

For more information and pointers to great information sources check out the:

Agriculture, Food and Natural Resources Subject Guide
Web: www.library.usyd.edu.au/subjects/agriculture/

Veterinary Education and Information Network (VEIN)
Web: vein.library.usyd.edu.au for animal science information.

Your Faculty Liaison Librarian

Information specialists are available to assist you with your information needs.

Camden and Narrabri campuses
Karen Black
Email: k.black@library.usyd.edu.au
Phone: +612 9351 1627
Fax: +612 4655 6719

Camperdown campus
Alison Turner
Email: a.turner@library.usyd.edu.au
Phone: +612 93513629
Fax: +612 93513852

Mathematics Learning Centre

Head Jacqueline M Nicholas

The Mathematics Learning Centre offers help to undergraduate students who enter the University with insufficient preparation in mathematics to enable them to cope with the mathematical requirements of their chosen course. In the Faculty of Agriculture, Food and Natural Resources, units in Agricultural Economics, Biometry, Economics and Econometrics all assume a certain level of knowledge of mathematics. Generally, students entering the Faculty are assumed to have taken HSC 2-unit mathematics or its equivalent. If you know that you lack this assumed knowledge, or if you are doubtful whether you are well enough prepared, you should contact the Mathematics Learning Centre.

Staff at the Centre can help you decide which topics you need to do extra work on. Resources are provided for individual study, with guidance from the Centre's staff, and small tutorials can be arranged for students who are having difficulties. Introductory and bridging courses are organised during the summer. The Centre is on the fourth floor of the Carslaw Building, Room 455. Any student seeking assistance should call at the Centre, phone +61 2 9351 4061 or see the website www.usyd.edu.au/mlc

Faculty Societies

The Sydney University Agricultural Society (AgSoc)

AgSoc is an association for the undergraduates of the Faculty of Agriculture, Food and Natural Resources, as well as students from rural backgrounds and anyone with an interest in agriculture. It is run by a student-elected committee from within the Faculty, which organises social and sporting events. Details of how to join are explained during Orientation Week.

Why should you join?

There is a small annual membership fee to become part of AgSoc, which entitles you to vote, hold office, participate in Faculty sports and obtain great discounts to all social functions as well as on the large range of'Agger" merchandise. Functions include formal events such as the annual ball, as well as numerous harbour cruises, barbecues and other informal occasions.

Membership of many Faculty societies is compulsory. This is not the case in Agriculture, yet large numbers of students join for every year of their degree, an indication of the close social interaction and love of a good time that makes Agriculture the envy of the larger faculties. The AgSoc 2006 Committee encourages all members of the Faculty to become involved.

Sydney University Agricultural Graduates'Association

The Sydney University Agricultural Graduates' Association (SUAGA) is a graduate society. All graduates of the Faculty of Agriculture, Food and Natural Resources, and all current and former members of the academic staff of the Faculty, are eligible for membership. Some of the more important aims of the Association are to maintain and foster the relationship between agriculture graduates and the University, to promote social and cultural relationships among the graduates and to take an interest in any matters that may be of benefit to the Faculty.

Institutes and Advisory Councils

Advisory Council of the Plant Breeding Institute within the Faculty of Agriculture, Food and Natural Resources

1.
(1) There shall be an institute to be known as the Plant Breeding Institute within the Faculty of Agriculture, Food and Natural Resources.
(2) The Institute shall undertake, promote and develop the science of plant breeding and allied areas.

2.
(1) The Institute shall have an Advisory Council comprising:
(a) the Vice-Chancellor and Principal, the Dean of the Faculty of Agriculture, Food and Natural Resources and the Director of the Plant Breeding Institute or their nominees;
(b) not more than three trustees of the New South Wales Wheat Research Foundation appointed by the Dean on the recommendation of the Foundation and three additional members of the broader industry sectors serviced by the Institute appointed by the Dean on the recommendation of the Director;
(c) not more than three members of the full-time staff of the University appointed by the Dean on the recommendation of the Faculty of Agriculture, Food and Natural Resources, two of whom shall be staff of the Plant Breeding Institute.
(2) Each member shall hold office for a period of three years and shall be eligible for reappointment.
(3) The Council shall provide advice to the Plant Breeding Institute on:
(i) industry trends
(ii) areas for research expansion/development
(iii) services required for industry (including educational services for the users of the Plant Breeding Institute's products)
(iv) strengths and weaknesses in the Plant Breeding Institute's programs
(4) The Council shall have such other functions as may be assigned by the Dean.

3.
(1) The Council shall elect annually from amongst its members an honorary Chairperson.
(2) All questions which come before the Council shall be decided at any meeting duly convened, at which a quorum is present, by a majority of the votes of the members present.
(3) Chairperson at any such meeting shall have one vote.
(4) At any such meeting seven members shall form a quorum.

4.
(1) There shall be a Director of the Plant Breeding Institute appointed under normal University procedures for appointing a Head of Department/School.
(2) The Director shall have functions and duties set out in the relevant position statement, and any other functions or duties delegated from time to time.

5. The Director shall report to the Dean. In addition, the Director shall present to the Council an Annual Report that includes an overview of the financial situation.

The Institute of Advanced Studies within the Faculty of Agriculture, Food and Natural Resources

1. The name of the Institute shall be the Institute of Advanced Studies within the Faculty.

2.
(1) The Institute shall advise the Senate regarding the funds of the Joane Josephine Harris Bequest, the Thomas Lawrance Pawlett Bequest, the Mrs Christian Rowe Thornett Bequest, the Alexander Hugh Thurburn Fund, the Turland Endowment and the portion of the funds of the FH Loxton Bequest which has been allocated to the Faculty.
(2) The Institute shall promote the attraction of additional income.

3.
(1) The Institute shall further the development of postgraduate studies and research in the Faculty.
(2) The Institute shall be responsible for the administration of the scholarship program in the Faculty.

4. The names of the donors shall be perpetuated by their association with the various projects that the Institute initiates.

5. The Directors of the Institute will be:
(i) Ex officio
(ii) Dean (Chair)
(iii) Pro-Dean
(iv) Associate Dean (Postgraduate)
(v) Discipline Leaders, Director of the Plant Breeding Institute
(vi) Two academic staff representatives, elected biennially at the final Faculty meeting of a year in which a term ends; a casual vacancy shall be filled on nomination by the Dean.

6. The directors shall submit recommendations for postgraduate activities to the Faculty for consideration and recommendation to Senate for approval.

EJ Holtsbaum University of Sydney Agricultural Research Institute

The EJ Holtsbaum University of Sydney Agricultural Research Institute (HARI) has been established in conjunction with the gift by Mr EJ Holtsbaum to the University of his property "Nowley". Mr Holtsbaum, whose family owned Nowley since 1964, made the gift with the view that the farm would continue to prosper under the

University's stewardship, and serve as a centre on the Liverpool Plains for the creation and dissemination of innovative technology for agricultural production and natural resource management.

"Nowley" is located in the Spring Ridge district on the central/north west slopes of NSW, in a versatile and reliable dryland cropping region. The property of 2083 ha supports a successful mixed farming enterprise centred on crops of wheat, barley and canola in winter, sorghum and sunflower in summer, and a Shorthorn cattle herd of breeders, replacement heifers and bulls.

"Nowley" has mostly fertile basaltic soils, an average annual rainfall of about 600 mm with a relatively even summer and winter distribution. The extreme variation in soil types and parent materials, and the proximity of a large, natural water body (Lake Goran), means that the property offers unique opportunities to study the impacts of parent material and topography on soil type, and consequently on agricultural opportunities. Stands of remnant native forest on sections of the property provide invaluable undisturbed reference sites for comparative studies of agricultural and native ecosytems, and the influence of human impacts.

"Nowley" will considerably enhance the Faculty's academic programs by giving students a strong sense of the interaction of landscape and agriculture. While continuing to operate as a fully commercial enterprise, "Nowley" will provide an excellent field site for undergraduate and postgraduate students to learn and research about crop and livestock management in mixed farming systems, plant improvement, and natural resource management.

Objectives of the Holtsbaum Agricultural Research Institute (HARI)

The objectives of the HARI are aligned with a Statement of Intention made by Mr Holtsbaum in conjunction with his gift.

"Nowley is to be used for the purposes of the Faculty of Agriculture, Food and Natural Resources (hereafter referred to as 'the Faculty') including in particular but not limited to:

- *research for the benefit of primary producers, researchers, students and other parties interested in agriculture*
- *provision of funds for scholarships to the Faculty.*

A wide range of enterprises should be trialled and evaluated as the need or otherwise arises in conjunction with the 'bread and butter' activities of the day. The results of these activities to be carried out at 'Nowley' to be available to farmers, faculty students, research workers and other parties with an interest in agriculture. The future mix of enterprises on the property will be determined to produce a viable income. After retention of profits or part thereof to provide working capital, any surplus is to be directed into a scholarship fund for the Faculty or for the benefit of teaching and research in agriculture as determined by the Dean in consultation with the Management Advisory Board. The property's well-being is of paramount importance and number one priority."

Management of the Holtsbaum Agricultural Research Institute

The purchase of plant and equipment, working capital and additional land by the University was financed by the creation of an internal Property Trust known as the "Nowley Property Pool". In recognition of the gift by Mr Holtsbaum, and additional funds invested in the Nowley Property Pool by the Faculty, the latter will be allocated approximately 74 per cent of the units in the Pool, with Livingston Farm to purchase the remaining 26 per cent of the units in the Pool.

Net operating surpluses will be distributed proportionately to unit holders in the Nowley Property Pool. The Properties and Investments Office will be responsible to the Management Advisory Committee for the day to day operation of the property, which will be managed as part of the rural property portfolio. Research and innovative trials by the Faculty will be oversighted by the Management Advisory Board.

In the event a situation arises where the Advisory Board recommends that the property be disposed of, it will be done so in a manner that will realise the Faculty the highest sum of money attainable on the day. The proceeds may be invested in a similar venture or one suitable to the Faculty and Management of the day. Whatever the new venture, the name "EJ Holtsbaum" is to be preserved.

Holtsbaum Agricultural Research Institute Management Advisory Board: Terms of Reference

To oversight the management of the Holtsbaum Agricultural Research Institute in order to ensure that it:

- operates as a financially viable enterprise
- facilitates research for the benefit of primary producers, researchers, students and other parties interested in Agriculture
- provides funds for the provision of scholarships and other activities for the benefit of teaching and research in the Faculty.

The Management Advisory Board will:

- receive financial statements relating to the property
- receive reports from the Dean of the Faculty relating to the use of the property for teaching, research and outreach activities.
- receive reports from the Properties and Investments Office relating to operational and financial aspects of the enterprise.
- advise the Dean of the Faculty on the distribution of the EJ Holtsbaum Trust's share of the profits from the Nowley Property Pool for scholarships and other activities for the benefit of teaching and research programs.

The Management Advisory Board will meet at least twice per year.

The HARI Management Advisory Board will consist of:

- The Dean of the Faculty
- A representative of the Faculty
- The working Manager
- Two practising agriculturists within reasonable proximity of "Nowley"
- The Director, University Properties and Investments

According to Mr Holtsbaum's Statement of Intention, "practising agriculturists" are to provide local knowledge. Their term of appointment should be at least three years, and they should be "quiet achievers" in their own right, demonstrating an ability to run a sound and profitable enterprise or having exceptional expertise in a field or fields relevant to the prevailing pursuit/s on Nowley. The initial appointments have been made by Mr Holtsbaum, and will be made subsequently by the Advisory Board. They shall not be nominated by farmer bodies, Boards or vested interests or politicians. The positions are honorary, apart from reimbursement for out-of-pocket expenses.

Scholarships

Should the Management Advisory Board determine there is sufficient money available for scholarship allocation Mr Holtsbaum made the following suggestions, in addition to conditions that normally apply in the University for the award of scholarships. The recipient shall be of high academic merit and show the intention to establish a career in agriculture (in whatever form). The Scholarship would be known as "The EJ Holtsbaum University of Sydney Faculty of Agriculture, Food and Natural Resources Scholarship".

The intention of the scholarships is to help students fund their studies, and to encourage in recipients a sense of giving something back to the land through their degree, should they have the opportunity to do so. Allocation of money for scholarships will be determined by the Faculty, in consultation with the Management Advisory Board.

Scholarships and prizes

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

Prize or scholarship	$Value	Qualification
ABARE Scholarship	9750	See details listed before the prize details
James S Ashton Memorial Scholarship	3000	See details listed before the prize details
Commonwealth Bank Scholarship	6000	See details listed before the prize details
Native Cockroach Research Scholarship	3000	See details listed before the prize details

Oasis Horticulture P L Scholarship in Horticulture	6000	See details listed before the prize details
Undergraduate Scholarships for HSC entrants	7100 pa	See details listed after the prize details
Value Added Wheat CRC Plant Breeding Scholarship	5000	See details listed before the prize details
Belmore Scholarships	500	Proficiency in First Year
	500	Proficiency in First Year Chemistry
	500	Proficiency in Second Year
	500	Proficiency in Soil Properties and Processes and either Plant Biochemistry and Molecular Biology or Rural Environmental Chemistry
Brian G Davey Memorial Scholarships in Soil Science	400	Proficiency in Soil Properties and Processes and the Soil Resource
Golden Jubilee Scholarship in Agri Science	500	Proficiency in Third Year
Martin Mcllrath Scholarships!!]	490	Proficiency in HSC and First, Second and Third Years (men only). Preference to sons of ex-servicemen
John Mercer Bursary	1000	See details listed before the prize details
ABARE Prizes	300	Highest honours aggregate at graduation in BAgrEc and highest honours aggregate at graduation in BResEc
John Arthur Cran	100	Proficiency in HSC
Bruce Davidson Prize in Resource Economics	300	Proficiency in an essay or thesis in natural resource economics
Bruce R. Davidson Memorial Prize in Resource Economics	200	Proficiency in First Year Examinations
Clifford Dawson Holliday	200	Proficiency in Third Year Examinations
John Neil Downing Memorial	350	Proficiency in professional experience
John and Beatrice Froggatt	1000	Proficiency in Second Year Entomology and the Fourth Year Agricultural Entomology specialisation
WW Froggatt Memorial	200	Proficiency in Agricultural Entomology project in Fourth Year
DL Jackson	400	Proficiency in Agricultural Science I or Horticultural Science 1 or Land and Water Science 1
FC McCleery Memorial Award	200	Fellowship and Leadership in the Faculty (Third Year students)
Theresa G Makinson	100	Proficiency in the specialisation of Horticultural Science in Fourth Year
Warren F. Musgrave Prize in Resource Economics	200	Proficiency in Second Year Examinations
Sibella Macarthur Onslow	200	Proficiency in the specialisation of Agronomy in Fourth Year
FL Partridge[2]	400	For students in Third and Fourth Years in need of financial assistance
Alan Randall Prize in Resource Economics	200	Proficiency in Third Year Examinations
Joyce Winifred Rouse	40	Proficiency in the specialisations of Food Science or Environmental Chemistry in Fourth Year
SUAGA Prize	n.a.	President, AGSOC
GW Walker Memorial Essay	100	Most proficient essay or report in the unit Agricultural Marketing Analysis
Professor WL Waterhouse	80	Proficiency in Agricultural Genetics 2 and Plant Disease
Sir Robert Watt Memorial Prize	80	Proficiency in Agronomy 3
Weed Society of NSW Prize	100	Proficiency in Weed Science
NH White Memorial Prize	100	Proficiency in the specialisation of Plant Pathology in Fourth Year
AR Woodhill Prize in Entomology	300	Proficiency in Entomology in Second Year
Arthur Yates and Co Pty Ltd (2 prizes)	100	Proficiency in the specialisation of Agricultural Genetics in Fourth Year
	100	Proficiency in the specialisation of Horticultural Science in Fourth Year

(l)Applicant required to submit an application to the Scholarships Office.

(2) Applicant required to submit an application to the Scholarships Office.

HSC scholarships and prizes

These scholarships and prizes are awarded on the basis of HSC results and no applications are required. Further information can be obtained from the Scholarships Office.

University bursaries

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

Other scholarships and prizes

University of Sydney (UoS) Scholarships
For 2006 the University offered 150 scholarships worth $5000 each to students completing their HSC (or equivalent) in 2005. These scholarships have a minimum UAI requirement of 95 and are between one and five years in length. These scholarships are available across all undergraduate degrees within the University.

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

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

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

Prize compositions

These are prizes for best essays in a variety of fields. Entries usually open around April and close at the end of August. See the Scholarships website (www.usyd.edu.au/scholarships) for more information.

Faculty Resolutions

A candidate who presents for re-examination in any unit of study shall not normally be eligible for any prize or scholarship awarded in connection with such examination.

Undergraduate scholarships

James S Ashton Memorial Scholarship

Established in 1995 by donations through the initiative of Professor Fred and Claire Hilmer with the assistance of Susan and James W Ashton in memory of their son James S Ashton (BScAgr 1993), to

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

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

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

Terms and conditions

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

Application forms are available at the Faculty Office.

Commonwealth Bank Scholarship

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

A candidate is expected to:

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

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

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

An interview of short-listed candidates is part of the selection process.

Value: $6000

Closing Date: September

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

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

Native Cockroach Research Scholarship

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

A candidate is expected to:

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

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

Oasis Horticulture Pty Ltd Scholarship in Horticulture

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

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

Terms and conditions

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

Value Added Wheat CRC Plant Breeding Scholarship

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

A candidate is expected to:

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

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

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

An interview of short-listed candidates is part of the selection process.

Value: $5000

Closing Date: September

More undergraduate scholarships

Belmore Scholarships

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

Brian G Davey Memorial Scholarships in Soil Science

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

Value: $400 per annum each

Golden Jubilee Scholarship in Agricultural Science

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

year, on the basis of academic achievement, application to the course of study and aptitude for agricultural science.

Value: $500

Martin Mcllrath Scholarships for Undergraduates in Veterinary Science and Agriculture

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

Value: Approximately $2000, tenable for 1 year

The application form is available from
www.usyd.edu.au/study/scholarships

John Mercer Bursary (Agriculture)

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

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

NSW Farmers Association Tertiary Scholarships

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

Applicants will be assessed on the basis of:

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

Application forms are available from:
www.nswfarmers.org.au

Value: $5000

Closing Date: 27 January 2006

Undergraduate prizes

ABARE Prize

Established in 1995 by ABARE for a prize in support of academic excellence in the field of agricultural economics. Two prizes are awarded annually on the recommendation of the Agricultural and Resource Economics Discipline Leader. One prize is awarded to the student who attains the highest honours aggregate on graduation in the degree of Bachelor of Agricultural Economics and another to the student who attains the highest honours aggregate on graduation in the degree of Bachelor of Resource Economics.

Value: $600

John Arthur Cran Prize

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

Value: $100

Bruce Davidson Prize in Resource Economics

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

Value: $300

Bruce R Davidson Memorial Prize in Resource Economics

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

Value: $200

Clifford Dawson Holliday Prize

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

Value: $200

John Neil Downing Memorial Prize

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

Value: $350

John and Beatrice Froggatt Prize

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

Value: $1000

WW Froggatt Memorial Prize

Established in 1979 by a bequest of $1000 from the estate of Joyce Chiosso Froggatt in memory of her father. Awarded annually on the recommendation of the Sciences Discipline Leader to the student in

fourth year Agricultural Entomology who shows the greatest proficiency in a research project in entomology, if the student's work is of sufficient merit.

Value: $200

DL Jackson Memorial Prize

Established in 1975 by public subscription in memory of DL Jackson, Senior Lecturer in the Department of Agronomy and Horticultural Science. To be awarded annually on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned to the most proficient student in the unit of study Agricultural Science 1, Horticultural Science 1 or Land and Water Science 1 provided that the candidate's work is of sufficient merit.

Value: $400

FC McCleery Memorial Award

Established in 1979 by a series of donations over a number of years by the Reverend AB Catley, a graduate of the Faculty of Agriculture, for an award in that Faculty. The award honours the memory of FC McCleery, BScAgr (1925), the former Chief Biometrician in the NSW Department of Agriculture. FC McCleery was judged by his peers, both when a student at this University and in his later professional career, to be a man of great integrity who contributed greatly in both fields by his leadership and fellowship. Throughout his professional career he remained interested in a wide range of subjects from classical Greek literature to modern theology.

The award is made annually after a ballot, conducted by the Dean, of third year students in the Faculty of Agriculture, Food and Natural Resources to the person amongst their number who they judge at that ballot to have contributed most to the life of the Faculty by way of leadership and fellowship. Only those students who have completed the first two years of their degree course in minimum time shall be eligible for nomination.

Value: $200

Theresa G Makinson Prize

Established in 1972 by the donation of $500 from Miss KJ Laurence, to establish a prize in memory of her aunt, Theresa Genevieve Makinson, 1885-1939. Awarded annually, on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned, to the most proficient student in fourth year specialisation Horticulture, provided that the candidate's work is of sufficient merit.

Value: $100

Warren F Musgrave Prize in Resource Economics

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

Value: $200

Sibella Macarthur Onslow Memorial Prize

Established in 1944 by a gift of £360 from members of the Victorian League of New South Wales and other friends of Miss Sibella Macarthur Onslow. Awarded annually on the recommendation of the Sciences Discipline Leader, after consulting academic staff most concerned, for greatest proficiency in the Fourth year specialisation Agronomy, provided the student's work is of sufficient merit.

Value: $200

FL Partridge Prize

Founded in 1928 by a gift of shares from an anonymous donor to establish the "FL Partridge Endowment" in memory of FL Partridge. The endowment is used to provide a prize in the Faculty of Agriculture, Food and Natural Resources in accordance with the following conditions:

- The FL Partridge Prize shall be awarded to undergraduates in the Faculty of Agriculture, Food and Natural Resources who have passed the second year examination in that Faculty.
- The prize shall be of the annual value of $400 and shall be tenable in the third and fourth years of the agricultural curriculum, provided the holder is diligent and of good conduct and passes creditably all the examinations of the course.
- The prize will only be awarded to students in such necessitous circumstances that they would have difficulty in completing the agricultural curriculum without some financial assistance.
- Where there are two or more candidates who fulfil the last condition the prize will be awarded to the student who at the end of the second or third year has the best academic record.
- Any unexpended income shall be used to create a fund for the carrying out of such research work within the Faculty as the Faculty may determine.
- Applications for the FL Partridge Prize must reach the Registrar before the end of March in each year.

Alan Randall Prize in Resource Economics

Established in 2002 by a donation from Dr David Godden in recognition of Professor Randall, a former student of this Faculty, for his research in international resource economics. Awarded annually, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to the Bachelor of Resource Economics student showing the greatest proficiency at the third year examinations.

Value: $200

Joyce Winifred Rouse Prize

The prize was established in 1987 by a donation from Randolph G Rouse on behalf of his wife. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in fourth year specialisation Food Science or Environmental Chemistry in the BScAgr degree or the BSc degree provided that the candidate's work is of sufficient merit.

Value: $40

Sydney University Agricultural Graduates'Association Prize

Established in 1994 by an offer of an annual donation from the Sydney University Agricultural Graduates' Association to recognise undergraduates who contribute time and effort to the leadership and fellowship of agricultural students. The prize shall be awarded annually to the student elected as President of the Sydney University Agricultural Society.
The prize shall be a commemorative object selected by SUAGA

GW Walker Memorial Essay Prize

Founded in 1944 and 1945 by amounts of £50 each received from the New South Wales Council of Agriculture Associations, Lindley Walker Wheat Coy Ltd, and the Flour Mill-Owners' Association of New South Wales, as a memorial to George W Walker. Awarded annually on the recommendation of the Agricultural and Resource Economics Discipline Leader to the student who presents the best essay in the unit of study Agricultural Marketing Analysis, provided the essay is of sufficient merit.

Value: $100

Professor WL Waterhouse Prize

In 1953 a sum of £150 was handed to the Senate by the Sydney University Agricultural Graduates' Association as part of subscriptions received in making a presentation to Professor WL Waterhouse on his retirement. The money was used to establish a prize to perpetuate the name and work of Professor Waterhouse. Awarded annually to the most proficient student in the units of study Agricultural Genetics 2 and Plant Disease, provided that the candidate's work is of sufficient merit.

Value: $80

Sir Robert Watt Memorial Prize

Established in 1966 by the gift of $500 from Lady Madge Watt and her daughter in memory of Emeritus Professor Sir Robert Watt, the

first Professor of Agriculture at this University. Awarded annually on the recommendation of the Sciences Discipline Leader, after consulting the professor most concerned, to the most proficient student in Agronomy 3, provided the candidate's work is of sufficient merit.

Value: $80

Weed Society of New South Wales Prize

Founded in 1971 by the offer of an annual gift from the Weed Society of New South Wales. Awarded annually on the recommendation of the Sciences Discipline Leader after consulting the professor most concerned to the most proficient undergraduate student in the area of Weed Science, provided that the candidate's work is of sufficient merit.

Value: $100

NH White Memorial Prize

Established in 1995 by donations from the former students and colleagues of Neville Hewlett White as a tribute to his outstanding contributions as a teacher and researcher in Plant Pathology. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in the specialisation of Plant Pathology within the fourth year of the BScAgr program.

Value: $100

AR Woodhill Prize in Entomology

Established in 1966 by the gift of $1000 from Mrs Woodhill and the colleagues and students of Dr AR Woodhill. Awarded annually on the recommendation of the Sciences Discipline Leader to the most proficient student in the second year unit of study Entomology provided that the candidate's work is of sufficient merit. The prize may be shared.

Value: $300

Arthur Yates and Co Pty Ltd Prize

Established in 1977. Two prizes of $100 each are awarded annually, the first on the recommendation of the Sciences Discipline Leader after consulting academic staff most concerned to the most proficient student in the specialisation of Horticulture in fourth year, provided that the candidate's work is of sufficient merit, and the second on the recommendation of the Director of the Plant Breeding Institute after consulting academic staff most concerned to the most proficient student in the specialisation of Agricultural Genetics in Fourth Year, provided that the candidate's work is of sufficient merit.

Undergraduate scholarships in Agriculture, Food and Natural Resources

Established in 1991, by funding from companies, organisations and individuals, referred to hereafter as "cooperating companies", to encourage and assist candidates for the degrees of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics or Bachelor of Science in Agriculture.

The scholarship shall be awarded under the following conditions:

1. Each scholarship shall be named an Undergraduate Scholarship in Agriculture, Food and Natural Resources, except where a "cooperating company" requests that its name be used as an identifier within the scheme.

2. The scholarships shall be open to citizens and permanent residents of Australia who qualify in the final year of secondary schooling to enter the Faculty of Agriculture, Food and Natural Resources at the University of Sydney.

3. Tenure

(a) Each scholarship shall be tenable for the specific agricultural degree for which it is offered, where applicable, and shall not be transferable to another degree except in exceptional circumstances.

(b) The scholarships shall be tenable for the duration of each recipient's degree program, provided that the scholar meets all the obligations of the program and maintains satisfactory academic progress.

4. Advisory committee

(a) There shall be an Advisory Committee consisting of the following persons:
  (i) no fewer than five representatives of separate cooperating companies;
  (ii) no fewer than two heads of disciplines in the Faculty including the Agricultural and Resource Economics Discipline Leader (or nominees);
  (iii) no more than three members of the Institute of Advanced Studies within the Faculty;
  (iv) the Dean of the Faculty; and
  (v) the Executive Director of the Undergraduate Scholarships in Agriculture, Food and Natural Resources Program.

(b) The Advisory Committee shall elect its own chairperson.

(c) The Advisory Committee shall advise the Faculty on the conduct and management of the program, including scholar selection, the nature and organisation of the industrial experience component, and such other matters as it considers pertinent to the effective operation of the program.

(d) The Executive Director of the program shall be a member of the Faculty, nominated by the Dean, appointed by the Advisory Committee.

(e) The Executive Officer of the program shall be a member of the University's administrative staff, nominated by the Dean, and shall attend meetings of the Advisory Committee.

5. Annual meeting of cooperating companies

There shall be an annual general meeting of cooperating companies during the first semester of each academic year, when:

(a) the Advisory Committee shall report on the operation of the program over the previous year;

(b) the membership of the Advisory Committee for the coming year shall be determined; and

(c) any matters relating to the program may be raised and decisions thereon made for implementation by the Advisory Committee.

6. Awarding of the scholarships

(a) The scholarships shall be awarded on the basis of academic merit (as indicated by the applicants' performance at the NSW Higher School Certificate Examination, or equivalent), leadership potential and personal qualities.

(b) The scholarships shall be awarded on the recommendation of selection panels consisting of at least one representative from cooperating companies and at least one member of the Faculty appointed by the Dean.

7. There shall be no bonding or other commitment to employment between a cooperating company and any scholar.

8. A scholarship is intended for a continuous four-year degree program, but the Advisory Committee may consider a request for an interruption in a scholar's progress towards the Bachelor degrees for some exceptional purpose, and, if such request is approved, the scholarship shall be suspended during such interruption.

9. **Cost**

(a) Cooperating companies shall make a donation to The University of Sydney Undergraduate Scholarship in Agriculture Program, for each year and for each scholarship place supported, comprising the annual scholarship stipend together with an administration levy of $600 + GST.

(b) Transfers of funds from cooperating companies to the University shall be made by 31 January in the year to which the scholarship place applies.

(c) The administrative levy will be reviewed each year.

10. Benefits to cooperating companies

Each current cooperating company shall be entitled to:

(a) access to the whole pool of Undergraduate Scholars in Agriculture, Food and Natural Resources for professional work experience in the cohort or cohorts contemporaneous with the year or years of its support; and
(b) inclusion of the company's name on a roll of cooperating companies to be set up in the Faculty Office.

11. Value and payments

(a) The value of the scholarship stipend in 2005 was $7100 per annum.
(b) The value of the scholarship stipend shall be adjusted annually by the Advisory Committee after considering movements in the consumer price index.
(c) A scholarship shall run from 1 March to the following 30 November.
(d) The scholarship payments shall be made at regular intervals.

8. Regulations

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Resolutions of the Senate

Constitution of the Faculty of Agriculture, Food and Natural Resources

1. The Faculty of Agriculture, Food and Natural Resources shall comprise the following persons:
   (a) the Professors, Readers, Associate Professors, Senior Lecturers, Lecturers and Associate Lecturers, being full-time and fractional permanent or full-time and fractional temporary members of the teaching staff in the Faculty;
   (b) the Deans of the Faculties of Veterinary Science, Science, Economics and Business, Rural Management, Arts, and Law;
   (c) nominees of the respective Deans of Veterinary Science, Science, and Economics and Business should be members of the academic staff in relevant areas of undergraduate and postgraduate teaching; the numbers of members so nominated to be seven (7) for Veterinary Science, six (6) for Science, and six (6) for Economics and Business;
   (d) the Director of the IA Watson Grains Research Centre;
   (e) the Director of the Australian Centre for Agricultural Health and Safety;
   (f) not more than three persons distinguished in the field of agriculture appointed by the Senate on the nomination of the Dean of the Faculty with the approval of the Faculty;
   (g) not more than four students elected in the manner prescribed by resolution of the Senate; and
   (h) such other persons, if any, being full-time members of the research staff assigned to the Faculty and holding a position at the level of Research Fellow and above, after they have been employed in the Faculty for more than three years.

2.
   (a) A person appointed pursuant to section 1(f) shall be appointed for a period of three years and shall be eligible for reappointment for one period of three years.
   (b) The persons, if any, appointed under section 1(h) shall be members of the Faculty for so long as they remain full-time members of the senior research staff in the Faculty.

Degrees and Diplomas in the Faculty of Agriculture, Food and Natural Resources

1. The degrees in the Faculty of Agriculture, Food and Natural Resources shall be:
   (a) Bachelor of Science in Agriculture (BScAgr)
   (b) Bachelor of Agricultural Economics (BAgrEc)
   (c) Bachelor of Horticultural Science (BHortSc)
   (d) Bachelor of Land and Water Science (BLWSc)
   (e) Bachelor of Resource Economics (BResEc)
   (f) Master of Agriculture (MAgr)
   (g) Master of Science in Agriculture (MScAgr)
   (h) Master of Agricultural Economics (MAgrEc)
   (i) Doctor of Philosophy (PhD)
   (j) Doctor of Science in Agriculture (DScAgr)
   (k) Doctor of Agricultural Economics (DAgrEc).

2. The diplomas in the Faculty of Agriculture, Food and Natural Resources shall be:
   (a) Graduate Diploma in Agricultural Economics (GradDipAgrEc)
   (b) Graduate Diploma in Agricultural Science (GradDipAgrSc)

Bachelor degrees in the Faculty of Agriculture, Food and Natural Resources

These Resolutions must be read in conjunction with the University of Sydney (Coursework) Rule 2000 (as amended), which sets out the requirements for all undergraduate degree courses, and the relevant Resolutions of the Faculty of Agriculture, Food and Natural Resources.

Requirements for the degree at pass level

To qualify for the award of the degree at pass level students must:
   (a) complete successfully units of study giving credit for a total of 192 credit points; and
   (b) satisfy the requirements of all other By-Laws, Rules and Resolutions of the University.

Requirements for the degree at honours level

To qualify for the award of the degree at honours level, students must complete the pass level requirements at the honours level published in the Faculty resolutions relating to the course. (See Resolutions of the Faculty relating to the Bachelor degrees in the Faculty of Agriculture, Food and Natural Resources in this section, following the Enrolment Regulations.)

Graduate Diploma in Agricultural Economics
Graduate Diploma in Agricultural Science
Graduate Diploma in Agricultural Science (Turf Management)
Master of Agriculture
Master of Agriculture (Turf Management)

1.
   (a) Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture and Master of Agriculture (Turf Management) candidates will proceed by coursework.
   (b) Students may undertake part-time candidature.
   (c) Students may commence candidature in either first or second semester.

Admission requirements

2. Admission requirements for the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture and Master of Agriculture (Turf Management) are normally a bachelor's degree or an equivalent qualification. In some instances the admission requirements may be met by evidence of general or professional qualifications and appropriate work experience to indicate that the student has the academic preparation and capacity to complete the course in question. With the approval of the Dean, students may be granted admission with advanced standing if they have completed relevant prior learning at an equivalent level elsewhere.

Periods of candidature

3.
   (a) The period of candidature for a full-time candidate for the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science and Graduate Diploma in Agricultural Science (Turf Management) will be one year.
   (b) The Master of Agriculture and Master of Agriculture (Turf Management) will normally take two semesters (one year) of full-time study to complete.

Coursework to be completed

4.
   (a) Candidates for the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science and Graduate Diploma in Agricultural Science (Turf Management) complete a total of 36 credit points made up of 18 credit points from

their selected specialisation as specified in Table A and the balance from elective units chosen from any other units listed in Table B (subject to meeting prior learning requirements and timetabling). Students who have completed relevant prior learning at an equivalent level may be given up to 12 credit points advanced standing with the approval of the Dean.

(b) Candidates for the Master of Agriculture and Master of Agriculture (Turf Management) complete a total of 48 credit points made up of 24 credit points from their selected specialisation as specified in Table A and the balance from elective units chosen from any other units listed in Table B (subject to meeting prior learning requirements and timetabling) or, with the Dean's approval, two appropriate 6 credit point units offered from outside the Faculty. Students who have completed relevant prior learning at an equivalent level may be given up to 18 credit points advanced standing with the approval of the Dean.

(c) Advanced standing is given only when:
  (i) no unit of study for which credit is granted has been a basis for the award of any other degree or diploma;
  (ii) the unit or units were passed at a level of competence or with such additional assessment or other requirements as may be determined by the Board in each case;
  (iii) the unit or units were completed within six years immediately preceding the commencement of candidature for the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture or Master of Agriculture (Turf Management).

(d) Students may transfer between programs and receive credit for any completed units, provided they have not taken out the award from which they are transferring.

(e) To achieve the objectives of the courses, especially for students seeking training in a new discipline, some classes may be taught in conjunction with advanced undergraduate units. However, postgraduate coursework students will engage in additional consultation and more advanced assignment work than their undergraduate counterparts. They will also be assessed against a higher standard.

Table A: core units

Note: All units are 6 credit points unless otherwise indicated

Semester 1	Semester 2
Agribusiness	
AGEC5301 Agribusiness Management	AGEC5401 Agricultural Marketing Analysis
AGEC5403 International Agricultural Trade	
AGEC5404 Agribusiness Analysis	
Agricultural Economics	
AGEC5403 International Agricultural Trade	AGEC5401 Agricultural Marketing Analysis
AGEC5404 Agribusiness Analysis	AGEC5402 Agricultural Development Economics
AGEC5405 Quantitative Planning Methods	AGEC5406 Agricultural Finance and Risk
AGEC5407 Professional Skills (3 credit points)	AGEC5408 Contemporary Issues (3 credit points)
Agricultural Technologies	
AFNR5102 Food Science A	AFNR5108 Plant Cytogenetics
AFNR5103 Food Science B	AFNR5203 Sustainable Grazing Systems
AFNR5104 Environmental Chemistry A	AFNR5204 Crop Water Management
AFNR5107 Analytical Chemistry A	AFNR5208 Research & Practice in Hort Science
AFNR5109 Plant Breeding	AFNR5301 Plant Disease
AFNR5201 Crop Agronomy	AFNR5501The Soil Resource
AFNR5201 Crop Agronomy	AFNR5502 Rural Spatial Information Systems
AFNR5205 Production Horticulture	AFNR5505 Environmental Soil Chemistry
AFNR5206 Postharvest Biology and Technology	AFNR5101 Plant Agricultural Biotechnology
AFNR5207 Issues in Horticultural Science	AFNR5105 Environmental Chemistry B
AFNR5302 Molecular & Physiological Plant Path	AFNR5106 Food Science C
AFNR5303 Adv Mycology & Diag Plant Path	
AFNR5304 Soil Biology and Biodiversity	
AFNR5305 Applied Entomology (Crops)	
AFNR5306 Insect Taxonomy	
AFNR5503 Field and Laboratory Soil Physics	
AFNR5504 Field and Laboratory Pedology	
AFNR5506 Limnology and Water Quality	
AFNR5507 Catchment Hydrology and Mngt	
Natural Resource Management	
AFNR5503 Field and Laboratory Soil Physics	AFNR5501The Soil Resource
AFNR5504 Field and Laboratory Pedology	AFNR5502 Rural Spatial Information Systems
AFNR5506 Limnology and Water Quality	AFNR5505 Environmental Soil Chemistry
AFNR5507 Catchment Hydrology and Mngt	
RSEC5431 Benefit-Cost Analysis	
RSEC5432 Environmental Economics	
Resource Economics	
RSEC5431 Benefit-Cost Analysis	RSEC5433 Econs of Mineral & Energy Industries
RSEC5432 Environmental Economics	RSEC5434 Econs of Water and Bio-resources

Sustainable Agriculture

AFNR5201 Crop Agronomy	AFNR5203 Sustainable Grazing Systems
AFNR5202 Professional Practice in Agronomy	AFNR5204 Crop Water Management
AFNR5205 Production Horticulture	AFNR5208 Research & Practice in Hort Science
AFNR5206 Postharvest Biology and Technology	
AFNR5207 Issues in Horticultural Science	
RSEC5431 Benefit-Cost Analysis	
RSEC5432 Environmental Economics	

Turf Management

AFNR5601 Turf Management	AFNR5602 Advanced Turf Management
AFNR5603 Turf Species and Varieties	AFNR5605 Applied Plant Ecology
AFNR5604 Diagnostic Methods in Turf Mngt	

Table B: all units

Code	Unit	Semester
AFNR5003	Biometry	1
AFNR5101	Plant Agricultural Biotechnology	2
AFNR5102	Food Science A	1
AFNR5103	Food Science B	1
AFNR5104	Environmental Chemistry A	1
AFNR5105	Environmental Chemistry B	2
AFNR5106	Food Science C	2
AFNR5107	Analytical Chemistry A	1
AFNR5108	Plant Cytogenetics	2
AFNR5109	Plant Breeding	1
AFNR5201	Crop Agronomy	1
AFNR5202	Professional Practice in Agronomy	1
AFNR5203	Sustainable Grazing Systems	2
AFNR5204	Crop Water Management	2
AFNR5205	Production Horticulture	1
AFNR5206	Postharvest Biology and Technology	1
AFNR5207	Issues in Horticultural Science	1
AFNR5208	Research and Practice in Horticultural Science	2
AFNR5209	Sustainable Cropping Systems	1
AFNR5301	Plant Disease	2
AFNR5302	Molecular & Physiological Plant Path	1
AFNR5303	Adv Mycology & Diagnostic Plant Path	1
AFNR5304	Soil Biology and Biodiversity	1
AFNR5305	Applied Entomology (Crops)	1
AFNR5306	Insect Taxonomy	1
AFNR5501	The Soil Resource	2
AFNR5502	Rural Spatial Information Systems	2
AFNR5503	Field and Laboratory Soil Physics	1
AFNR5504	Field and Laboratory Pedology	1
AFNR5505	Environmental Soil Chemistry	2
AFNR5506	Limnology and Water Quality	1
AFNR5507	Catchment Hydrology and Management	1
AFNR5601	Turf Management	1
AFNR5602	Advanced Turf Management	2
AFNR5603	Turf Species and Varieties	1
AFNR5604	Diagnostic Methods in Turf Management	1
AFNR5605	Applied Plant Ecology	2
AFNR5901*	Research Review	1 or 2
AFNR5902*	Research Study (12 credit points)	1 or 2
AFNR5903*	Research Project (24 credit points)	1 or 2
AGEC5300**	Business Topics in Amenity Horticulture	1
AGEC5301	Agribusiness Management	1
AGEC5302	Agricultural and Resource Policy	2
AGEC5303	Applied Optimisation	1
AGEC5304	Research Methods	1
AGEC5401	Agricultural Marketing Analysis	2
AGEC5402	Agricultural Development Economics	2
AGEC5403	International Agricultural Trade	1
AGEC5404	Agribusiness Analysis	1
AGEC5405	Quantitative Planning Methods	1
AGEC5406	Agricultural Finance and Risk	2
AGEC5407	Professional Skills (3 credit points)	1
AGEC5408	Contemporary Issues (3 credit points)	2
RSEC5431	Benefit-Cost Analysis	1
RSEC5432	Environmental Economics	1
RSEC5433	Economics of Mineral & Energy Industries	2
RSEC5434	Economics of Water and Bio-resources	2

*AFNR5901, AFNR5902 and AFNR5903 are mutually exclusive

**AGEC5300 is not available in the Agribusiness, Agricultural Economics and Resource Economics streams

Subject areas
5. The Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management) and Master of Agriculture may be awarded in the following subject areas and the testamur for the award will specify the subject area:
(a) Agribusiness
(b) Agricultural Economics
(c) Agricultural Technologies
(d) Natural Resource Management
(e) Resource Economics
(f) Sustainable Agriculture
(g) Turf Management

Satisfactory progress
6. The Board of Postgraduate Studies may require a candidate proceeding by coursework to show good cause why he or she should be allowed to re-enrol in a unit of study which has been twice failed or discontinued to count as failure.

Withdrawal from units of study
7.
(a) A candidate for a Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture or Master of Agriculture (Turf Management) who discontinues enrolment in a Semester 1 unit of study on or before 31 March in that year, will be recorded as withdrawn from that unit.
(b) A candidate for a Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture or Master of Agriculture (Turf Management) who discontinues enrolment in a Semester 2 unit of study on or before 31 August in that year, will be recorded as withdrawn from that unit.

Discontinuation
8. A candidate for a Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture or Master of Agriculture (Turf Management) who discontinues enrolment in a unit of study after the withdrawal period but before the end of classes in that unit, will be recorded as "Discontinued - Not to count as failure" in that unit.

Completion of course
9. Except by permission of the Dean, no student will be allowed to sit for any examination unless the requirements specified by the Faculty have been completed. The Dean may call upon any student who has been absent from more than 10 per cent of classes in any semester to show cause for such absence. Students who fail to show sufficient cause may be excluded from admission to examinations. No excuse for absence from lectures, demonstration or practical work will be received unless tendered in writing to the Faculty Office within one week after attendance is resumed.

Delegation
10. In these resolutions:
(a) Faculty delegates its responsibility to the Board of Postgraduate Studies.
(b) The Board of Postgraduate Studies awards the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture and Master of Agriculture (Turf Management) whenever the coursework results are satisfactory.
(c) The Board of Postgraduate Studies delegates the following responsibilities to the Dean who in turn delegates them to the Associate Dean (Postgraduate): approval of:
(i) admission to candidature;
(ii) suspension of candidature;
(hi) award of the Graduate Diploma in Agricultural Economics, Graduate Diploma in Agricultural Science, Graduate Diploma in Agricultural Science (Turf Management), Master of Agriculture and Master of Agriculture (Turf Management).

Master of Science in Agriculture
Master of Agricultural Economics
Doctor of Philosophy

1. A candidate for the degree of Master of Science in Agriculture, Master of Agricultural Economics or Doctor of Philosophy, will proceed by research and submission of a thesis.
2.
(a) A candidate for the degree of Master of Science in Agriculture will proceed to the degree in the Sciences Discipline.
(b) A candidate for the degree of Master of Agricultural Economics will proceed in the Agricultural and Resource Economics Discipline.

Admission requirements
3.
(a) An applicant for admission to candidature for a research degree will:
(i) hold a degree of Bachelor of the Faculty with First or Second Class Honours or equivalent of The University of Sydney; or
(ii) for the Master of Agricultural Economics or Master of Science in Agriculture, hold a degree of Bachelor of the Faculty with a credit grade or above in the fourth year in the field in which the candidate is proceeding; or
(iii) have completed courses in another faculty or institution, these courses being deemed by the Faculty to be equivalent.
(b) Demonstrated research ability will be considered when determining eligibility; applicants proposing to proceed primarily by research and thesis should provide evidence such as publications in scientific journals.
(c) A research topic, which is satisfactory in terms of research interests, resources and availability of supervision within the discipline, must be agreed upon between the applicant and the supervisor.

4. The Faculty will require a person admitted as a candidate for the degree of Master of Science in Agriculture, Master of Agricultural Economics or Doctor of Philosophy to serve a period of probation for not more than one year and to complete such work during the period as it may prescribe, and at the completion of the period, the Faculty will review the candidature and the work completed, and may confirm or terminate the candidature. If the Faculty confirms the candidature, it will be deemed to have commenced at the beginning of the period of probation.

5. Applicants may be required to provide evidence of adequate financial resources for personal support and compulsory fees during candidature. They may be required to demonstrate to the satisfaction of the Faculty a proficiency in the English language adequate to undertake the proposed candidature.

Availability
6. The number of students admitted may be limited and will be determined by:
(a) availability of resources, including space, library, equipment and computing facilities, and
(b) availability of adequate and appropriate supervision.

7. In considering an application for admission to candidature the Faculty will take account of resource limitations and will select in preference applicants who are most meritorious in terms of section 3 above.

Periods of candidature
8.
(a) The period of candidature for a full-time candidate for the degree of Master of Science in Agriculture or the degree of Master of Agricultural Economics will be two years, except in the case of a candidate who holds the degree of Bachelor of the Faculty with first- or second-class honours or another qualification accepted by the Faculty as equivalent, for whom the minimum period will be one year.
(b) The maximum period of full-time candidature for the Master of Science in Agriculture or the Master of Agricultural Eco-

nomics will be three years, but the Faculty may, in special circumstances, extend a candidature.
(c) The minimum period of candidature for a full-time candidate for the degree of Doctor of Philosophy will usually be three years.
(d) The maximum period of full-time candidature for the Doctor of Philosophy will be four years, but the Faculty may, in special circumstances, extend a candidature.
(e) The Faculty will determine the minimum and maximum periods of candidature for part-time candidates on a pro-rata basis.
(f) The Faculty may deem time spent or work done for another research degree of The University of Sydney to be time spent or work done for the degree of Master of Science in Agriculture or the degree of Master of Agricultural Economics if the candidate has ceased to be a candidate for the other degree, and the Faculty may reduce the minimum and maximum periods of candidature accordingly.

Part-time candidature

9.
(a) The Faculty may permit candidates to enrol in part-time candidature provided they supply a satisfactorily detailed plan of their proposed program and attend at the University for such consultation with the supervisor and participate in such faculty activities as are required by the Associate Dean (Postgraduate).
(b) The Faculty may permit part-time candidates for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy admitted under the provisions of chapter 10 of the by-laws to complete the investigation elsewhere, after two years have been spent in this or equivalent candidature within the University.
(c) Candidates admitted to part-time candidature are expected to devote a minimum of 20 hours per week (or equivalent) to their candidature.
(d) Research assistants or associate lecturers in the University will enrol part-time unless they can demonstrate to the satisfaction of the Faculty that they have sufficient time to pursue full-time candidature.

Control of candidature

10.
(a) Each candidate for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy will pursue his or her course of advanced study and research wholly under the control of the Faculty.
(b) Where a candidate is employed by an institution other than the University, the Faculty may require a statement by that employer acknowledging that the candidature will be under the control of the Faculty.

Appointment of supervisor

11. The Faculty will appoint a member of the full-time academic or research staff of the Discipline in which a candidate for the Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy is proceeding to be the candidate's supervisor. The Faculty will also appoint one or more associate supervisor/s of the candidate who may be a member of the academic or research staff of the University, an Honorary Research Associate, or a person with appropriate qualifications in another institution or organisation.

Progress

12.
(a) Each candidate will report regularly to the Faculty on his or her progress towards completing the requirements for the degree.
(b) The Faculty will consider the report of each candidate and may, if it considers that a candidate has not made satisfactory progress towards completing the requirements for the degree, terminate the candidature.

Discontinuation of enrolment and readmission after discontinuation

13.
(a) A Master of Agricultural Economics, Master of Science in Agriculture or Doctor of Philosophy candidate will be presumed to have discontinued enrolment in a unit of study or the degree from the date of application to the Faculty unless evidence is produced:
(i) that the discontinuation occurred at an earlier date, and
(ii) that there was good reason why the application could not be made at the earlier time.
(b) A candidate who discontinues enrolment in a unit of study or degree before 31 March or 31 August will be recorded as having withdrawn from that unit or degree.
(c) A candidate who discontinues enrolment in a unit of study or degree after 31 March or 31 August will be recorded as "Discontinued - Not to count as failure".
(d) A candidate who at any time discontinues enrolment from a degree will not be entitled to re-enrol in that degree unless the candidate is readmitted to candidature for that degree.
(e) Subject to subsections (i) and (ii) of section 1, candidates may not discontinue enrolment in a unit of study after the end of classes in that unit, unless the degree regulations permit otherwise.
(f) The Dean, Pro-Dean or an Associate Dean of a Faculty may act on behalf of that Faculty in the administration of these resolutions.

Lodgement of thesis

14.
(a) Not earlier than the end of the minimum period of candidature, each candidate proceeding by research and thesis will lodge with the Faculty copies of a thesis embodying the results of an original investigation carried out by the candidate. Three copies of a thesis are required from Master's candidates and four copies from PhD candidates.
(b) The candidate will state in the thesis, generally in a preface and specifically in notes, the sources from which the information was derived, the extent to which the candidate has made use of the work of others, and the portion of the thesis the candidate claims to be original.
(c) The thesis will be accompanied by a certificate from the candidate's supervisor stating whether, in the supervisor's opinion, the form of presentation of the thesis is satisfactory.
(d) A candidate must be enrolled at the time of submission of the thesis.

Form of a thesis

15.
(a) A thesis may be bound for submission in either a temporary or a permanent form.
(b) Temporary binding must be strong enough to withstand ordinary handling and postage. The preferred form of binding is the "Perfect Binding" system; ring-back or spiral binding is not permitted.
(c) The cover of a temporarily bound thesis must have a label with the candidate's name, name of the degree, the title of the thesis and the year of submission.
(d) The requirements for permanent binding are set out in the Statutes and Regulations in the Academic Board's resolutions for binding of PhD theses.
(e) Following examination, and emendation if necessary, at least one copy of a thesis (the Rare Book Library copy) must be bound in permanent form on archive paper.
(f) If emendations are required, all copies of a thesis which are to remain available within the University must be emended.

Examination

(a) The Faculty will appoint three examiners for a PhD thesis, of whom at least two will be external to the University. An internal examiner need not be expected and the supervisor can not be an examiner.
(b) The Faculty will generally appoint two examiners for a Master's thesis of whom at least one will be external to the University. The supervisor can not be an examiner.

Result of candidature

17.
(a) The Board of Postgraduate Studies awards, or for the PhD degree the PhD Awards Subcommittee of the University's Committee of Graduate Studies recommends the award of, the degree whenever:
(i) the examiners have recommended without reservation that the degree be awarded and the Pro Dean concurs; or

(ii) all of the examiners have recommended that the degree be awarded or awarded subject to emendations to all copies of the thesis which are to remain available within the University and the Pro Dean concurs; or
(iii) the Board of Postgraduate Studies unanimously accepts a recommendation from the Discipline Leader to award or award subject to emendations despite reservations expressed by one or more of the examiners; or

(b) The Board of Postgraduate Studies may permit an unsuccessful candidate to prepare for re-examination if, in its opinion, the candidate's work is of sufficient merit to warrant this concession and the Pro Dean has so recommended.

Delegation

18. In these resolutions:
(a) Faculty delegates its responsibility to the Board of Postgraduate Studies.
(b) The Board of Postgraduate Studies delegates to the Dean who in turn delegates to the Associate Dean (Postgraduate): approval of:
(i) award of the degree of Doctor of Philosophy under conditions approved by the University's Committee for Graduate Studies;
(ii) award of the Master of Science in Agriculture and Master of Agricultural Economics degrees when there is no apparent reason for debate by the Board;
(iii) appointment of examiners;
(iv) admission to candidature;
(v) supervisory arrangements;
(vi) variation of candidature;
(vii) extension of candidature;
(viii) completion of candidature away from the University;
(ix) suspension of candidature;
(x) continuance following receipt of annual progress reports.

Board of Postgraduate Studies

19. Pursuant to the resolutions of Senate the Faculty appoints the following to the Board of Postgraduate Studies:
Dean
Pro-Dean
Associate Dean (Postgraduate)
Professors of the Faculty
Discipline Leaders (or nominees)
Postgraduate Coordinators
Two elected representatives of the Faculty of Agriculture, Food and Natural Resources.

Resolutions of the Faculty

(relating to bachelor degrees in the Faculty of Agriculture, Food and Natural Resources)

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

Section 1

1. To qualify for a degree, candidates must complete units of study making a total of 192 credit points and Professional Experience specified for individual degree courses. In a full-time program the normal load will be 48 credit points in each year for 4 years. The degree program must be completed within 10 calendar years of the first enrolment or readmission without credit. If a candidate is admitted or readmitted with credit, the Faculty will determine a reduced time limit for completion of the degree.

2. Candidates for the degrees of Bachelor of Agricultural Economics, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Resource Economics and Bachelor of Science in Agriculture shall complete the units of study listed for each degree in the "Units of undergraduate study" section of this Handbook.

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

3. Variations permitted to the requirements specified in Resolution 2 include:

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

(ii) Summer School
Units of study completed at the University of Sydney Summer School which correspond to units of study in the Tables of undergraduate units of study may be credited towards the course requirements.

(Hi) Cross-institutional enrolment
Provided that permission has been obtained in advance, the Dean may permit a student to complete a unit of study at another institution and have that unit credited to his/her course requirements provided that either:
(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.

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

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

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

(vii) Credit Transfer
(a) Graduates or students in other faculties or other degrees within the Faculty or of other institutions who are admitted to candidature for the degree of Bachelor may be granted credit for units of study required for the various degrees of the Faculty as specified in Resolution 2, as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 credit points.
(b) The Dean may approve credit for a maximum of 36 unspecified credit points for units of study successfully completed elsewhere, but not comparable to units listed in Resolution 2, as part of the 96 credit point maximum credit transfer permitted.

Section 2

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

(ii) Examinations
(a) Completion of unit of study
A student who has been absent from more than 10 per cent of classes in a unit may be deemed to have failed to complete the requirements specified by the Faculty for the unit and may be excluded by the Dean from admission to examinations in that unit.
(b) Further Testing
A Discipline Leader may arrange for further testing of students in addition to scheduled assessments and examinations, in accordance with Academic Board policy.

Further tests for the BAgrEc, BHortSc, BLWSc, BResEc andBScAgr degrees
1. Further tests may be awarded where the candidate has been prevented by sufficient and duly certified illness or misadventure from completing the assessment for a unit of study. The full range of common result grades is available for these candidates.
2. Further tests may be awarded in a unit of study where the examiner requires further evidence to reach a final assessment of a candidate who has failed a unit of study and whose performance is borderline (e.g. a final mark in the range 45-49 per cent). The highest grade of award available is Pass.
3. Where possible and practicable, all further tests will be administered and results finalised no later than two weeks after the end of the examination period.
4. The Discipline Leader is responsible for the awarding, timetabling and conduct of further tests, which may take such form as the Discipline Leader directs. Students in a unit of study must be given notice of the proposed date for conducting further tests no later than the date of publication of the final University Examinations Timetable.
5. Individual students granted a further test should wherever possible be given at least three days' prior notice. A candidate who is absent from a further test without sufficient reason will be deemed to have failed the test.
6. In respect to the notification of students referred to in sections 4 and 5, students will be deemed to have been notified by the Discipline Leader as a result of the posting of information by the due date on one or more noticeboards as advised by the Discipline Leader concerned and posting an email to the students' official University email address(es).
7 It is the responsibility of the student to provide written evidence of illness or misadventure to the appropriate Discipline Leader as soon as possible and practicable and in any case before the close of the relevant examination period. Where such evidence is not presented in time for the student to be offered a further test on the advertised date, the evidence will only be considered by the Discipline Leader where there is sufficient reason why it has not been presented by that date.

5. Honours
(i) First Class or Second Class Honours, Division One or Division Two may be awarded at graduation.
(ii) First Class Honours candidates whose work is of sufficient merit, in the opinion of the Faculty Committee to Award Prizes, Honours and the University Medal, shall receive a bronze medal.
(iii) Award of honours at graduation

1. Honours are awarded in Agriculture and not in an individual subject.
2. Details of the Fourth Year work and determination of marks for Fourth Year are the responsibility of the Discipline Leader and sections concerned.
3. All candidates who have completed an independent research project as part of the final year degree program are formally eligible to be considered for honours. Except with the special permission of the Faculty, honours shall not be awarded to any candidate for the degree of Bachelor of Science in Agriculture, Bachelor of Horticultural Science, Bachelor of Land and Water Science, Bachelor of Agricultural Economics or Bachelor of Resource Economics unless the candidate has completed the course in the minimum time. Notwithstanding the previous condition, candidates who complete the first three years of the course in four years, and who by virtue of their weighted average marks would otherwise qualify for the award of honours, will be so considered. Such candidates may however be disadvantaged in terms of honours grading and ranking.
4.
   (i) For the BAgrEc and BResEc degrees. For the assessment of an aggregate mark for the award of honours at the end of the Fourth Year:
      (a) Each of the units of study at level 2 and level 3 provided for in the resolutions shall be weighted according to credit point value and a weighted average mark (WAM) obtained. Each of the units of study at level 4 provided for in the resolutions shall be weighted according to credit point value and a weighted average mark (WAM) obtained.
      (b) The overall aggregate honours mark shall be the average of the level 2/3 WAM and the level 4 WAM.
   (ii) For the BScAgr, BHortSc and BLWSc degrees. For the determination of the overall honours mark for the award of honours at the end of the Fourth Year:
      (a) Each of the units of study provided for in the resolutions in Second and Third Years shall be weighted according to credit point value and a weighted average mark (WAM) obtained.
      (b) The overall honours mark shall be the average of the Second and Third Year WAM and the Fourth Year mark.
5. In computing the aggregate marks of students, the mark achieved on the occasion of the first attempt at a unit of study shall be the mark used.
6.
   (1) For the BAgrEc and BResEc degrees. For the award of a particular level of honours a candidate, except in special circumstances, must obtain the relevant minimum aggregate honours mark and the minimum WAM in Second and Third Year units of study set out in the following table:

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

   In the event of a recommendation for the award of honours that departs from these standards, it shall be incumbent upon the Discipline Leader and section concerned to make out a substantial case for such a departure. Admissible grounds for departure would include medical disability or misadventure early in the course, and the existence of consistently lower standards of grading in units of study undertaken outside the Faculty of Agriculture, Food and Natural Resources.
   (2) For the BScAgr, BHortSc and BLWSc degrees. For the award of a particular level of honours, a candidate, except in special circumstances, must obtain the relevant minimum marks as set out in the following table:

Level of honours (under review)	Minimum overall honours mark	Minimum WAM Year 4	Minimum WAM Years 2/3
First Class	**75**	**75**	**70**
Second Class, Division 1	**66**	**70**	**63**
Second Class, Division 2	**61**	**65**	**58**

   In the event of a recommendation for honours that departs from these standards, it shall be incumbent upon the Discipline Leader and section concerned to make a substantial case for such a departure.
7. The CAPHUM shall be responsible for the award of the university medal and the award of honours. Achievement of the minimum standards referred to elsewhere in these resolutions is not in itself sufficient justification for these awards.
8.
   (1) (under review) For the BAgrEc and BResEc degree, a university medal may be awarded, on the recommendation of the Agricultural and Resource Economics Discipline Leader, to a student who has a Level 4 WAM of at least 85, an aggregate honours mark of at least 80 and a Second/ Third Year WAM of at least 75.
   (2) (under review) For the BScAgr, BHortSc and BLWSc degrees, a university medal may be awarded, on the recommendation of the Discipline Leader, to a student who has a Level 4 WAM of at least 85, an overall honours mark of at least 80 and a Second/Third Year WAM of at least 75.

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

(i) Suspension of candidature

A student, who has enrolled for the degree and who wishes to suspend candidature for more than two semesters, must seek approval of the Dean, who, where appropriate, may consult Discipline Leaders concerned and having considered advice, may determine any conditions for re-enrolment. A student, who has not obtained written permission to suspend candidature for more than two semesters, will be required to apply for re-admission in accordance with procedures determined by the Dean.

(ii) Withdrawal and Discontinuation of enrolment

(a) Withdrawal from Semester 1 units of study

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

(b) Withdrawal from Semester 2 units of study

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

(c) Discontinuation

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

(1) Discontinued - Not to count as failure

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

(2) Discontinued - Fail

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

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

(Hi) Re-enrolment after an absence

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

(iv) Satisfactory progress - exclusion and re-admission

There are certain circumstances in which a student may be asked to show good cause why he/she should be permitted to repeat any previously attempted study, if, in the opinion of the Faculty Exclusions

and Re-admission Committee, he/she has not made satisfactory progress towards fulfilling the requirements of the degree or the unit.

Satisfactory progress cannot be defined in all cases in advance but a student who has:

(a) twice failed (F), or discontinued enrolment to count as a failure (DF), any unit of study as defined in Resolution 2 relating to the Bachelor degrees of the Faculty or
(b) failed more than sixty per cent of the credit points for which enrolled in any four successive semesters, shall be deemed not to have made satisfactory progress.

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

It is not possible to define in advance all the reasons that constitute 'good cause' but serious ill health, or misadventure properly attested, will be considered. In addition your general record, for example in other courses, would be taken into account. In particular if you were transferring from another faculty your record in your previous faculty would be considered. Not usually acceptable as good cause are such matters as demands of employers, pressure of employment, time devoted to non-university activities and so on, except as they may be relevant to any serious ill health or misadventure.

7. Professional experience and Faculty excursions

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

The aims of professional experience are to:

1. Familiarise students with agricultural, horticultural or natural resource industries;
2. Provide the opportunity to experience agricultural and horticultural production and natural resource management across a range of environments and managerial systems;
3. Provide experience with business organisations involved in finance, marketing, research and development and other aspects of the rural industries;
4. Train students to collect, collate, analyse and report.

BAgrEc, BLWSc and BScAgr

1. Candidates must complete a minimum of 60 days of professional experience. Each component of the experience must be approved on behalf of the Dean before credit is granted. A minimum of 30 days must be completed as on-farm experience with the minimum on any enterprise being 10 days.
A maximum of 10 days may be credited on property which is owned by the candidate's parents or the University.
In addition, candidates must complete a minimum of 30 days 'graduate placement' (minimum 15 days at any one enterprise). Graduate placement is non-farm experience, typically with organisations with whom graduates find employment e.g. NSW Department of Primary Industries, finance organisations, experiencing the kind of work they will find as a graduate.

2. It is a requirement that on-farm experience includes:
(a) experience in 2 different regions (and not adjacent shires)
(b) experience in 2 rural enterprises

A significant proportion of this 30 day on-farm component should be completed before non-farm professional experience is undertaken. The farms concerned must be commercial farms not hobby farms. Commercial farms are defined as those having a gross income of at least $25,000.

3. A separate Professional Experience report must be submitted following each visit to a farm or organisation. Credit is subject to a satisfactory and timely report. Late reports normally are not credited. Time penalties are applied to resubmitted and incomplete reports. A senior report must be completed on a commercial farm. (A maximum of 3 "General Reports" can be credited.)

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

5. Final year students wishing to graduate must complete all practical work requirements by 14 January of the year of graduation. *Reports from graduands submitted after 14 January will not be marked until the July semester*

BHortSc

As for the BAgrEc, BLWSc, BScAgr, except that:
1. A minimum of 30 days professional experience must be completed in horticultural production industries (on-farm).

2. It is a requirement that the experience in horticultural production industries include a minimum of 10 days in at least 2 industries in at least 2 climatic regions as defined below. A significant proportion of this 30 day on-farm component should be completed before non-farm professional experience is undertaken. The farms concerned must be commercial farms not hobby farms. Commercial farms are defined as those having a gross income of at least $25 000.
The horticultural industries are classified into 4 groups for professional experience:

(a) Fruit and Nut
(b) Vegetables
(c) Ornamentals (including nursery stock, cut flower and turf production)
(d) Amenity (including parks, gardens and streetscape establishment and maintenance and landscape horticulture).

The Australian regions are listed in the back of the Professional Experience Book except that for BHortSc students the coastal region (Zone 1) is subdivided along the southern boundary of Kempsey Shire.

BResEc

As for the BAgrEc, BLWSc, BScAgr, except that:
1. Students must complete at least 2 "field-work" experience placements. These placements must be with firms or organisations involved in natural resources and each must be in a different industry (e.g. farming, forestry, fishing, mining, energy, water harvesting or use, national parks). "Field-work" here means working with the resource system in situ, not managing or working in relation to it remotely.

2. At least one field-work placement will normally be completed before the commencement of the second academic year. At least two field-work placements and a minimum of 40 days of professional experience will normally be completed before commencement of the third academic year.

3. Students must complete a minimum of 20 days on one or more placements in professional activities gaining experience of management or economic analysis of natural resources relevant to BResEc graduates.

4. Sufficient placements to accrue 60 days professional experience should be completed before the commencement of the final semester of the student's course of study.

5. A maximum of 10 days may be credited for a natural resources enterprise which is owned or operated by the candidate's parents or by the University.

Faculty excursions

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

(a) First Year - at Easter, from Easter Monday (to the Macquarie Valley in the Central West)
(b) South West Excursion - in the 2nd semester mid-semester break (the end of September, just before the October long weekend).
(c) North West Excursion - during Orientation Week.

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

University of Sydney (Coursework) Rule 2000 (as amended)

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Approved by: Senate on 4 December 2000
Date of effect: 1 January 2001

Latest amendment approved by: Senate on 3 December 2001
Date of effect: 1 January 2002

University of Sydney (Coursework) Rule 2000 (as amended)

Preliminary

1. Commencement and purpose of Rule
(1) This Rule is made by the Senate pursuant to section 37(1) of the University of Sydney Act 1989 for the purposes of the University of Sydney By-law 1999.
(2) This Rule comes into force on 1 January 2001.
(3) This Rule governs all coursework award courses in the University. It is to be read in conjunction with the University of Sydney (Amendment Act) Rule 1999 and the Resolutions of the Senate and the faculty resolutions relating to each award course in that faculty.

Rules relating to coursework award courses

1. Definitions
In this Rule:
award course means a formally approved program of study which can lead to an academic award granted by the University.
coursework means an award course not designated as a research award course. While the program of study in a coursework award course may include a component of original, supervised research, other forms of instruction and learning normally will be dominant. All undergraduate award courses are coursework award courses.
credit means advanced standing based on previous attainment in another award course at the University or at another institution. The advanced standing is expressed as credit points granted towards the award course. Credit may be granted as specific credit or non-specific credit.

specific credit means the recognition of previously completed studies as directly equivalent to units of study;
non-specific credit means a "block credit" for a specified number of credit points at a particular level. These credit points may be in a particular subject area but are not linked to a specific unit of study; and
credit points means a measure of value indicating the contribution each unit of study provides towards meeting award course completion requirements stated as a total credit point value.

dean means the dean of a faculty or the director or principal of an academic college or the chairperson of a board of studies.
degree means a degree at the level of bachelor or master for the purpose of this Rule.
embedded courses/programs means award courses in the graduate certificate/graduate diploma/master's degree by coursework sequence which allow unit of study credit points to count in more than one of the awards.
faculty means a faculty, college board, a board of studies or the Australian Graduate School of Management Limited as established in each case by its constitution and in these Rules refers to the faculty or faculties responsible for the award course concerned.
major means a defined program of study, generally comprising specified units of study from later stages of the award course.
minor means a defined program of study, generally comprising units of study from later stages of the award course and requiring a smaller number of credit points than a major.
postgraduate award course means an award course leading to the award of a graduate certificate, graduate diploma, degree of master or a doctorate. Normally, a postgraduate award course requires the prior completion of a relevant undergraduate degree or diploma.
research award course means an award course in which students undertake and report systematic, creative work in order to increase the stock of knowledge. The research award courses offered by the University are: higher doctorate, Doctor of Philosophy, doctorates by research and advanced coursework, and certain degrees of master designated as research degrees. The systematic, creative component of a research award course must comprise at least 66 per cent of the overall award course requirements.
stream means a defined program of study within an award course, which requires the completion of a program of study specified by the award course rules for the particular stream, in addition to the core program specified by award course rules for the award course.
student means a person enrolled as a candidate for a course.
testamur means a certificate of award provided to a graduate, usually at a graduation ceremony.
transcript or **academic transcript** means a printed statement setting out a student's academic record at the University.
unit of study means the smallest stand-alone component of a student's award course that is recordable on a student's transcript. Units of study have an integer credit point value, normally in the range 3-24.
undergraduate award course means an award course leading to the award of an associate diploma, diploma, advanced diploma or degree of bachelor.

2. Authorities and responsibilities
(1) Authorities and responsibilities for the functions set out in this Rule are also defined in the document *Academic Delegations of Authority*. The latter document sets out the mechanisms by which a person who has delegated authority may appoint an agent to perform a particular function.
(2) The procedures for consideration of, and deadlines for submission of, proposals for new and amended award courses will be determined by the Academic Board.

Division 1: Award course requirements, credit points and assessment

3. Award course requirements
(1) To qualify for the award of a degree, diploma or certificate, a student must:
(a) complete the award course requirements specified by the Senate for the award of the degree, diploma or certificate concerned;
(b) complete any other award course requirements specified by the Academic Board on the recommendation of the faculty and published in the faculty resolutions relating to the award course;
(c) complete any other award course requirements specified by the faculty in accordance with its delegated authority

and published in the faculty resolutions relating to the award course; and

(d) satisfy the requirements of all other relevant by-laws, rules and resolutions of the University.

4. Units of study and credit points

(1)

(a) A unit of study comprises the forms of teaching and learning approved by a faculty. Where the unit of study is being provided specifically for an award course which is the responsibility of another faculty, that faculty must also provide approval.

(b)Any faculty considering the inclusion of a unit of study in the tables of units available for an award course for which it is responsible may review the forms of teaching and learning of that unit, may consult with the approving faculty about aspects of that unit and may specify additional conditions with respect to inclusion of that unit of study.

(2) A student completes a unit of study if the student:

(a) participates in the learning experiences provided for the unit of study;

(b) meets the standards required by the University for academic honesty;

(c) meets all examination, assessment and attendance requirements for the unit of study; and

(d) passes the required assessments for the unit of study.

(3) Each unit of study is assigned a specified number of credit points by the faculty responsible for the unit of study.

(4) The total number of credit points required for completion of an award course will be as specified in the Senate resolutions relating to the award course.

(5) The total number of credit points required for completion of award courses in an approved combined award course will be specified in the Senate or faculty resolutions relating to the award course.

(6) A student may, under special circumstances, and in accordance with faculty resolutions, be permitted by the relevant dean to undertake a unit or units of study other than those specified in the faculty resolutions relating to the award course and have that unit or those units of study counted towards fulfilling the requirements of the award course in which the student is enrolled.

5. Unit of study assessment

(1) A student who completes a unit of study will normally be awarded grades of high distinction, distinction, credit or pass, in accordance with policies established by the Academic Board. The grades high distinction, distinction and credit indicate work of a standard higher than that required for a pass.

(2) A student who completes a unit of study for which only a pass/fail result is available will be recorded as having satisfied requirements.

(3) In determining the results of a student in any unit of study, the whole of the student's work in the unit of study may be taken into account.

(4) Examination and assessment in the University are conducted in accordance with the policies and directions of the Academic Board.

6. Attendance

(1) A faculty has authority to specify the attendance requirements for courses or units of study in that faculty. A faculty must take into account any University policies concerning modes of attendance, equity and disabled access.

(2) A faculty has authority to specify the circumstances under which a student who does not satisfy attendance requirements may be deemed not to have completed a unit of study or an award course.

Division 2: Enrolment

7. Enrolment restrictions

(1) A student who has completed a unit of study towards the requirements of an award course may not re-enrol in that unit of study, except as permitted by faculty resolution or with the written permission of the dean. A student permitted to re-enrol may receive a higher or lower grade, but not additional credit points.

(2) Except as provided in subsection (1), a student may not enrol in any unit of study which overlaps substantially in content with a unit that has already been completed or for which credit or exemption has been granted towards the award course requirements.

(3) A student may not enrol in units of study additional to award course requirements without first obtaining permission from the relevant dean.

(4) Except as prescribed in faculty resolutions or with the permission of the relevant dean:

(a) a student enrolled in an undergraduate course may not enrol in units of study with a total value of more than 32 credit points in any one semester, or 16 credit points in the summer session; and

(b) a student enrolled in a postgraduate award course may not enrol in units of study with a total value of more than 24 credit points in any one semester, or 12 credit points in the summer session.

Division 3: Credit, cross-institutional study and their upper limits

8. Credit for previous studies

(1) Students may be granted credit on the basis of previous studies.

(2) Notwithstanding any credit granted on the basis of work completed or prior learning in another award course at the University of Sydney or in another institution, in order to qualify for an award a student must:

(a) for undergraduate award courses, complete a minimum of the equivalent of two full-time semesters of the award course at the University; and

(b) for postgraduate award courses, complete at least 50 per cent of the requirements prescribed for the award course at the University.

These requirements may be varied where the work was completed as part of an embedded program at the University or as part of an award course approved by the University in an approved conjoint venture with another institution.

(3) The credit granted on the basis of work completed at an institution other than a university normally should not exceed one third of the overall award course requirements.

(4) A faculty has authority to establish embedded academic sequences in closely related graduate certificate, graduate diploma and master's degree award courses. In such embedded sequences, a student may be granted credit for all or some of the units of study completed in one award of the sequence towards any other award in the sequence, irrespective of whether or not the award has been conferred.

(5) In an award course offered as part of an approved conjoint venture the provisions for the granting of credit are prescribed in the Resolutions of the Senate and the faculty resolutions relating to that award course.

9. Cross-institutional study

(1) The relevant dean may permit a student to complete a unit or units of study at another university or institution and have that unit or those units of study credited to the student's award course.

(2) The relevant dean has authority to determine any conditions applying to cross-institutional study.

Division 4: Progression

10. Repeating a unit of study

(1) A student who repeats a unit of study shall, unless granted exemption by the relevant dean:

(a) participate in the learning experiences provided for the unit of study; and

(b) meet all examination, assessment and attendance requirements for the unit of study.

(2) A student who presents for re-assessment in any unit of study is not eligible for any prize or scholarship awarded in connection with that unit of study without the permission of the relevant dean.

11. Time limits

A student must complete all the requirements for an award course within ten calendar years or any lesser period if specified by resolution of the Senate or the faculty.

Division 5: Discontinuation of enrolment and suspension of candidature

12. Discontinuation of enrolment

(1) A student who wishes to discontinue enrolment in an award course or a unit of study must apply to the relevant dean and will be presumed to have discontinued enrolment from the date of that application, unless evidence is produced showing:
(a) that the discontinuation occurred at an earlier date; and
(b) that there was good reason why the application could not be made at the earlier time.

(2) A student who discontinues enrolment during the first year of enrolment in an award course may not re-enrol in that award course unless:
(a) the relevant dean has granted prior permission to re-enrol; or
(b) the student is reselected for admission to candidature for that course.

(3) No student may discontinue enrolment in an award course or unit of study after the end of classes in that award course or unit of study, unless he or she produces evidence that:
(a) the discontinuation occurred at an earlier date; and
(b) there was good reason why the application could not be made at the earlier time.

(4) A discontinuation of enrolment may be recorded as "Withdrawn (W)" or "Discontinued Not To Count As Failure (DNF)" where that discontinuation occurs within the time-frames specified by the University and published by the faculty, or where the student meets other conditions as specified by the relevant faculty.

13. Suspension of candidature

(1) A student must be enrolled in each semester in which he or she is actively completing the requirements for the award course. A student who wishes to suspend candidature must first obtain approval from the relevant dean.

(2) The candidature of a student who has not re-enrolled and who has not obtained approval from the dean for suspension will be deemed to have lapsed.

(3) A student whose candidature has lapsed must apply for re-admission in accordance with procedures determined by the relevant faculty.

(4) A student who enrols after suspending candidature shall complete the requirements for the award course under such conditions as determined by the dean.

Division 6: Unsatisfactory progress and exclusion

14. Satisfactory progress

A faculty has authority to determine what constitutes satisfactory progress for all students enrolled in award courses in that faculty, in accordance with the policies and directions of the Academic Board.

15. Requirement to show good cause

(1) For the purposes of this Rule, "good cause" means circumstances beyond the reasonable control of a student, which may include serious ill health or misadventure, but does not include demands of employers, pressure of employment or time devoted to non-University activities, unless these are relevant to serious ill health or misadventure. In all cases the onus is on the student to provide the University with satisfactory evidence to establish good cause. The University may take into account relevant aspects of a student's record in other courses or units of study within the University and relevant aspects of academic studies at other institutions provided that the student presents this information to the University.

(2) The relevant dean may require a student who has not made satisfactory progress to show good cause why he or she should be allowed to re-enrol.

(3) The dean will permit a student who has shown good cause to re-enrol.

16. Exclusion for failure to show good cause

The dean may, where good cause has not been established:

(1) exclude the student from the relevant course; or

(2) permit the student to re-enrol in the relevant award course subject to restrictions on units of study, which may include, but are not restricted to:
(a) completion of a unit or units of study within a specified time;
(b) exclusion from a unit or units of study, provided that the dean must first consult the head of the department responsible for the unit or units of study; and
(c) specification of the earliest date upon which a student may re-enrol in a unit or units of study.

17. Applying for re-admission after exclusion

(1) A student who has been excluded from an award course or from a unit or units of study may apply to the relevant dean for re-admission to the award course or re-enrolment in the unit or units of study concerned after at least four semesters, and that dean may readmit the student to the award course or permit the student to re-enrol in the unit or units of study concerned.

(2) With the written approval of the relevant dean, a student who has been excluded may be given credit for any work completed elsewhere in the University or in another university during a period of exclusion.

18. Appeals against exclusion

(1) In this Rule a reference to the Appeals Committee is a reference to the Senate Student Appeals Committee (Exclusions and Re-admissions).

(2) (a) (i) A student who has been excluded in accordance with this Rule may appeal to the Appeals Committee.
(ii) A student who has applied for re-admission to an award course or re-enrolment in a unit of study after a period of exclusion, and who is refused re-admission or re-enrolment may also apply to the Appeals Committee.
(b) The Appeals Committee shall comprise:
(i) three ex officio members (the Chancellor, the Deputy Chancellor and the Vice-Chancellor and Principal);
(ii) the Chair and Deputy Chairs of the Academic Board;
(iii) two student Fellows; and
(iv) up to four other Fellows.
(c) The Appeals Committee may meet as one or more subcommittees providing that each subcommittee shall include at least one member of each of the categories of:
(i) ex officio member;
(ii) Chair or Deputy Chair of the Academic Board;
(iii) student Fellow; and
(iv) other Fellows.
(d) Three members shall constitute a quorum for a meeting of the Appeals Committee or a subcommittee.
(e) The Appeals Committee and its subcommittees have authority to hear and determine all such appeals and must report its decision to the Senate annually.
(f) The Appeals Committee or a subcommittee may uphold or disallow any appeal and, at its discretion, may determine the earliest date within a maximum of four semesters at which a student who has been excluded shall be permitted to apply to re-enrol.
(g) No appeal shall be determined without granting the student the opportunity to appear in person before the Appeals Committee or subcommittee considering the appeal. A student so appearing may be accompanied by a friend or adviser.
(h) The Appeals Committee or subcommittee may hear the relevant dean but that dean may only be present at those stages at which the student is permitted to be present. Similarly, the dean is entitled to be present when the Committee or subcommittee hears the student.
(i) If, due notice having been given, a student fails to attend a meeting of the Appeals Committee or subcommittee scheduled to consider that student's appeal, the Appeals Committee or subcommittee, at its discretion, may defer consideration of the appeal or may proceed to determine the appeal.
(j) A student who has been excluded in accordance with these resolutions and has lodged a timely appeal against that exclusion may re-enrol pending determination of that appeal if it has not been determined by the commencement of classes in the next appropriate semester.

Division 7: Exceptional circumstances

19. Variation of award course requirements in exceptional circumstances

The relevant dean may vary any requirement for a particular student enrolled in an award course in that faculty where, in the opinion of the dean, exceptional circumstances exist.

Division 8: Award of degrees, diplomas and certificates

20. Classes of award

(1) Undergraduate diplomas may be awarded in five grades - pass, pass with merit, pass with distinction, pass with high distinction or honours.
(2) Degrees of bachelor may be awarded in two grades - pass or honours.
(3) Graduate diplomas and graduate certificates may be awarded in one grade only - pass.
(4) Degrees of master by coursework may be awarded three grades - pass, pass with merit or honours.

21. Award of the degree of bachelor with honours

(1) The award of honours is reserved to indicate special proficiency. The basis on which a student may qualify for the award of honours in a particular award course is specified in the faculty resolutions relating to the course.
(2) Each faculty shall publish the grading systems and criteria for the award of honours in that faculty.
(3) Classes which may be used for the award of honours are:
First Class
Second Class/Division 1
Second Class/Division 2
Third Class
(4) With respect to award courses which include an additional honours year:
(a) a student may not graduate with the pass degree while enrolled in the honours year;
(b) on the recommendation of the head of the department concerned, a dean may permit a student who has been awarded the pass degree at a recognised tertiary institution to enrol in the honours year in that faculty;
(c) faculties may prescribe the conditions under which a student may enrol part-time in the honours year;
(d) a student who fails or discontinues the honours year may not re-enrol in it, except with the approval of the dean.

22. University Medal

An honours bachelor's degree student with an outstanding academic record throughout the award course may be eligible for the award of a University Medal, in accordance with Academic Board policy and the requirements of the faculty resolutions relating to the award course concerned.

23. Award of the degree of master with honours or merit

The award of honours or pass with merit is reserved to indicate special proficiency or particular pathways to completion. The basis on which a student may qualify for the award of honours or the award with merit in a particular degree is specified in the Faculty Resolutions relating to that degree.

24. Transcripts and testamurs

(1) A student who has completed an award course or a unit of study at the University will receive an academic transcript upon application and payment of any charges required.
(2) Testamurs may indicate streams or majors or both as specified in the relevant faculty resolutions.

Division 9: Transitional provisions

25. Application of this Rule during transition

This Rule applies to all candidates for degrees, diplomas and certificates who commence candidature after 1 January 2001. Candidates who commenced candidature prior to this date may choose to proceed in accordance with the resolutions of the Senate in force at the time they enrolled, except that the faculty may determine specific conditions for any student who has re-enrolled in an award course after a period of suspension.

General University information

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Accommodation Service

The Accommodation Service helps students find off-campus accommodation. The service maintains an extensive database of accommodation close to the Camperdown and Darlington Campus or within easy access via public transport. Currently enrolled students can access the database online through the MyUni student portal (http://myuni.usyd.edu.au), or the accommodation website via your MyUni student portal or the Services for Students website (http ://w w w.usy d. edu.au/stuserv).

Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +61 29351 3312
Fax: +612 93518262
Email: accomm@stuserv.usyd.edu.au
Web: www.usyd.edu.au/accom

Admissions Office

The Admissions Office, located in the Student Centre, is responsible for overseeing the distribution of offers to undergraduate applicants through the Universities Admission Centre (UAC). They can advise prospective local undergraduate students on admission requirements. Postgraduate students should contact the appropriate faculty. If you are an Australian citizen or a permanent resident but have qualifications from a non-Australian institution phone +61 2 9351 4118 for more information. For enquiries regarding special admissions (including mature-age entry) phone +61 29351 3615. Applicants without Australian citizenship or permanent residency should contact the International Office (see International Student Centre entry).

Student Centre
Ground Floor, Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4117 or +61 2 9351 4118
Fax: +612 93514869
Email: admissions @records.usyd.edu.au
Web: www.usyd.edu.au/su/studentcentre

Applying for a course

Local applicants for undergraduate courses and programs of study

For the purpose of admission and enrolment "local applicant" refers to citizens and permanent residents of Australia and citizens of New Zealand. If you are in this group and wish to apply for admission into an undergraduate course, you would generally apply through the Universities Admissions Centre (UAC). The deadline for application is the last working day of September in the year before enrolment. Go to the UAC website (http://www.uac.edu.au) for more information.

Note that some faculties, such as Pharmacy, the Sydney Conservatorium of Music and Sydney College of the Arts, have additional application procedures.

Local applicants for postgraduate courses and programs of study

For the purpose of admission and enrolment "local applicant" refers to citizens and permanent residents of Australia and citizens of New Zealand. Application is direct to the faculty which offers the course that you are interested in. Application forms for postgraduate coursework, postgraduate research and the Master's qualifying or preliminary program and for non-award postgraduate study can be found at www.usyd.edu.au/su/studentcentre/applications/applications.html.

Please note that some faculties use their own specially tailored application forms for admission into their courses. Please contact the relevant faculty.

International applicants for all course types (undergraduate and postgraduate)

"International applicants" refers to all applicants other than Australian citizens, Australian permanent residents and citizens of New Zealand. In the majority of cases international applicants apply for admission through the University's International Office (IO) (see International Student Centre entry). All the information international applicants need, including application forms, is available from the IO website.

Assessment

For assessment matters refer to the relevant department or school.

Careers Centre

The Careers Centre will help you with careers preparation and gradutate recruitment.

Careers Centre
Ground Floor, Mackie Building KOI
The University of Sydney
NSW 2006 Australia

Phone: +612 93513481
Fax: +612 93515134
Email: info@careers.usyd.edu.au
Web: www.careers.usyd.edu.au

Casual Employment Service

The Casual Employment Service helps students find casual and part-time work during their studies and during University vacations. The service maintains a database of casual employment vacancies. Currently enrolled students can access the database online through the MyUni student portal, or the casual employment website via your MyUni student portal, or the Services for Students website (http://www.usyd.edu.au/stuserv).

Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +612 93518714
Fax: +612 93518717
Email: ces@stuserv.usyd.edu.au
Web: www.usyd.edu.au/cas_emp

Centre for Continuing Education

The Centre for Continuing Education offers a wide range of short courses for special interest, university preparation and professional development.
Centre for Continuing Education
Cnr Missenden Road and Campbell Street
Sydney University Village
Newtown NSW 2042

Postal address:
Locked Bag 20
Glebe NSW 2037

Ph: +61 2 9036 4789
Fax: +612 9036 4799
Email: info@cce.usyd.edu.au
Web: www.cce.usyd.edu.au

Subject areas include: history and culture, creative arts, social sciences, languages, IT, business and overseas study tours. Courses are open to everyone.

Centre for English Teaching (CET)

The Centre for English Teaching (CET) offers English language and academic study skills programs to students from overseas and Australian residents from non-English speaking backgrounds who need to develop their English language skills to meet academic entry requirements.

Mallett Street Campus M02

Phone: +612 93510760
Fax: +612 93510710
Email: info@cet.usyd.edu.au
Web: www.usyd.edu.au/cet

Child care

Contact the Child Care Information Officer for information about child care for students and staff of the University who are parents. For details of centres, vacation and occasional care see the child care website via your MyUni student portal or the Services for Students website (http://www.usyd.edu.au/stuserv)

Child Care Information Officer
Level 7, Education Building A35

Phone: +612 93515667
Fax: +612 93517055
Email: childc @ stuserv.usyd.edu.au
Web: www.usyd.edu.au/childcare

Client Services, Information and Communications Technology (ICT)

Client Services are responsible for the delivery of many of the computing services provided to students. Students can contact Client Services by phoning the ICT Helpdesk on 9351 6000, through the IT Assist website (www.itassist.usyd.edu.au) or by visiting the staff of the University Access Labs.
The access labs on the Camperdown and Darlington campus are located in:

- Fisher Library (Level 2);
- Carslaw Building (Room 201);
- Education Building (Room 232);
- Christopher Brennan Building (Room 232);
- Engineering Link Building (Room 222); and
- Pharmacy and Bank Building (Room 510).

Other labs are available at the Law, Westmead Hospital and Cumberland campuses.

The labs provide students free access to computers including office productivity and desktop publishing software.

Services available on a fee for service basis include Internet access, printing facilities and the opportunity to host their own non-commercial website.

Each student is supplied with an account, called a "Unikey" account, which allows access to a number of services including:

- free email (www-mail.usyd.edu.au);
- access to the Internet from home or residential colleges (www.itassist.usyd.edu.au/services.html);
- student facilities via the MyUni student portal (http://my-uni.usyd.edu.au), including exam results, enrolment variations and timetabling; and
- free courses in basic computing (such as MS Office; basic html and excel) that are run by Access Lab staff in the week following orientation week. To register contact the Access Lab Supervisor on+61 2 9351 6870.

Client Services, Helpdesk
University Computer Centre, H08
The University of Sydney
NSW 2006 Australia

Phone: +612 93516000
Fax: +612 93516004
Email: support@usyd.edu.au
Web: www.itassist.usyd.edu.au

The Co-op Bookshop

The Co-op Bookshop is a one-stop bookshop for:

- textbooks;
- general books;
- course notes;
- reference books;
- DVDs;
- flash drives; and
- software at academic prices.

Lifetime membership costs $20.00 and gives a ten per cent discount on purchases (conditions apply).

Sports and Aquatic Centre Building G09

Phone: +612 93513705
Fax: +61 2 9660 5256
Email: sydu@coop-bookshop.com.au
Web: www.coop-bookshop.com.au

Counselling Service

The Counselling Service aims to help students fulfil their academic, individual and social goals through professional counselling. Counselling is free and confidential. The service provides short-term, problem-focused counselling to promote psychological wellbeing and to help students develop effective and realistic coping strategies. The service runs a program of workshops during each semester. For details of workshops, activities and online resources provided by the service see the Counselling Service website via your MyUni student portal or the Services for Students website www.usyd.edu.au/stuserv.

Camperdown and Darlington
Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +612 93512228
Fax: +612 93517055
Email: counsell@mail.usyd.edu.au
Web: www.usyd.edu.au/counsel

Cumberland Campus
Ground Floor, A Block, Cumberland Campus C42
The University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +612 93519638
Fax: +612 93519635
Email: CS_Cumberland@fhs.usyd.edu.au
Web: www.usyd.edu.au/counsel

Disability Services

Disability Services is the principal point of contact for advice on assistance available for students with disabilities. The service works closely with academic and administrative staff to ensure that students receive reasonable accommodations in their areas of study. Assistance available includes the provision of note taking, interpreters and advocacy with academic staff to negotiate assessment and course requirement modifications where appropriate. For details on registering with the service and online resources see the Disability Services website via your MyUni student portal or the Services for Students website www.usyd.edu.au/stuserv.

Camperdown and Darlington campuses

Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +612 93517040
Fax: +612 93513320
TTY: +612 93513412
Email: disserv@stuserv.usyd.edu.au
Web: www.usyd.edu.au/disability

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
The University of Sydney
East Street
Lidcombe
NSW 2141 Australia
Phone: +612 93519638
Fax: +612 93519635
Email: DS_Cumberland@fhs.usyd.edu.au
Web: www.usyd.edu.au/disability

Enrolment

Students entering first year

Details of enrolment procedures will be sent to you with your UAC offer of enrolment. Enrolment takes place at a specific time and date, usually during the last week of January, depending on your surname and the faculty in which you are enrolling. You must attend the University in person or else nominate somebody in writing to act on your behalf. On enrolment day you pay the compulsory fees for joining the Student Union, the Students' Representative Council and sporting bodies. (These are currently subject to Parliamentary Review and may be voluntary in 2006.) You also nominate your preferred payment option, either "up front" or deferred, for your Higher Contribution Scheme (HECS) liability. You will also choose your first-year units of study, so it's important to consult the appropriate faculty handbook before enrolling.

All other students

A pre-enrolment package is sent to all enrolled students in late September and contains instructions on the procedure for pre-enrolment.

Environmental Policy

The University of Sydney's Environmental Policy promotes sustainable resource and product use; and encourages the practice of environmental stewardship by staff and students. The policy is supported by the University wide Sustainable Campus Program.

Enquiries can be directed to the Manager, Environmental Strategies phone +61 2 93512063, email: janet.broady@usyd.edu.au, or go to www.facilities.usyd.edu.au/projects/environ/about.shtmlwhereyou can find out what the University is doing and how you can get involved, make suggestions or receive the Sustainable Campus Newsletter.

Examinations

The Examinations and Exclusions Office looks after the majority of examination arrangements and student progression. Some faculties, such as the Sydney Conservatorium of Music, make all examination arrangements for the units of study that they offer.

Examinations and Exclusions Office
Student Centre
Level 1, Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 4005 or +61 2 9351 4006
Fax: +612 93517330
Email: exams.office@exams.usyd.edu.au

Fees

The Fees Office provides information on how to pay fees, where to pay fees and if payments have been received. The office also has information on obtaining a refund for fee payments.

Fees Office
Margaret Telfer Building K07
The University of Sydney
NSW 2006 Australia

Phone: +612 93515222
Fax: +612 93514202

Financial Assistance Office

The University of Sydney has a number of loan and bursary funds to assist students experiencing financial difficulties. Loan assistance is available for undergraduate and postgraduate students enrolled in degree and diploma courses at the University. The assistance is not intended to provide the principle means of support but to help enrolled students in financial need with expenses such as housing bonds and rent; phone and electricity bills; medical expenses; buying textbooks and course equipment. Loans are interest free and are repayable usually within one year. Bursaries may be awarded depending on financial need and academic merit and are usually only available to local full-time undergraduate students. Advertised bursaries, including First Year Bursaries, are advertised through the MyUni student portal in January each year. For details of types of assistance and online resources provided by the service see the Financial Assistance website via your MyUni student protal or the Services for Students website www.usyd.edu.au/stuserv

Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +612 93512416
Fax: +612 93517055
Email: fao@stuserv.usyd.edu.au
Web: www.usyd.edu.au/fin_assist

Freedom of Information

The University of Sydney falls within the jurisdiction of the *NSW Freedom of Information Act, 1989.* The act:

- requires information concerning documents held by the University to be made available to the public;
- enables a member of the public to obtain access to documents held by the University; and
- enables a member of the public to ensure that records held by the University concerning his or her personal affairs are not incomplete, incorrect, out of date or misleading.

(Note that a "member of the public" includes staff and students of the University.)

It is a requirement of the act that applications be processed and a determination made within a specified time period, generally 21 days. Determinations are made by the University's Registrar.

While application may be made to access University documents, some may not be released in accordance with particular exemptions

provided by the act. There are review and appeal mechanisms which apply when access has been refused.

The University is required to report to the public on its freedom of information (FOI) activities on a regular basis. The two reports produced are the *Statement of Affairs* and the *Summary of Affairs.* The *Statement of Affairs* contains information about the University, its structure, function and the kinds of documents held. The *Summary of Affairs* identifies the University's policy documents and provides information on how to make an application for access to University documents.

Further information and copies of the current reports may be found at www.usyd.edu.au/arms/foi

Graduations Office

The Graduations Office is responsible for organising graduation ceremonies and informing students of their graduation arrangements.

Student Centre
Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3199, +61 2 9351 4009
Protocol:+61 2 93514612
Fax: +612 93515072

(Grievances) Appeals

You may consider that a decision affecting your candidature for a degree or other activities at the University has not taken into account all relevant matters.

In some cases the by-laws or resolutions of the Senate (see the University Calendar (http://www.usyd.edu.au/about/publication/pub/calendar.shtml)) provide for a right of appeal against particular decisions; for example, there is provision for appeal against academic decisions, disciplinary decisions and exclusion after failure.

A document outlining the current procedures for appeals against academic decisions is available at the Student Centre, at the SRC, and on the University's policy online website (http://www.usyd.edu.au/policy) (click on "Study at the University", then click on "Appeals" - see the Academic Board and Senate resolutions).

For assistance or advice regarding an appeal contact:

Students' Representative Council
Level 1, Wentworth Building G01
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9660 5222

HECS and Fees Office

Student Centre
Ground Floor, Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 5659, +61 2 9351 5062, +61 2 9351 2086
Fax: +612 93515081

International Student Centre

The International Student Centre consists of the International Office and the Study Abroad and Exchange Office. The IO provides assistance with application, admission and enrolment procedures and administers scholarships for international students. The Study Abroad and Exchange unit assists both domestic and international students who wish to enrol for study abroad or exchange programs.

International Student Centre

Services Building G12
The University of Sydney
NSW 2006 Australia

Phone: +612 93514079
Fax: +612 93514013
Email: info@io.usyd.edu.au
Web: www.usyd.edu.au/international

Study Abroad and Exchange Unit

Study Abroad
Phone: +612 93513699
Fax: +612 93512795
Email: studyabroad@io.usyd.edu.au
Web: w w w.usy d. edu. au/fstudent/study abroad/index, shtml

Exchange
Phone: +612 93513699
Fax: +612 93512795
Email: exchange@io.usyd.edu.au
Web: ww w.usy d. edu. au/f student/study abroad/partners. shtml

International Student Services Unit

The International Student Services Unit assists international students through the provision of orientation, counselling and welfare services to both students and their families. ISSU aims to help international students cope successfully with the challenges of living and studying in a unfamiliar culture, to achieve success in their studies and to make the experience of being an international student rewarding and enjoyable. For details of orientation activities, counselling and welfare services provided to both students and their families and online resources, see the MyUni student portal or the Services for Students website www.usyd.edu.au/stuserv. International students also have access to all University student support services.

Camperdown and Darlington campuses

Ground Floor, Services Building G12
The University of Sydney
NSW 2006 Australia

Phone: +612 93514749
Fax: +612 93516818
Email: info@issu.usyd.edu.au
Web: www.usyd.edu.au/issu

Cumberland Campus

Ground Floor, A Block, Cumberland Campus C42
The University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +612 93519638
Fax: +612 93519635
Email: ISSU_Cumberland@fhs.usyd.edu.au
Web: www.usyd.edu.au/issu

Koori Centre and Yooroang Garang

The Koori Centre provides programs, services and facilities to encourage and support the involvement of Aboriginal and Torres Strait Islander people in all aspects of tertiary education at the University of Sydney. The Cadigal Special Entry Program assists Indigenous Australians to enter undergraduate study across all areas of the University.

As well as delivering block-mode courses for Indigenous Australian students, the Koori Centre teaches Aboriginal Studies in various mainstream courses. In addition the Centre provides tutorial assistance, and student facilities such as: computer lab, Indigenous research library and study rooms.
In particular the Koori Centre aims to increase the successful participation of Indigenous Australians in undergraduate and postgraduate degrees, develop the teaching of Aboriginal Studies, conduct research

in the field of Aboriginal education, and establish working ties with schools and communities.

The Koori Centre works in close collaboration with Yooroang Garang: School of Indigenous Health Studies in the Faculty of Health Sciences at the University's Cumberland Campus. Yooroang Garang provides advice, assistance and academic support for Indigenous students in the faculty, as well as preparatory undergraduate and postgraduate courses.

Koori Centre
Ground Floor, Old Teachers College A22
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2046 (general enquiries)
Toll Free: 1800 622 742
Community Liaison Officer: +61 2 9351 7003
Fax: +612 93516923
Email: koori@koori.usyd.edu.au
Web: www.koori.usyd.edu.au

Yooroang Garang
T Block, Level 4, Cumberland Campus C42
The University of Sydney
NSW 2006 Australia

Phone: +612 93519393
Toll Free: 1800 000 418
Fax: +612 93519400
Email: yginfo@fhs.usyd.edu.au
Web: www.yg.fhs.usyd.edu.au

Learning Centre

The Learning Centre helps students develop the generic learning and communication skills that are necessary for university study and beyond. The centre is committed to helping students achieve their academic potential throughout their undergraduate and postgraduate studies. The centre's program includes a wide range of workshops on study skills, academic reading and writing, oral communication skills and postgraduate writing and research skills. Other services include an individual learning program, a special program for international students, faculty-based workshops, computer-based learning resources, publications of learning resources and library facilities. For details of programs, activities and online resources provided by the centre see the website via your MyUni student portal or the Services for Students website www.usyd.edu.au/stuserv.

Camperdown and Darlington campuses
Level 7, Education Building A3 5
The University of Sydney
NSW 2006 Australia

Phone: +612 93513853
Fax: +612 93514865
Email: lc@stuserv.usyd.edu.au
Web: www.usyd.edu.au/lc

Cumberland Campus
Ground Floor, A Block, Cumberland Campus C42
The University of Sydney
East Street
Lidcombe
NSW 2141 Australia

Phone: +612 93519638
Fax: +612 93519635
Email: LC_Cumberland@fhs.usyd.edu.au
Web: www.usyd.edu.au/lc

Library

The University of Sydney Library, the largest academic library in the Southern Hemisphere, is a network of 18 libraries located on nine campuses. The Library website (http://www.library.usyd.edu.au) provides access to services and resources, anywhere at anytime. The locations, opening hours and subject specialities of the libraries are listed on the website.

Over five million items are available via the Library catalogue, including more than 52,000 electronic journals and 270,000 electronic books. Past exam papers are also available online. Enrolled students are entitled to borrow from any of the University Libraries. More information is available at www.library.usyd.edu.au/borrowing.

Reading list items are available via the reserve service. Increasingly, reading list material is becoming available in electronic form. For details see the reserve service website (http://opac.library.usyd.edu.au/screens/reserve.html).

Library staff are always available to support students in their studies. "Ask a Librarian" in person, by email, or by using an online chat service (http://www.library.usyd.edu.au/contacts/index.html).

A specialist librarian is available for all discipline areas and will provide training in finding high quality information. Courses cover a range of skills including research methodology, database searching, effective use of the Internet and the use of reference management software. See the subject contact page (http ://w ww.library.usyd.edu. au/contacts/subjectcontacts .html).

Library facilities include individual and group study spaces, computers, printers, multimedia equipment, photocopiers and adaptive technologies. Check the "Libraries" link on the home page (http://www.library.usyd.edu.au) to find out about services and facilities in specific libraries.

The *Client Service Charter* describes the Library's commitment to supporting students' learning, including those with special needs. See the *Client Service Charter* online (http://www.library.usyd.edu.au/about/policies/clientcharter.html).

Your comments and suggestions are always welcome.

University of Sydney Library F03
University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 2993 (general enquiries)
Fax: +61 2 9351 2890 (administration), +61 2 9351 7278 (renewals)
Email: loanenq@library.usyd.edu.au (loan enquiries), udd@library.usyd.edu.au (document delivery enquiries)
Web: www.library.usyd.edu.au

Mathematics Learning Centre

The Mathematics Learning Centre assists undergraduate students to develop the mathematical knowledge, skills and confidence that are needed for studying first level mathematics or statistics units at university. The entre runs bridging courses in mathematics at the beginning of the academic year (fees apply). The centre also provides ongoing support to eligible students during the year through individual assistance and small group tutorials. For details of activities and online resources provided by the centre see the website via your MyUni student portal or the Services for Students website www.usyd.edu.au/stuserv.

Level 4, Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +612 93514061
Fax: +612 93515797
Email: mlc@stuserv.usyd.edu.au
Web: www.usyd.edu.au/mlc

Multimedia and Educational Technologies in Arts (META) Resource Centre (Languages and E-Learning)

The centre provides access to lectures, classwork and interactive self-paced learning materials for students of languages other than English (LOTE) and English as a second language (ESL). The library

holds materials in over 90 LOTE languages. The self study room provides interactive computer assisted learning and access to live multilingual satellite television broadcasts. Computer access labs provide Internet, email and word processing access. The centre also provides teaching rooms with state-of-the-art multimedia equipment, language laboratories and video conferencing facilities for Faculty of Arts courses.

Level 2, Brennan Building (opposite Manning House)
The University of Sydney
NSW 2006 Australia

Phone: For language enquiries +612 9351 2371, for all other enquiries +612 93516781
Fax:+61 2 9351 3626
Email: For language related enquiries language.enquiries® arts.usyd.edu.au, for all other enquiries METAResourceCentre@arts.usyd.edu
Web: www.arts.usyd.edu.au/centres/meta

MyUni Student Portal

Launched in July 2004, the MyUni student portal (http://myuni.usyd.edu.au) is the starting point and "one-stop" environment for students to access all their web-based University information and services. MyUni automatically tailors what a student sees based on thier login-in and offers students the option of further personalising content. Most importantly, MyUni allows students to complete tasks online that would previously have required attendance in person. The following are examples of MyUni services and information:

- support services for students in health, counselling, child care, accommodation, employment and wellbeing;
- student administration systems for obtaining exam results, enrolment and variations, timetabling, email services and links to courses and units of study information;
- links to the University's e-learning systems;
- library services;
- important messages and student alerts;
- information technology and support services;
- information for international students; and
- campus maps, with descriptions of cultural, sporting and campus facilities.

Part-time, full-time

Undergraduate Students

Undergraduate students are usually considered full-time if they have a student load of at least 0.375 each semester. Anything under this amount is considered a part-time study load. Note that some faculties have minimum study load requirements for satisfactory progress.

Postgraduate Students (Coursework)

For postgraduate coursework students part-time or full-time status is determined by credit-point load. Enrolment in units of study which total at least 18 credit points in a semester is classed as full-time. Anything under this amount is a part-time study load. Please note that classes for some coursework programs are held in the evenings (usually 6-9pm).

Postgraduate Students (Research)

Full-time candidates for research degrees do not keep to the normal semester schedule, instead they work continuously throughout the year with a period of four weeks recreation leave. There is no strict definition of what constitutes full-time candidature but if you have employment or other commitments that would prevent you from devoting at least the equivalent of a 35-hour working week to your candidature (including attendance at the University for lectures, seminars, practical work and consultation with your supervisor) you should enrol as a part-time candidate. If in doubt you should consult your faculty or supervisor.

International Students

Student visa regulations require international students to undertake full-time study. International students on visas other than student visas may be permitted to study part-time.

Privacy

The University is subject to the *NSW Privacy and Personal Information Protection Act 1998* and the *NSW Health Records and Information Privacy Act 2002*. Central to both acts are the sets of information protection principles (IPPs) and health privacy principles which regulate the collection, management, use and disclosure of personal and health information. In compliance with the *Privacy and Personal Information Protection Act* the University developed a *Privacy Management Plan* which includes the *University Privacy Policy*. The *Privacy Management Plan* sets out the IPPs and how they apply to functions and activities carried out by the University. Both the plan and the *University Privacy Policy* were endorsed by the Vice-Chancellor on 28 June 2000.

Further information and a copy of the plan may be found at www.usyd.edu. au/arms/privacy.

Any questions regarding the *Freedom of Information Act*, the *Privacy and Personal Information Protection Act*, the *Health Records and Information Privacy Act* or the *Privacy Management Plan* should be directed to:

Tim Robinson: +61 2 9351 4263, or Anne Picot: +61 2 9351 7262
Email: foi@mail.usyd.edu.au

Scholarships for undergraduates

Scholarships Unit
Room 147, Ground Floor, Mackie Building KOI
The University of Sydney
NSW 2006 Australia

Phone: +612 93512717
Fax: +612 93515134
Email: scholarships@careers.usyd.edu.au
Web: www.usyd.edu.au/scholarships

Student Centre

Ground Floor, Carslaw Building F07
The University of Sydney
NSW 2006 Australia

Phone: +61 2 9351 3023 (general enquiries)
Academic records: +61 2 9351 4109
Discontinuation of enrolment: +61 2 9351 3023
Handbooks: +61 2 9351 5057
Prizes: +612 93515060
Fax: +61 2 9351 5081, +61 2 9351 5350 (academic records)
Web: www.usyd.edu.au/su/studentcentre

Student Identity Cards

The student identity card functions as a library borrowing card, a transport concession card (when suitably endorsed) and a general identity card. The card must be carried at all times on the grounds of the University and must be shown on demand. Students are required to provide a passport-sized colour photograph of their head and shoulders for lamination on to this card. Free lamination is provided at a range of sites throughout the University during the January/February enrolment/pre-enrolment period. Cards that are not laminated, or do not include a photograph, will be rejected. New identity cards are required for each year of a student's enrolment.

Student Services

The University provides personal, welfare, administrative and academic support services to facilitate your success at University. Many factors can impact on your wellbeing while studying at university and student services can assist you in managing and handling these more effectively. For details of services and online resources provided see the Student Services website (http://www.usyd.edu.au/stuserv).

The Sydney Summer School

Most faculties at the University offer units of study from undergraduate degree programs during summer. There are also some units of study available for postgraduate coursework programs from some faculties. As the University uses its entire quota of Commonwealth supported places in first and second semester, these units are full fee-paying for both local and international students and enrolment is entirely voluntary. However, Summer School units enable students to accelerate their degree progress, make up for a failed unit or fit in a unit which otherwise would not suit their timetables. New students may also gain a head start by completing subjects before they commence their degrees. Units start at various times from late November and run for up to six weeks (followed by an examination week). Notice of the units available is on the Summer School website (http://www.summer.usyd.edu.au) and is usually circulated to students with their results notices. A smaller Winter School is also run from the Summer School office. It commences on 3 July and runs for up to three weeks (followed by an examination week). It offers mainly postgraduate and a few undergraduate units of study. Information can be found on the Summer School website (http://www.summer.usyd.edu.au).

Timetabling Unit

The Timetabling Unit in the Student Centre is responsible for producing students' class and tutorial timetables. Semester One timetables are available from the Wednesday of O Week through the MyUni website (http://myuni.usyd.edu.au).

The Faculty of Health Sciences, The Sydney College of the Arts, The Sydney Conservatorium of Music and the Faculty of Vetinary Science produce their own timetables for all teaching that they deliver. These timetables are available from the faculties.

University Health Service

The University Health Service provides full general practitioner services and emergency medical care to all members of the University community. Medical centres on the Camperdown and Darlington Campuses offer general practioners, physiotherapy and some specialist services.

Email: director@unihealth.usyd.edu.au
Web: www.unihealth.usyd.edu.au

University Health Service (Wentworth)
Level 3, Wentworth Building G01
The University of Sydney
NSW 2006 Australia

Phone: +612 93513484
Fax: +612 93514110

University Health Service (Holme)
Science Rd entry, Holme Building A09
The University of Sydney
NSW 2006 Australia

Phone: +612 93514095
Fax: +612 93514338

See also the Glossary for administrative information relating to particular terms.

Student organisations

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Students' Representative Council

The Students' Representative Council (SRC) is the organisation which represents undergraduates both within the University and in the wider community. All students enrolling in an undergraduate course automatically become members of the SRC.

Level 1, Wentworth Building G01
The University of Sydney
NSW 2006 Australia

Phone: + 612 9660 5222 (editors, *Honi Soit/Legal* Aid, Student Welfare and Centrelink advice, interest free loans)
Second-hand Bookshop: +61 2 9660 4756
Mallet Street: +61 2 9351 0691
Conservatorium: +61 2 9351 1291
Fax: +61 2 9660 4260
Email: info@src.usyd.edu.au
Web: www.src.usyd.edu.au

Sydney University Postgraduate Representative Association (SUPRA)

SUPRA is an organisation that provides services to and represents the interests of postgraduate students.
All postgraduate students at the University of Sydney are members of SUPRA.

Raglan Street Building G10
University of Sydney
NSW 2006 Australia

Phone: +612 93513715
Freecall: 1800 249 950
Fax: +612 93516400
Email: supra@mail.usyd.edu.au
Web: www.supra.usyd.edu.au

Sydney University Sport

Sydney University Sport provides opportunities for participation in a range of sporting and recreational activities along with first class facilities.

University Sports and Aquatic Centre G09
The University of Sydney
NSW 2006 Australia

Phone: +612 93514960
Fax: +612 93514962
Email: admin@susport.usyd.edu.au
Web: www.susport.com

University of Sydney Union

The University of Sydney Union is the main provider of catering facilities, retail services, welfare programs and social and cultural events for the University community on the Camperdown and Darlington campuses and at many of the University's affiliated campuses.

University of Sydney Union
Level 1, Manning House A23
The University of Sydney
NSW 2006 Australia

Phone: 1800 013 201 (switchboard)
Fax: +61 2 9563 6109
Email: info@usu.usyd.edu.au
Web: www.usydunion.com

Abbreviations

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

For a glossary of terms, describing the terminology in use at the University of Sydney, please see the glossary section.

Listed below are the more commonly used acronyms that appear in University documents and publications.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

AARNet	Australian Academic Research Network
AAUT	Australian Awards for University Teaching
AAM	Annual Average Mark
ABC	Activity Based Costing
ABSTUDY	Aboriginal Study Assistance Scheme
ACER	Australian Council for Educational Research
AGSM	Australian Graduate School of Management
ANZAAS	Australian and New Zealand Association for the Advancement of Science
APA	Australian Postgraduate Awards
APAC	Australian Partnership for Advanced Computing
APAI	Australian Postgraduate Awards (Industry)
APA-IT	Australian Postgraduate Awards in Information Technology
APDI	Australian Postdoctoral Fellowships Industry
APEC	Asia-Pacific Economic Cooperation
APF	Australian Postdoctoral Fellowship
AQF	Australian Qualifications Framework
ARC	Australian Research Council
ARTS	Automated Results Transfer System
ASDOT	Assessment Fee Subsidy for Disadvantaged Overseas Students
ATN	Australian Technology Network
ATP	Australian Technology Park
ATPL	Australian Technology Park Limited
AUQA	Australian Universities Quality Agency
AusAID	Australian Agency for International Development
AUTC	Australian Universities Teaching Committee
AVCC	Australian Vice-Chancellors Committee

B

BAA	Backing Australia's Ability
BAC	Budget Advisory Committee
BITLab	Business Intelligence Lab
BLO	Business Liaison Office
BOTPLS	Bridging for Overseas Trained Professionals Loans Scheme

C

CAF	Cost Adjustment Factor
CAUT	Committee for Advancement of University Teaching
CDP	Capital Development Program
CEP	Country Education Profile
CEQ	Course Experience Questionnaire
CFO	Chief Financial Officer
CHASS	College of Humanities and Social Sciences
CHESSN	Commonwealth Higher Education System Student Number
CHS	College of Health Sciences
CIO	Chief Information Officer
COE	Confirmation of Enrolment
CPSU	Community and Public Sector Union
CRC	Cooperative Research Centre

C

CREO	Centre for Regional Education, Orange
CRICOS	Commonwealth Register of Institutions and Courses for Overseas Students
CRRI	Centre for Rural and Regional Innovation
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CST	College of Sciences and Technology
CULT	Combined Universities Language Test
CUTSD	Committee for University Teaching and Staff Development

D

DAC	Data Audit Committee
DEST	Commonwealth Department of Education, Science and Training
DET	NSW Department of Education and Training
D-IRD	Discovery-Indigenous Researchers Development Program
DVC	Deputy Vice-Chancellor

E

EB	Enterprise Bargaining
EFTSU	Equivalent Full-Time Student Unit
EFTSL	Equivalent Full-Time Student Load
EIP	Evaluations and Investigations Program
ELICOS	English Language Intensive Course of Study
EMU	Electron Microscope Unit
ESOS Act	Education Services for Overseas Student Act

F

FFT	Fractional Full-Time (Equivalent Staff)
FlexSIS	Flexible Student Information System
FHS	Faculty of Health Sciences
FMO	Facilities Management Office
FOS	Field of Study
FTE	Full-Time Equivalent (Staff)
FRM	Faculty of Rural Management

G

GATS	General Agreement on Trade in Services
GCCA	Graduate Careers Council of Australia
GDS	Graduate Destination Survey
GPOF	General Purpose Operating Funds
GSA	Graduate Skills Assessment
GSG	Graduate School of Government
GWSLN	Greater Western Sydney Learning Network

H

HDR	Higher Degree Research
HECS	Higher Education Contribution Scheme
HEEP	Higher Education Equity Program
HEFA	Higher Education Funding Act 1988
HEIMS	Higher Education Information Management System
HEIP	Higher Education Innovation Program (DEST)
HELP	Higher Education Loan Program

H

HEO	Higher Education Officer
HEP	Higher Education Provider
HERDC	Higher Education Research Data Collection
HESA	Higher Education Support Act
HOD	Head of Department

I

IAF	Institutional Assessment Framework (This is a new name for what was previously the DEST Profile process.)
IAS	Institute of Advanced Studies
ICT	Information and Communication Technology
ICTR	Information and Communication Technology Resources
IELTS	International English Language Testing Scheme
IGS	Institutional Grants Scheme (DEST)
10	International Office
IP	Intellectual Property
IPRS	International Postgraduate Research Scholarships
IREX	International Researcher Exchange Scheme
ISFP	Indigenous Support Funding Program
ISIG	Innovation Summit Implementation Group
ISSU	International Student Services Unit
ITC	Information Technology Committee
ITL	Institute for Teaching and Learning
ITS	Information Technology Services

J

JASON	Joint Academic Scholarships Online Network

L

LBOTE	Language Background Other Than English

M

MBA	Master of Business Administration
MISG	Management Information Steering Group
MNRF	Major National Research Facilities Scheme
MOU	Memorandum of Understanding
MPG	Major Projects Group
MRB	Medical Rural Bonded Scholarship Scheme

N

NBCOTP	National Bridging Courses for Overseas Trained Program
NCG	National Competitive Grant
NESB	Non-English-Speaking Background
NHMRC	National Health and Medical Research Council
NOIE	National Office for the Information Economy
NOOSR	National Office for Overseas Skill Recognition
NRSL	Non-Recent School Leaver
NSWVCC	New South Wales Vice-Chancellors' Conference
NTEU	National Tertiary Education Industry Union

O

OECD	Organisation for Economic Cooperation and Development
OLA	Open Learning Australia
OLDPS	Open Learning Deferred Payment Scheme
OPRS	Overseas Postgraduate Research Scholarships

P

PELS	Postgraduate Education Loans Scheme
PSO	Planning Support Office
PVC	Pro-Vice-Chancellor

Q

QA	Quality Assurance
QACG	Quality Advisory and Coordination Group

R

R&D	Research and Development
R&R	Restructuring and Rationalisation Program
RC	Responsibility Centre
REG	Research and Earmarked Grants
REP	Research Education Program
RFM	Relative Funding Model
RIBG	Research Infrastructure Block Grant (DEST)
RIEF	Research Infrastructure Equipment and Facilities Scheme
RISF	Restructuring Initiatives Support Fund
RMO	Risk Management Office
ROA	Record of Achievement
RQ	Research Quantum
RQU	Recognition Quality Unit (Higher Education Division - DEST)
RRTMR	Research and Research Training Management Reports
RSL	Recent School Leaver
RTS	Research Training Scheme (DEST)

S

SCA	Sydney College of the Arts
SCEQ	Sydney Course Experience Questionnaire
SCM	Sydney Conservatorium of Music
SCR	Science Capability Review
SDF	Strategic Development Fund
SEG	Senior Executive Group
SES	Socioeconomic Status
SI	Scholarship Index
SLE	Student Learning Entitlement
SNA	Safety Net Adjustment
SPIRT	Strategic Partnerships with Industry - Research and Training Scheme
SPR	Student Progress Rate
SRC	Students' Representative Council
SSR	Student/Staff Ratio
STABEX	Study Abroad Exchange (database)
SUPRA	Sydney University Postgraduate Students' Representative Association
SUSport	Sydney Univerisity Sport

T

TAFE	Technical and Further Education
TOEFL	Test of English as a foreign language
TPI	Teaching Performance Indicator

u

UAC	Universities Admissions Centre
UMAP	University Mobility in Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UPA	University Postgraduate Awards

V

VCAC	Vice-Chancellor's Advisory Committee
VET	Vocational Education and Training

W

WAM	Weighted Average Mark
WRP	Workplace Reform Program
WTO	World Trade Organization

Y

YFE	Year of First Enrolment

Glossary

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

For a table of the more commonly used acronyms and abbreviations that appear in University documents and publications please see the abbreviations section.

This glossary describes terminology in use at the University of Sydney.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Annual average mark (AAM)

The average mark over all units of study attempted in a given academic year (equivalent to the calendar year).

The formula for this calculation is:

$$AAM = \frac{2\ (marks\ \text{x}\ credit\ point\ value)}{2\ (credit\ point\ value)}$$

(sums over all units of study completed in the selected period)

Where the mark is the actual mark obtained by the student for the unit of study, or in the case of a failing grade with no mark - 0. Pass/Fail assessed subjects and credit transfer subjects (from another institution) are excluded from these calculations; however, the marks from all attempts at a unit of study are included.

Academic Board

The senior academic body within the University. In conjunction with faculties, the Academic Board has responsibility for approving, or recommending to Senate for approval, new or amended courses and units of study and policy relating to the admission and candidature of students. (For further information, see the University Calendar.)

Academic cycle

The program of teaching sessions offered over a year. Currently the cycle runs from the enrolment period for Semester One through to the completion of the processing of results at the end of Semester Two. (See also Stage.)

Academic dishonesty

Academic dishonesty occurs when a student presents another person's ideas, findings or written work as his or her own by copying or reproducing them without due acknowledgement of the source and with intent to deceive the examiner. Academic dishonesty also covers recycling, fabrication of data, engaging another person to complete an assessment or cheating in exams. (See also Plagiarism.)

Academic record

The complete academic history of a student at the University. It includes, among other things: personal details; all units of study and courses taken; assessment results (marks and grades); awards and prizes obtained: infringements of progression rules; approvals for variation in course requirements and course leave; thesis and supervision details.

Access to a student's academic record is restricted to authorised University staff and is not released to a third party without the written authorisation of the student. (See also Academic transcript.)

Academic transcript

A printed statement setting out a student's academic record at the University. There are two forms of academic transcript: external and internal. (See also External transcript, Internal transcript.)

Academic year

The current calendar year in which a student is enrolled. (See also Academic cycle, Stage.)

Admission

Governed by the University's admission policy, this is the process for identifying applicants eligible to receive an initial offer of enrolment in a course at the University. Admission to most courses is based on performance in the HSC, with applicants ranked on the basis of their UAI. Other criteria such as a portfolio, interview, audition, or results in standard tests may also be taken into account for certain courses.

Admission basis

The main criteria used by a faculty in assessing an application for admission to a course. The criteria used include, among other things, previous secondary, TAFE or tertiary studies; work experience; special admission; and the Universities Admission Index (UAI).

Admission (Deferment)

An applicant who receives an offer of admission to a course may apply to defer enrolment in that course for one semester or one academic cycle.

Admission mode

A classification based on how a student was admitted to a course, for example "UAC" or "direct".

Admission period

The period during which applications for admission to courses are considered.

Admission year

The year the student expects to begin the course (see also Commencement date.)

Advanced diplomas

(See Award course.)

Advanced standing

(See Credit.)

Advisor

A member of academic staff appointed in an advisory role for some postgraduate coursework students. (See also Associate supervisor, Instrumental supervisor/teacher, Research supervisor, Supervision.)

Aegrotat

In exceptional circumstances involving serious illness or death of a student prior to completion of their course, the award of aegrotat and posthumous degrees and diplomas may be conferred.

Alumni sidneiensis

A searchable database of graduates of the University from 1857 to 30 years prior to the current year.

Annual average mark (AAM)

The average mark over all units of study attempted in a given academic year (equivalent to the calendar year).

The formula for this calculation is:
(mark* credit_pt_value)/ (credit_pt_value)
(sums over all units of study completed in the selected period)

Where the mark is the actual mark obtained by the student for the unit of study, or in the case of a failing grade with no mark - 0. Pass/Fail assessed subjects and credit transfer subjects (from another institution) are excluded from these calculations; however, the marks from all attempts at a unit of study are included.

Annual progress report

A form which is used to monitor a research student's progress each year. The form provides for comments by the student, the supervisor, the head of the department and the dean (or their nominee). The completed form is attached to the student's official file.

Appeals

Students may lodge an appeal against academic or disciplinary decisions. An academic appeal (e.g. against exclusion) is managed by the Student Centre - Exclusions Office while it is under consideration and a record of the outcome of the appeal will be retained.

Assessment

The process of measuring the performance of students in units of study and courses. Performance may be assessed by examinations, essays, laboratory projects, assignments, theses, treatises or dissertations. (See also Result processing, Result processing schedule.)

Formative assessment
Formative assessment is used principally to provide students with feedback on their progress in learning. It reinforces successful learning, and is an opportunity for students to expose the limitations in their knowledge and understanding.

Summative assessment
Summative assessment is used to certify competence, or to arrange students in a rank order of merit. It certifies the attainment of a standard, and is used as the basis for progression to the next part of a program, or to graduation.

Associate supervisor

A person who is appointed in addition to the supervisor of a research student, who can provide the day-to-day contact with the candidate or provide particular expertise or additional experience in supervision. (See also Advisor, Instrumental supervisor/teacher, Research supervisor, Supervision.)

Assumed knowledge

For some units of study, a student is assumed to have passed a relevant subject at the HSC and this is called assumed knowledge. While students are generally advised against taking a unit of study for which they do not have the assumed knowledge, they are not prevented from enrolling in the unit of study. (See also Prerequisite.)

Attendance pattern

Attendance pattern is classified as full-time, part-time or external, this is dependant on the student's mode of attendance and the student load.

Attendance mode

A Department of Education, Science and Technology (DEST) classification defining the manner in which a student is undertaking a course, i.e. internal, external, mixed or offshore.

Australian Graduate School of Management (AGSM)

A joint venture with the University of New South Wales. The AGSM is derived from the Graduate School of Business at the University of Sydney and the then AGSM at the University of New South Wales.

Australian Qualifications Framework (AQF)

The framework for recognition and endorsement of qualifications established by the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA).

AUSTUDY

Austudy provides financial help to students who are aged 25 years or more who meet the required criteria, and are undertaking an approved full-time course at an approved institution. (See also Youth Allowance.)

Automated Results Transfer System (ARTS)

This system was developed by the Australasian Conference of Tertiary Admissions Centres (ACTAC) to allow the electronic academic record of a student to be accessed, via an admission centre, by tertiary institutions.

Award course
(See Course.)

B

Bachelor's degree

The highest undergraduate award offered at the University. A bachelor's degree course normally requires three or four years of full-time study or the part-time equivalent. (See also Award course.)

Barrier

An instruction placed on a student's record that prevents the student from re-enrolling or graduating. (See also Deadlines (fees), Suppression of results.)

Board of Studies

An academic body which supervises a course or courses, and which is similar to a faculty except that it is headed by a chair rather than a dean and does not supervise PhD candidates.

Bursaries

Financial award made to a student, based primarily on need. (See also Scholarships.)

C

Cadigal program

A program, named in recognition of the Aboriginal people of the land on which the University is located, designed to increase the successful participation of Aboriginal and Torres Strait Islander people in degree courses in all faculties at the University of Sydney.

Campus

The grounds on which the University is situated. There are 11 campuses of the University of Sydney:

- Burren Street (Institute for International Health, Institute of Transport Studies)
- Camperdown and Darlington (formerly known as Main Campus)
- Camden (Agriculture and Veterinary Science)
- Conservatorium (Sydney Conservatorium of Music)
- Cumberland (Health Sciences)
- Mallett Street (Nursing)
- Orange (Faculty of Rural Management and Centre for Regional Education)
- Rozelle (Sydney College of the Arts)
- St James (Law)
- Surry Hills (Dentistry)

Cancellation

Where enrolment is cancelled for non-payment of fees.

Candidature

Candidature commences when a student is admitted to a course of study leading to the award of a degree, diploma or certificate. There are maximum periods and in some cases minimum periods of candidature depending on the award course and whether the candidate is a full-time or part-time student.

Census date

The date at which a student's enrolment, load and HECS liability are finalised before this information is reported to DEST. (See also HECS.)

Ceremony

(See Graduation ceremony.)

Chancellor

The non-executive head of the University. An honorary position, the Chancellor presides over meetings of the University's governing body, the Senate, and important ceremonial occasions such as graduations.

Clinical experience

Students undertake clinical placements in a professional environment as part of their course requirements. Many require University approved supervision. In order to undertake clinical placements a student may be required to fulfil additional requirements.

College of Health Sciences

Consists of the Faculties of Dentistry; Health Sciences; Medicine; Nursing; and Pharmacy.

College of Humanities and Social Sciences (CHASS)

Consists of the Faculties of Arts; Economics and Business; Education; Law; the Sydney College of the Arts; and the Sydney Conservatorium of Music.

College of Sciences and Technology (CST)

Consists of the Faculties of Agriculture, Food and Natural Resources; Architecture; Engineering; Rural Management; Science; and Veterinary Science.

Combined course

A course which leads to two awards. For example the Arts/Law course leads to the separate awards of Bachelor of Arts and Bachelor of Laws.

Combined degree

A combined degree is a single program with a single set of course resolutions leading to the award of two degrees (unless otherwise specified in the resolutions). (See also Combined course.)

Commencement date

The date a student commences candidature.

Compulsory subscriptions

Each enrolled student is liable to pay annual (or semester) subscriptions, as determined by the Senate, to the student organisations at the University. There are different organisations for undergraduate and postgraduate students.

The student organisations are specific to different campuses. The organisations at campuses other than Camperdown and Darlington include: the Conservatorium Student Association, the Cumberland Student Guild, the Orange Agricultural College Student Association and the Student Association of Sydney College of the Arts. (See also Compulsory subscription exemption, Joining fee, Life membership.)

Compulsory subscription exemption

Students of a certain age or those with disabilities or medical conditions may be exempt from the subscription to the sports body.

Conscientious objectors to the payment of subscriptions to unions of any kind may apply to the Registrar for exemption. The Registrar may permit such a student to make the payment to the Jean Foley Bursary Fund instead. (See also Compulsory subscriptions.)

Confirmation of Enrolment form (COE)

This form is issued to each student after enrolment, showing the course and the units of study in which the student is enrolled, together with the credit point value of the units of study and the HECS weights. Until all fees are paid, it is issued provisionally.

A new confirmation of enrolment form is produced every time a student's enrolment is varied.

Conjoint ventures

Two or more institutions cooperate to provide a unit or course of study to postgraduate coursework students. Arrangements exist between individual departments at the University of Sydney and individual departments at the University of New South Wales (UNSW) and the University of Technology Sydney (UTS), whereby students enrolled for a degree at one institution complete one or more units of study at the other institution to count towards the award program at their "home" institution.

Continuing professional education

A process which provides a number of programs of continuing education courses for professionals as they move through their career. These programs are presently administered by the Centre for Continuing Education and a number of departments and foundations across the University. This process supports the whole of life learning concept and involves the maintenance of a long term relationship between the student and the University.

Convocation

The body comprising all graduates of the University.

Core unit of study

A unit of study that is compulsory for a particular course or subject area. (See also Unit of study.)

Corequisite

A unit of study which must be taken in the same semester or year as a given unit of study (unless it has already been completed). These are determined by the faculty or board of studies concerned, published in the faculty handbook and shown in FlexSIS. (See also Prerequisite, Waiver.)

Cotutelle Scheme

Agreement between the University and any overseas university for joint supervision and examination of a PhD student as part of an ongoing cooperative research collaboration. If successful, the student receives a doctorate from both universities with each testamur acknowledging the circumstances under which the award was made.

Course

An undertaking of study at the University of Sydney

Award course

A formal course of study that will see attainment of a recognised award. Award courses are approved by Senate, on the recommendation of the Academic Board. The University broadly classifies courses as undergraduate, postgraduate coursework or postgraduate research. (See also Bachelor's degree, Course rules, Diploma, Doctorate, Major, Master's degree, Minor, PhD, Stream.)

Non-award course

Studies undertaken by students who are not seeking an award from the University. (See also Cross-institutional enrolment.)

Coursework

An award course not designated as a research award course. While the program of study in a coursework award course may include a component of original, supervised, other forms of instruction and learning normally will be dominant.

Research

A course in which at least 66 per cent of the overall course requirements involve students in undertaking supervised research, leading

to the production of a thesis or other piece of written or creative work, over a prescribed period of time.

Course alias

A unique five character alpha-numeric code which identifies a University course.

Course code

(See Course alias.)

Course enrolment status

A student's enrolment status in a course is either "enrolled" or "not enrolled". "Not enrolled" reasons include: cancelled; suspended; under examination; or terminated. (See also Cancellation, Candidature, Course leave, Enrolment, Enrolment variation, Terminated, Under examination.)

Course leave

Students are permitted to apply for a period away from their course without losing their place. Course leave is formally approved by the supervising faculty for a minimum of one semester. Students on leave are regarded as having an active candidature, but they are not entitled to a student card. At undergraduate level, leave is not counted towards the total length of the course. Students who are absent from study without approved leave may be discontinued and may be required to formally reapply for admission. (See also Progression.)

Course rules

Rules which govern the allowable enrolment of a student in a course. Course rules may be expressed in terms of types of units of study taken, length of study, and credit points accumulated, e.g. a candidate may not enrol in units of study having a total value of more than 32 credit points per semester. Course rules also govern the requirements for the award of the course, e.g. a candidate must have completed a minimum of 144 credit points. (See also Award course, Corequisite, Prerequisite.)

Course suspension

See Course leave.

Course transfer

A transfer occurs when a student changes from one course in the University to another course in the University without the requirement for an application and selection process (e.g. from a PhD to a master's program in the same faculty).

Credit

The recognition of previous studies successfully completed at this University, or another university or tertiary institution recognised by the University of Sydney, as contributing to the requirements of the course to which the applicant requesting such recognition has been admitted. Credit may be granted as specified credit or non-specified credit.

Specified credit
The recognition of previously completed studies as directly equivalent to units of study.

Non-specified credit
A "block credit" for a specified number of credit points at a particular level. These credit points may be in a particular subject area but are not linked to a specific unit of study.
(See also AAM - Annual average mark, Waiver, Weighted average mark (WAM).)

Credit points

The value of the contribution each unit of study provides towards meeting course completion requirements. Each unit of study will have a credit point value assigned to it. The total number of credit points required for completion of award courses will be specified in the Senate Resolutions relevant to the award course.

Cross-institutional enrolment

An enrolment in units of study at one university to count towards an award course at another university. Cross-institutional enrolments incur a HECS liability or tuition fee charge at the institution at which the unit of study is being undertaken. Students pay compulsory subscriptions to one university only (usually their home university, i.e. the university which will award their degree). (See also Non-award course).

Course enrolment status

A student's enrolment status in a course is either "enrolled" or "not enrolled". "Not enrolled" reasons include: cancelled, suspended, under examination or terminated. (See also Cancellation, Candidature, Course leave, Enrolment, Enrolment variation, Terminated, Under examination.)

D

The Data Audit Committee's role is to oversee the integrity and accuracy of the course and unit of study data as strategic University data. It also advises the Academic Board on suggested policy changes related to course and unit of study data. A sub-committee of the VCAC Enrolment Working Party, it is chaired by the Registrar, with membership including the deans, the Student Centre, FlexSIS and the Planning Support Office.

Deadlines (Enrolment variations)

(See Enrolment variation.)

Deadlines (Fees)

The University has deadlines for the payment of fees (e.g. HECS, compulsory subscriptions, course fees). Students who do not pay fees by these deadlines may have their enrolment cancelled or they may have a barrier placed on the release of their record. (See also Barrier, Cancellation.)

Dean

The head of a faculty, or the principal or director of a college (such as the Sydney Conservatorium of Music or the Sydney College of Arts).

Dean's certificate

A statement from the Dean certifying that all requirements, including fieldwork and practical work, have been met and that the student is eligible to graduate. Not all faculties use Dean's Certificates. In faculties that do, qualified students have "Dean's Certificate" noted on their academic record.

Deferment (Deferral)

See Admission (deferment), Course leave.

Degree

See also Award course, Bachelor's degree.

Delivery mode

Indicates how students receive the instruction for a unit of study. The delivery mode must be recorded for each unit as distinct from the attendance mode of the student, i.e. an internal student may take one or more units by distance mode and an external student may attend campus for one or more units.

Distance education
Where subject matter is delivered in a more flexible manner, such as correspondence notes, and student may only attend campus if required. (See also Extended semester, Distance education, International - off shore.)

Intensive on campus
Core content is delivered with support learning in an intensive (one or more days) format on campus. Participation is usually compulsory. Previously this may have been called residential, block mode, or weekend workshop.

On campus (normal)
Attendance of scheduled lectures, tutorials etc at a campus of the University.

Department

(See School.)

Department of Education, Science and Training (DEST)

The Commonwealth Government department responsible for higher education.

Differential HECS

(See Higher Education Contribution Scheme (HECS).)

Diploma

The award granted following successful completion of diploma course requirements. A diploma course usually requires less study than a degree course. (See also Award course.)

Direct admissions

For some courses, applications may be made directly to the University. Applications are received by faculties or the International Office, and considered by the relevant department or faculty body. Decisions are recorded and letters are forwarded to applicants advising them of the outcome. (See also Admission, UAC.)

Disability information

Students may inform the University of any temporary or permanent disability which affects their life as a student. Disability information is recorded but it is only available to particular authorised users because of its sensitive nature.

Disciplinary action

Undertaken as the result of academic or other misconduct, e.g. plagiarism, cheating, security infringement, criminal activity.

Discipline

A defined area of study, for example, chemistry, physics, economics.

Discipline group

A DEST code used to classify units of study in terms of the subject matter being taught or being researched.

Discontinuation (course)

(See Enrolment variation.)

Discontinuation (unit of study)

(See Enrolment variation.)

Dissertation

A written exposition of a topic which may include original argument substantiated by reference to acknowledged authorities. It is a required unit of study for some postgraduate award courses in the faculties of Architecture and Law.

Distance education

Where a student does not attend campus on a daily basis for a given course or unit of study. (See also Delivery mode, Extended semester.)

Doctorate

A high-level postgraduate award. A doctorate course normally involves research and coursework; the candidate submits a thesis that is an original contribution to the field of study. Entry to a doctorate course often requires completion of a Master's degree course. Note that the doctorate course is not available in all departments at the University. (See also Award course, PhD.)

Domestic Student

A student who is not an international student. See also Local student.)

Double degree

A double degree is a program where students are permitted by participating faculties (and/or by specific resolutions within a single award) to transfer between courses in order to complete two awards.

Downgrade

Where a student enrolled in a PhD reverts to a master's by research, either on the recommendation of the University on the basis that the research they are undertaking is not at an appropriate level for a PhD; or at the student's own request, for personal or academic reasons.

E

Earliest date

(See Research candidature.)

Equivalent full-time student unit (EFTSU)

The equivalent full-time student unit (EFTSU) is a measure of student load based on the workload for a student undertaking a full year of study in a particular course. A student is then recorded as having generated one EFTSU. (See also Load, Stage.)

Equivalent full-time student load (EFTSL)

The equivalent full-time student load (EFTSL) for a year. It is a measure, in respect of a course of study, of the study load for a year of a student undertaking that course of study on a full-time basis. (effective 1 January 2005)

Embedded courses

Award courses in the Graduate Certificate, Graduate Diploma and Master's degree by coursework sequence which allow unit of study credit points to count in more than one of the awards, e.g. the Graduate Certificate in Information Technology, Graduate Diploma in Information Technology and Master of Information Technology.

Enrolment

A student enrols in a course by registering with the supervising faculty in the units of study to be taken in the coming year, semester or session.

Commencing
An enrolment is classified as commencing if a student has enrolled in a particular degree or diploma for the first time.

Continuing
Students already in a course at the University re-enrol each year or semester. Most continuing students are required to pre-enrol. (See also Pre-enrolment.)

Enrolment list
A list of all currently enrolled students in a particular unit of study. (See also Unit of study.)

Enrolment status

(See Course enrolment status.)

Enrolment Variation

Students may vary their enrolment at the beginning of each semester. Each faculty determines its deadlines for variations, but HECS liability depends on the HECS census date. (See also HECS.)

Examination

A set of questions or exercises evaluating on a given subject given by a department or faculty. (See Examination period, Assessment.)

Examination period

The time set each semester for the conduct of formal examinations.

Examiner (Coursework)

The person assessing either the written/oral examination, coursework assignments, presentations, etc of a student or group of students.

Exchange student

Either a student of the University of Sydney who is participating in a formally agreed program involving study at an overseas university or an overseas student who is studying here on the same basis. The International Office provides administrative support for some exchanges.

Exclusion

A faculty may ask a student whose academic progress is considered to be unsatisfactory to "show good cause" why the student should be allowed to re-enrol. If the faculty deems the student's explanation unsatisfactory, or if the student does not provide an explanation, the student may be excluded either from a unit of study or from a course or faculty. An excluded student may apply to the faculty for permission to re-enrol. Normally, at least two years must have elapsed before such an application would be considered.

University policy relating to exclusion is set out in the University Calendar. (See also Progression, Senate appeals.)

Exemption

A decision made at a sub-unit of study level to allow a student to complete a unit of study without also completing all the prescribed components of coursework and/or assessment. (See also Credit, Waiver.)

Expulsion

The ultimate penalty of disciplinary action is to expel the student from the University. The effect of expulsion is:

- the student is not allowed to be admitted or to re-enrol in any course at the University;
- the student does not receive their results;
- the student is not allowed to graduate; and
- the student does not receive a transcript or testamur.

Extended semester

A distance-learning student may be allowed more time to complete a module or program if circumstances beyond the student's control, e.g. drought, flood or illness, affect the student's ability to complete the module or program in the specified time. (See also Distance education.)

External

(See Attendance mode, Distance education.)

External transcript

A certified statement of a student's academic record printed on official University security paper. It includes the student's name, any credit granted, all courses the student was enrolled in and the final course result and all units of study attempted within each course together with the result. It also acknowledges prizes the student has received. Marks can be included or omitted, as required. (See also Academic transcript, Internal transcript.)

F

Faculty

A formal part of the University's academic governance structure, consisting mainly of academic staff members and headed by a dean, which is responsible for all matters concerning the award courses that it supervises. Usually, a faculty office administers the faculty and student or staff inquiries related to its courses. The University Calendar sets out the constitution of each of the University's faculties. (See also Board of Studies, Supervising faculty.)

Fee-paying students

Students who pay tuition fees to the University and are not liable forHECS.

Flexible learning

(See Delivery mode, Distance education.)

Flexible start date

Full fee-paying distance students are not restricted to the same enrolment time frames as campus-based or HECS students.

Flexible Student Information System (FlexSIS)

The computer-based Flexible Student Information System at the University of Sydney. FlexSIS holds details of courses and units of study being offered by the University and the complete academic records of all students enrolled at the University.

Formative assessment

(See Assessment.)

Full-time student

(See also Attendance pattern, EFTSU.)

G

Grade

The outcome for a unit of study linked with a mark range. For example, a mark in the range 85-100 attracts the grade "high distinction" ("HD"). (See also Mark.)

Grade	Description	Comment
HD	High distinction	A mark of 85-100.
D	Distinction	A mark of 75-84.
CR	Credit	A mark of 65-74.
P	Pass	A mark of 50-64.
R	Satisfied requirements	This is used in pass/fail only outcomes.
UCN	Unit of study continuing	Used at the end of semester for units of study that have been approved to extend into a following semester. This will automatically flag that no final result is required until the end of the last semester of the unit of study.
PGDN	Pass (concessional)	A mark of 46-49. Use of this grade is restricted to those courses that allow for a concessional pass of some kind to be awarded. A student may re-enrol in a unit of study for which the result was PCON. Each faculty will determine and state in its course regulations what proportion, if any, may count — e.g. "no more than one sixth of the total credit points for a course can be made up from PCON results".
F	Fail	A mark of 0-49. This grade may be used for students with marks of 46-49 in those faculties which do not use PCON.
AF	Absent fail	Includes non-submission of compulsory work (or non-attendance at compulsory labs, etc) as well as failure to attend an examination.
W	Withdrawn	Not recorded on an external transcript. This is the result that obtains where a student applies to discontinue a unit of study by the HECS census date (i.e. within the first four weeks of enrolment).
DNF	Discontinued - not to count as failure	Recorded on external transcript. This result applies automatically where a student discontinues after the HECS census date but before the end of the seventh week of the semester (or before half of the unit of study has run, in the case of units of study which are not semester-length). A faculty may determine that the result of DNF is warranted after this date if the student has made out a special case based on illness or misadventure.
INC	Incomplete	This result is used when examiners have grounds (such as illness or misadventure) for seeking further information or for considering additional work from the student before confirming the final result. Except in special cases approved by the Academic Board, this result will be converted to a normal permanent passing or failing grade either: by the dean at the review of examination results conducted pursuant to section 2 (4) of the Academic Board policy "Examinations and Assessment Procedures"; or automatically to an AF grade by the third week of the immediately subsequent academic session. Deans are authorised to approve the extension of a MINC grade for individual students having a valid reason for their incomplete status.
UCN	Incomplete	A MINC or INC grade is converted, on the advice of the dean, to UCN when all or many students in a unit of study have not completed the requirements of the unit. The students may be engaged in practicum or clinical placements, or in programs extending beyond the end of semester (e.g. Honours).

Graduand

A student who has completed all the requirements for an award course but has not yet graduated. (See also Graduation, Potential graduand.)

Graduate

A person who holds an award from a recognised tertiary institution. (See also Graduand, Graduation.)

Graduate Certificate

(See Award course.)

Graduate Diploma

(See Award course.)

Graduation

The formal conferring of awards either at a ceremony or in absentia. (See also In absentia, Potential graduand.)

Graduation ceremony

A ceremony where the Chancellor confers awards upon graduands.

Group work

Means a formally established project to be conducted by a number of students in common, resulting in a single piece of assessment or a number of associated pieces of assessment. (See also Legitimate cooperation.)

H

Head of department (HOD)

The head of the academic unit which has responsibility for the relevant unit of study, or equivalent program leader.

Higher doctorates

See Award course.

HECS (Higher Education Contribution Scheme)

All students, unless they qualify for an exemption, are obliged to contribute towards the cost of their education under the Higher Education Contribution Scheme. These contributions are determined annually by the Commonwealth Government. This scheme will cease in its current form from 1 January, 2005.

Honorary degrees

A degree *honoris causa* (translated from the Latin as "for the purpose of honouring") is conferred on a person whom the University wishes to honour. Long-standing full-time members of the University's academic staff who are not graduates of the University may be considered by Senate, upon their retirement, for admission ad eundem gradum, to an appropriate degree of the University.

Honours

Some degrees may be completed "with Honours". This may involve either the completion of a separate Honours year or additional work in the later years of the course or meritorious achievement over all years of the course. Honours are awarded in a class (Class I, Class II - which may have two divisions or, Class **III).**

NSW Higher School Certificate (HSC)

The NSW Higher School Certificate (HSC), which is normally completed at the end of year 12 of secondary school. The UAI (Universities Admission Index) is a rank out of 100 that is computed from a student's performance in the HSC.

I

In absentia

Latin for "in the absence of". Awards are conferred in absentia when graduands do not, or cannot, attend the graduation ceremony scheduled for them. Those who have graduated in absentia may later request that they be presented to the Chancellor at a graduation ceremony. (See also Graduation.)

Instrumental supervisor / teacher

All students at the Sydney Conservatorium of Music and BMus students on the Camperdown Campus have an instrumental teacher appointed. (See also Advisor, Associate supervisor, Research supervisor, Supervision.)

Internal mode

(See Attendance mode.)

Internal transcript

A record of a student's academic record for the University's own internal use. It includes the student's name, student identifier (SID), address, all courses in which the student was enrolled and the final course result, and all units of study attempted within each course together with the unit of study result. (See also Academic transcript, External transcript.)

International student

Any student who is not an Australian or New Zealand citizen or a permanent resident of Australia is an international student. An international student is required to hold a visa that allows study in Australia and may be liable for international tuition fees.

Fee-paying
A private International Student who is liable to pay tuition fees for their studies with the University.

Fee-paying - Outgoing exchange
An international fee-paying student undertaking short term study at a recognised overseas institution with which the University has a student exchange agreement. Exchange study counts towards the student's University of Sydney award and students remain enrolled in their University of Sydney course during the period of exchange.

International — cross-institutional
An international fee paying student undertaking non-award study at the University on a cross-institutional basis. They are liable to pay fees for the study they undertake at the University, but there is no compliance reporting requirement, which rests with their "home" institution.

International - Sponsored
A private international student who is fully sponsored for his/her tuition; his/her sponsorship may also cover Overseas Health Cover and Compulsory Subscriptions.

Offshore studies
International offshore students undertake their program of study at one of the University's offshore campuses and hence do not enter Australia; therefore they do not require a visa. The are distinct from international students who are on outbound exchange programs as they never enter Australia during their program of study.

Short course
An international fee-paying student undertaking a short course with the University of Sydney comprising such programs as international development programs, executive training or study visits. The study undertaken by these students is non-award and generally a student visa is not required.

Sponsored award
An international student sponsored by the Australian government, undertaking a program of study at the University. Currently Australian Development Scholarships holders, funded by AusAID, are the only students in this category. These students are fully sponsored for their tuition and other costs such as travel and health cover, and are paid a stipend.

Study Abroad
An international student who is undertaking short-term study at the University under the Study Abroad scheme. Study Abroad students must have completed at least one year of study towards a degree at a recognised institution in their home country and are continuing towards the degree of their home institution.

(See also Local student, Student type.)

J

Joining fee

Students enrolling for the first time pay a joining fee in addition to the standard subscription for the University of Sydney Union or equivalent student organisation. (See also Compulsory subscription.)

L

Leave

See Course leave.

Legitimate cooperation

Any constructive educational and intellectual practice that aims to facilitate optimal learning outcomes through interaction between students. (See also Group work.)

Life membership

Under some circumstances (e.g. after five full-time years of enrolments and contributions) students may be granted life membership of various organisations. This means they are exempt from paying yearly fees. (See also Compulsory subscriptions.)

Load

The sum of the weights of all the units of study in which a student is enrolled. The weight is determined by the proportion of a full year's work represented by the unit of study in the degree or diploma for which the student is a candidate. Student load is measured in terms of Equivalent full-time student units (EFTSU). (See also Equivalent full-time student units (EFTSU).)

Local Student

Either an Australian or New Zealand citizen or Australian permanent resident. New Zealand citizens are required to pay their Higher Education Contribution Scheme (HECS) fees upfront. (See also Domestic student, HECS, International student.)

M

Major

A field of study, chosen by a student, to represent their principal interest this would consist of specified units of study from later stages of the award course. Students select and transfer between majors by virtue of their selection of units of study. One or more majors may be awarded upon the graduands assessment of study. (See also Award course, Minor, Stream.)

Major timetable clash

The term used when a student attempts to enrol in units of study which have so much overlap in the teaching times that it has been decided that students must not enrol in the units simultaneously.

Mark

An integer (rounded if necessary) from 0 to 100 indicating a student's performance in a unit of study. (See also Grade.)

Master's degree

A postgraduate award. Master's degree courses may be offered by coursework, research only or a combination of coursework and research. Entry to the course often requires completion of an honours year at an undergraduate level. (See also Award course.)

Method of candidature

A course is either a research course or a coursework course and so the methods of candidature are "research" and "coursework". (See also Course - coursework, Course - research.)

Minor

Studies undertaken to support a Major. Requiring a smaller number of credit points than a major students select and transfer between minors (and majors) by virtue of their selection of units of study. One or more minors may be awarded upon the graduand's assessment of study. (See also Award course, Major, Stream.)

Mixed mode

(See Attendance mode.)

Mutually exclusive units of study

(See Prohibited combinations of units of study.)

N

Non-award course

(See Course.)

Non-standard session

A teaching session other than the standard February and August sessions - e.g. Summer School, in which units of study are delivered and assessed in an intensive mode during January. (See also Semester, Session.)

O

Orientation Week

Orientation or "O Week", takes place in the week before lectures begin in Semester One. During O Week, students can join various clubs, societies and organisations, register for courses with departments and take part in activities provided by the University of Sydney Union.

P

Part-time student

(See Attendance mode, Attendance pattern, Equivalent full-tme student units (EFTSU).)

Permanent home address

The address used for all official University correspondence with a student, both inside and outside of semester time (e.g. during semester breaks), unless the student provides a different overridden by semester address for use during the semester. (See also Semester address.)

PhD

The Doctor of Philosophy (PhD) and other doctorate awards are the highest awards available at the University. A PhD course is normally purely research-based; the candidate submits a thesis that is an original contribution to the field of study. (See also Award course, Doctorate.)

Plagiarism

Presenting another person's ideas, findings or work as one's own by copying or reproducing them without the acknowledgement of the source. (See also Academic dishonesty.)

Postgraduate

A term used to describe a course leading to an award such as graduate diploma, a Master's degree or PhD which usually requires prior completion of a relevant undergraduate degree (or diploma) course. A "postgraduate" is a student enrolled in such a course. (See also Course - Coursework, Course - Research)

Postgraduate Education Loans Scheme (PELS)

An interest-free loans facility for eligible students who are enrolled in fee-paying, postgraduate non-research courses. It is similar to the deferred payment arrangements available under the Higher Education Contribution Scheme (HECS). This scheme will cease in this manner from 1 January, 2005, and will be replaced by the FEE-HELP scheme.

Potential graduand

A student who has been identified as being eligible to graduate on the satisfactory completion of their current studies. (See also Graduand, Graduation.)

Pre-enrolment

Pre-enrolment - also known as provisional re-enrolment - takes place in October, when students indicate their choice of unit of study enrolment for the following year. After results are approved, pre-enrolment students are regarded as enrolled in those units of study for which they are qualified. Their status is "enrolled" and remains so provided they pay any money owing and comply with other requirements by the due date. Students who do not successfully pre-enrol in their units of study for the next regular session are required to attend the University on set dates during the January/February enrolment period. (See also Enrolment.)

Prerequisite

A unit of study that is required to be successfully completed before another unit of study can be attempted. Prerequisites can be mandatory (compulsory) or advisory. (See also Assumed knowledge, Corequisite, Waiver, Qualifier.)

Prizes

Awarded in recognition of outstanding performance, academic achievement or service to the community or University.

Probationary candidature

A student who is enrolled in a postgraduate course on probation for a period of time up to one year. The head of department is required to consider the candidate's progress during the period of probation and make a recommendation for normal candidature or otherwise to the faculty.

Professional practice

Students undertake placement in a professional practice as a part of their course requirements. May require University approved supervision. Professional placements are located in a wide range of professional practices environments, and may not require additional criteria to be fulfilled.

Progression

Satisfactory progression is satisfying all course and faculty rules (normally assessed on an annual basis) to enable the completion of the chosen award within the (maximum) completion time allowed. (See also Exclusion.)

Prohibited combinations of units of study

When two or more units of study contain a sufficient overlap of content, enrolment in any one such unit prohibits enrolment in any other identified unit. (See also unit of study.)

Provisional re-enrolment

See Pre-enrolment.

Q

Qualification

An academic attainment recognised by the University.

Qualifier

A mandatory (compulsory) prerequisite unit of study which must have a grade of pass or better. (See also Assumed knowledge, Corequisite, Prerequisite, Waiver.)

R

Recycling

The submission for assessment of one's own work, or of work which substantially the same, which has previously been counted towards the satisfactory completion of another unit of study, and credited towards a university degree, and where the examiner has not been informed that the student has already received credit for that work.

Registration

In addition to enrolling with the faculty in units of study, students must register with the department responsible for teaching each unit. This is normally done during Orientation Week. Note that unlike enrolment, registration is not a formal record of units attempted by the student.

Research course

See Course - research.

Research supervisor

A supervisor is appointed to each student undertaking a research postgraduate degree. The supervisor will be a full-time member of the academic staff or a person external to the University recognised for their association with the clinical teaching or the research work of the University. A research supervisor is commonly referred to as a supervisor. (See also Advisor, Associate supervisor, Instrumental supervisor/teacher, Supervision.)

Result processing

Refers to the processing of assessment results for units of study. For each unit of study, departments tabulate results for all assessment activities and assign preliminary results. (See also Assessment, Formative assessment, Examination period, Summative assessment)

Result processing schedule

The result processing schedule will be determined for each academic cycle. All departments and faculties are expected to comply with this schedule. (See also Assessment, Examination period, Result processing.)

Result

The official statement of a student's performance in each unit of study attempted as recorded on the academic transcript, usually expressed as a mark and grade. (See also Grade, Mark.)

Research Training Scheme (RTS)

The RTS provides Commonwealth-funded higher degree by research (HDR) students with an "entitlement" to a HECS exemption for the duration of an accredited HDR course, up to a maximum period of four years full-time equivalent study for a doctorate by research and two years full-time equivalent study for a master's by research.

S

Scholarships

Financial or other form of support made available to enable students to further their studies. (See also Bursaries.)

School

A school or academic unit shall encourage and facilitate teaching, scholarship and research and coordinate the teaching and examining duties of members of staff in the subjects or courses of study with which it is concerned.

Semester

A half-yearly teaching session whose dates are determined by the Academic Board. Normally all undergraduate sessions will conform to the semesters approved by the Academic Board. Any offering of an undergraduate unit not conforming to the semester dates (non-standard session) must be given special permission by the Academic Board. (See also Session, Non-standard session.)

Semester address

The address to which all official University correspondence is sent during semester time, if it is different to the permanent address.

Senate

The governing body of the University. (See the University Calendar for more details of its charter and powers.)

Senate appeals

Senate appeals are held for those students who, after being excluded by a faculty from a course, appeal to the Senate for readmission. While any student may appeal to the Senate against an academic decision, such an appeal will normally be heard only after the student has exhausted all other avenues, i.e. the department, faculty, board of study and, in the case of postgraduates, the Committee for Graduate Studies. (See also Exclusion.)

Session

Any period of time during which a unit of study is taught. A session differs from a semester in that it need not be a six-month teaching period, but it cannot be longer than six months. Each session maps to either Semester One or Two for DEST reporting purposes. Session offerings are approved by the relevant dean, taking into account all the necessary resources, including teaching space and staffing. The Academic Board must approve variation to the normal session pattern. (See also Semester, Non-standard teaching period.)

Session address

(See Semester address.)

Short course

A fee paying student undertaking a short course with the University of Sydney comprising professional development, executive training etc. The study undertaken by these students is a non-award course.

Show cause

(See Progression, Exclusion.)

Special consideration

Candidates who suffer serious illness or misadventure which may affect performance in any assessment, may request that they be given special consideration in relation to the determination of their results.

Sponsorship

Financial support of a student by a company or government body.

Stage

A normal full-time course of study taken in a year. (See also Course rules, EFTSU, Progression.)

Stream

A defined award course, which requires the completion of set units of study as specified by the course rules for the particular stream, in addition to the core program specified by the course rules. A stream will appear with the award course name on testamurs, e.g. Bachelor of Engineering in Civil Engineering (Construction Management). (See also Award course, Major, Minor.)

Student

Student means a person enrolled as a candidate for an award course or unit of study.

Student identifier (SID)

A nine-digit number which uniquely identifies a student at the University.

Student ID Card

All students who enrol are issued with an identification card. The card includes the student's name, SID, the course code, a library borrower's bar code and a pas sport-style photo. The card identifies the student as eligible to attend classes and must be displayed at formal examinations. It must be presented to secure student concessions and to borrow books from all sections of the University Library.

Student progress rate (SPR)

A calculation which measures the rate at which load undertaken is passed annually in each award program.

Student type

Student type identifies whether a student is local or international and the type of study the student is undertaking. (See also International student, Domestic student, Exchange student.)

Study Abroad program

A scheme administered by the International Office which allows international students who are not part of an exchange program to take units of study at the University of Sydney, but not towards an award program. In most cases the units of study taken here are credited towards an award at their home institution. (See also Exchange student.)

Subject area

A unit of study may be associated with one or more subject areas. The subject area can be used to define prerequisite and course rules, e.g. the unit of study "History of Momoyama and Edo Art" may count towards the requirements for the subject areas "Art History and Theory" and "Asian Studies".

Summative assessment

See Assessment.

Summer School

(See Sydney Summer School.)

Supervising faculty

The faculty which has the responsibility for managing the academic administration of a particular course, i.e. the interpretation and administration of course rules, approving students' enrolments and variations to enrolments. Normally the supervising faculty is the faculty offering the course. However, in the case of combined courses, one of the two faculties involved will usually be designated the supervising faculty. Further, in the case where one course is jointly offered by two or more faculties (e.g. the Liberal Studies course), a joint committee may make academic decisions about candidature and the student may be assigned a supervising faculty for administration.

Supervision

Refers to a one-to-one relationship between a student and a nominated member of the academic staff or a person specifically appointed to the role. (See also Advisor, Associate supervisor, Instrumental supervisor/teacher, Research supervisor.)

Suppression of results

Results for a particular student can be suppressed by the University when the student has an outstanding debt to the University; or the student is facing disciplinary action. A student may also request a suppression for personal reasons.

Suspension

(See Course leave.)

Sydney Summer School

A program of accelerated, intensive study running for approximately six weeks during January and February each year. Both undergraduate and postgraduate units are offered. Summer School provides an opportunity for students at Sydney and other universities to catch up on needed units of study, to accelerate completion of a course or to undertake a unit that is outside their award course. All units attract full fees and enrolled students are also liable for compulsory subscriptions. Some fee-waiver scholarships are available.

T

Teaching department

(See School.)

Teaching end date

Official finish date of formal timetabled classes.

Teaching start date
Official commencement date of formal timetabled classes.

Terminated
Term used when a student's candidature has been officially closed because they are not able to complete the Course requirements. (See also Candidature.)

Testamur
A certificate of award provided to a graduand, usually at a graduation ceremony. The Award conferred will be displayed along with other appropriate detail.

Thesis
A major work that is the product of an extended period of supervised independent research. (See also Course - research.)

Timetable
The schedule of lectures, tutorials, laboratories and other academic activities that a student must attend.

Transcript
(See Academic transcript.)

Transfer
(See Course transfer.)

Tuition fees
Tuition fees may be charged to students in designated tuition fee-paying courses. Students who pay fees are not liable for HECS.

U

Universities Admissions Centre (UAC)
The UAC receives and processes applications for admission to undergraduate courses at recognised universities in NSW and the ACT. Most commencing, local undergraduate students at the University apply through the UAC.

Universities Admission Index (UAI)
A measure of overall academic achievement in the HSC that assists universities in ranking applicants for university selection. The UAI is based on the aggregate of scaled marks in ten units of the HSC, and is a number between 0.00 and 100.00 with increments of 0.05.

Under examination
Indicates that a research student has submitted their written work (thesis) for assessment, and is awaiting the finalisation of the examiners' outcome and recommendation.

Undergraduate
A term used to describe both a course leading to a diploma or bachelor's degree and a student enrolled in such a course.

Unit of study
Unit of study or unit means a stand-alone component of an award course. Each unit of study is the responsibility of a department. (See also Prohibited combinations of unit of study.)

Unit of study enrolment status
The enrolment status indicates whether the student is still actively attending the unit of study (i.e. currently enrolled) or is no longer enrolled. (See also Discontinuation or Cancellation.)

Unit of study level
Units of study are divided into Junior, Intermediate, Senior, Honours, Year 5, and Year 6. Most majors consist of 32 Senior credit points in a subject area (either 3000 level units of study or a mix of 2000 and 3000 level units of study).

University
Unless otherwise indicated, University in this document refers to the University of Sydney.

University Medal
A faculty may recommend the award of a University Medal to a student qualified for the award of an undergraduate honours degree (or some master's degrees), whose academic performance is judged to be outstanding.

Upgrade
Where a student enrolled in a Master's by research course is undertaking research at such a standard that either the University recommends that the student upgrade their degree to a PhD, or the student seeks to upgrade to a PhD and this is supported by the University.

USYDnet
The University of Sydney's intranet system. It provides access to other services such as directories (maps, staff and student, organisations), a calendar of events (to which staff and students can submit entries), and a software download area.

V

Variation of enrolment
(See Enrolment variation.)

Vice-Chancellor and Principal
The chief executive officer of the University, responsible for its leadership and management. The Vice-Chancellor and Principal is head of both academic and administrative divisions.

W

Waiver
In a prescribed course, a faculty may waive the prerequisite or corequisite requirement for a unit of study or the course rules for a particular student. Unlike credit, waivers do not involve a reduction in the number of credit points required for a course.
(See also Credit, Exemption.)

Winter School
An intensive session offered by the University during the mid-year break.

Weighted average mark (WAM)
This mark uses the unit of study credit point value in conjunction with an agreed "weight". The formula for this calculation is:

$$WAM = \frac{2,(W_c x.M_c)}{\sum (W_c)}$$

Where Wc is the weighted credit point value - ie, the product of the credit point value and the level of weighting of 1, 2, 3, or 4 for a first, second, third or fourth year unit of study respectively; and where Mc is the greater of 45 or the mark out of 100 for the unit of study.

The mark is the actual mark obtained by the student for the unit of study, or in the case of a failing grade with no mark - 0. Pass/Fail assessed subjects and credit transfer subjects (from another institution) are excluded from these calculations; however, the marks from all attempts at a unit of study are included. (Effective from 1 January 2004.)

In addition, faculties may adopt other average mark formulae for specific progression or entry requirements. If such a formula is not specified in the faculty resolutions, the formula outlined above is used. (See also WAM weight.)

WAM weight

A weight assigned to each unit of study to assist in the calculation ofWAMs.

Y

Year of first enrolment (YFE)

The year in which a student first enrols at the University. (See also Commencement date.)

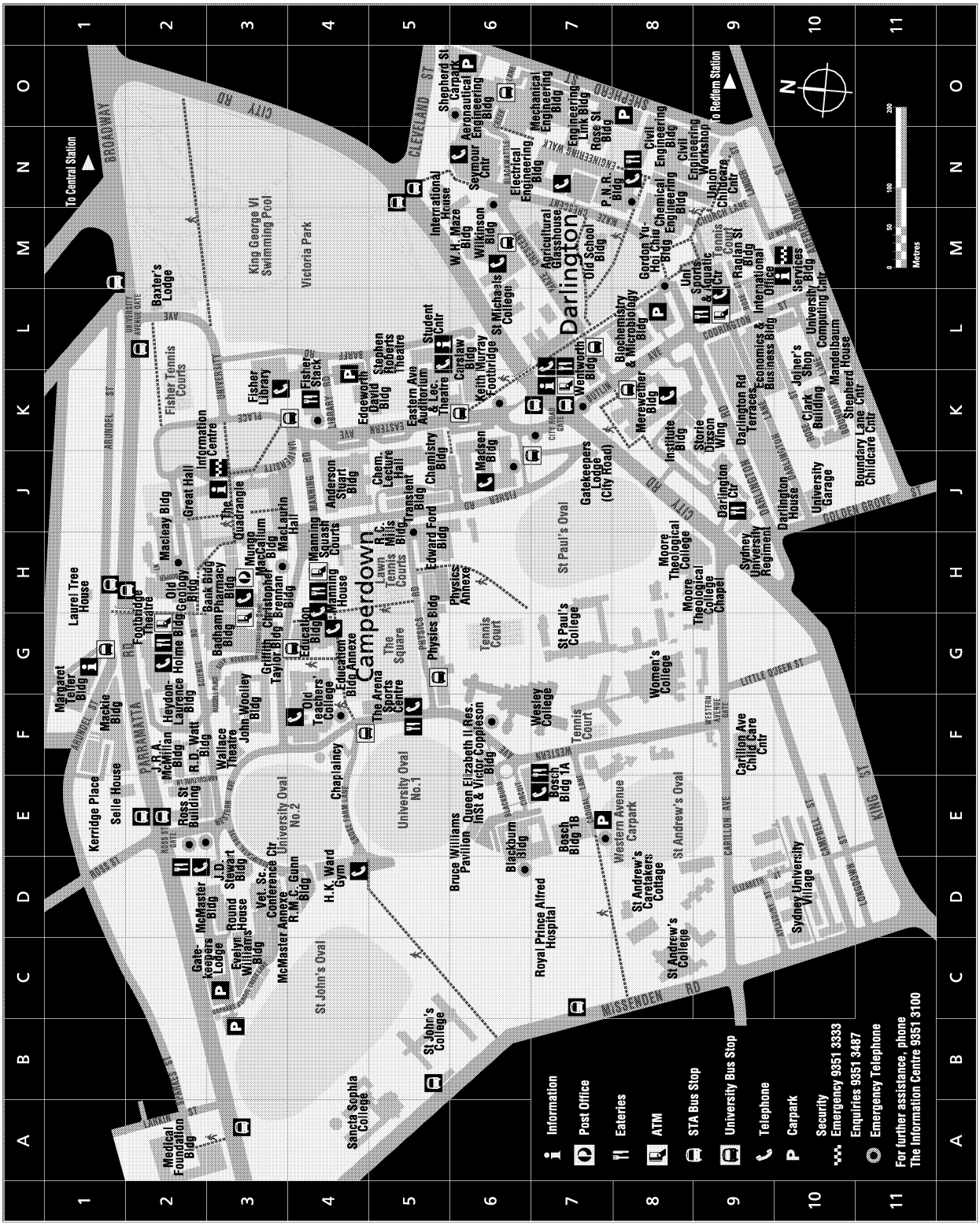
Youth Allowance

Youth Allowance is payable to a full-time student or trainee aged 16-24 years of age who is enrolled at an approved institution such as a school, college, TAFE or university, and undertaking at least 15 hours a week face-to-face contact.

Index

The following information is a printed version of the information available through Handbooks Online, on the University of Sydney website. Please visit [M]http://www.usyd.edu.au/handbooks/[M].

Camperdown / Darlington campus map



University Buildings

06 Aeronautical Engineering Building
J4 Anderson Stuart Building
G3 Badham Building
H3 Bank Building
L2 Baxter's Lodge
L8 Biochemistry and Microbiology Building
E6 Blackburn Building
E7 Bosch Building 1A
E7 Bosch Building IB
E6 Bruce Williams Pavilion
L6 Carslaw Building
F4 Chaplaincy
M8 Chemical Engineering Building
J5 Chemistry Building
H3 Christopher Brennan Building
N8 Civil Engineering Building
N9 Civil Engineering Workshop
K10 Clark Building
J9 Darlington Centre
J10 Darlington House
K9 Darlington Road Terraces
K5 Eastern Avenue Auditorium and Lecture Theatre Complex
L9 Economics and Business Building
K4 Edgeworth David Building
G4 Education Building
G4 Education Building Annexe
H5 Edward Ford Building
N7 Electrical Engineering Building
N7 Engineering Link Building
C3 Evelyn Williams Building
K3 Fisher Library
K4 Fisher Library Stack
C3 Gatekeeper's Lodge
J7 Gatekeeper's Lodge (City Road)
M8 Gordon Yu-Hoi Chui Building
J2 Great Hall
G3 Griffith Taylor Building
D4 H.K.Ward Gymnasium
F2 Hey don-Laurence Building
G2 Holme Building
K8 Institute Building
N5 International House
F2 J.R.A.McMillan Building
D3 LD.Stewart Building
F3 John Woolley Building
Fl Mackie Building
H3 MacLaurin Hall
H2 Macleay Building
Gl Margaret Telfer Building
J6 Madsen Building
H4 Manning House
H4 Manning Squash Courts
D3 McMaster Annexe
D3 McMaster Building
06 Mechanical Engineering Building
A2 Medical Foundation Building
K8 Merewether Building
H3 Mungo MacCallum Building
H2 Old Geology Building
M7 Old School Building
F4 Old Teachers' College
H3 Pharmacy Building
H6 Physics Annexe
G5 Physics Building
N8 P.N.R.Building
E6 Queen Elizabeth II Research Institute
H5 R.C.Mills Building
F2 R.D.Watt Building
D4 R.M.C.Gunn Building
M9 Raglan Street Building
N7 Rose Street Building
E2 Ross Street Building
G2 Science Road Cottage
El Selle House
M10 Services Building
N6 Seymour Centre
K10 Shepherd Centre
06 Shepherd Street Carpark
L5 Stephen Roberts Theatre
K9 Storie Dixson Wing
F5 The Arena Sports Centre
J3 The Quadrangle
J5 Transient Building
L10 University Computing Centre
J10 University Garage
M9 University Sports and Aquatic Centre
D3 Veterinary Science Conference Centre
E6 Victor Coppleson Building
F3 Wallace Theatre
K7 Wentworth Building
E7 Western Avenue Carpark
M6 W.H.Maze Building
M6 Wilkinson Building

Academic Colleges (offices)

H5 Health Sciences
F4 Humanities and Social Sciences
N8 Sciences and Technology

Childcare Centres

K1l Boundary Lane
F9 Carillon Avenue
HI Laurel Tree House
N9 Union

Colleges and Residential Accommodation

J10 Darlington House
K9 Darlington Road Terraces
N5 International House
L10 Mandelbaum House
A4 Sancta Sophia College
C8 St Andrew's College
B5 St John's College
L6 St Michael's College
G7 St Paul's College
El Selle House
D10 Sydney University Village
F7 Wesley College
G8 Women's College

Computer Access Centres (ITS)

G3 Brennan
G4 Education
K3 Fisher
N7 Link
L6 McGrath (Carslaw)
H3 Pharmacy

Cultural Venues

G2 Footbridge Theatre
H2 Macleay Museum
J3 Nicholson Museum
N6 Seymour Centre
K7 Sir Hermann Black Gallery
M6 Tin Sheds Gallery
J2 War Memorial Art Gallery

Faculties (offices)

F2 Agriculture
M6 Architecture
H3 Arts
K8 Economics and Business
G4 Education and Social Work
N7 Engineering
H5 Medicine
H3 Pharmacy
L6 Science
D3 Veterinary Science

Libraries

M6 Architecture
G3 Badham
H5 Burkitt-Ford
K3 Curriculum Resources
N8 Engineering
K3 Fisher
J6 Madsen
L6 Mathematics
E7 Medical
N6 Music
H6 Physics
H5 S chaeffer Fine Arts

Retail

H3 Australia Post Office
H3 Bank Building
J9 Darlington Centre
G2 Holme Building
H4 Manning House
F5 The Arena Sports Centre
M9 University Copy Centre
K7 University Health Service
M9 University Sports and Aquatic Centre
M9 University Co-op Bookshop
D3 Veterinary Hospital and Clinic
K7 Wentworth Building

Security

M10 Emergency Services
M10 Lost Property
J3 Information Centre
M10 Traffic and Parking

Sports and Recreational Venues

K2 Fisher Tennis Courts
D4 HK Ward Gymnasium
H5 Lawn Tennis Courts
H4 Manning Squash Courts
F5 The Arena Sports Centre
G5 The Square
E5 University Oval No1
E3 University Oval No2
M9 University Sports and Aquatic Centre

Unions and Associations (offices)

K7 Students' Representative Council (SRC)
M9 Sydney University Postgraduate Representative Association (SUPRA)
M9 Sydney University Sport
G2 University of Sydney Union

University Administration and Services

F3 Business Liaison Office
F1 Careers Centre
G1 Cashier
F1 Centre for Continuing Education
H3 Chancellor
L10 Computing Centre
H3 Development, Alumni Relations and Events
M10 Development Services
H2 Executive Offices
J3 Information Centre
L10 Information Technology Services
L9 International Office
G1 Personnel
M10 Printing Services (UPS)
H2 Publications Office
H3 Research Office
M10 Room Bookings and Venue Management
F1 Scholarships Unit
L5 Student Centre
G1 Student Housing
G4 Student Services Unit
K8 Summer School
C3 Veterinary Hospital and Clinic
H2 Vice-Chancellor

The University of Sydney

Faculty of Agriculture, Food and Natural Resources Handbook 2006

Amendments

Amendments

Please note that the following Handbook amendments should be read in conjunction with the 2006 Handbooks as published on www.usyd.edu.au/handbooks

- All amendments are listed by item number and referenced by the page to which it refers.
- The relevant Handbook and those amendments listed below are binding and final.
- Inquiries and questions relating to the information below should be directed to the relevant faculty.

Item	Amendment	Handbook page number
1	The word 'or' should appear between BIOL 1002 and BIOL 1902	28
2	At 'Economics Units of Study' the 'o' has fallen off the 'to' in the first line	45
	Authorised by Pamela Brass 01.02.2006	