Faculty of Agriculture
Handbook
1996

Editors
Robert F. Jeffs
Harley A. Rose
Semester and vacation dates 1996*

<table>
<thead>
<tr>
<th>Semester</th>
<th>Day</th>
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<tr>
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*There may be variations to the semester dates for some courses.
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The management of our natural resources so as to ensure the sustainable production of food and fibre is vital to the future of the planet. Highly trained and dedicated graduates are crucial to the task of conserving and protecting these resources while meeting the needs of a global community expected to double by the year 2050.

Australian agriculture is highly efficient and environmentally aware as illustrated by its commitment to Landcare. It is an industry based on a renewable energy source, solar radiation, and is supported by an excellent research and technological infrastructure. Agricultural economists and agricultural scientists help ensure that we are efficient and effective users of our resources. Our graduates have outstanding employment rates, together with diverse career opportunities in the rural and related industries and in the management and conservation of our natural resources.

There remain many challenges and problems which will require attention in the decade ahead. Molecular genetics, for example, offers great potential for facilitating the incorporation of genes for resistance to disease and insect pests into new plant cultivars, one form of biological control. The successful exploitation of these new techniques will require intensive research by well-trained plant geneticists and breeders. Furthermore, there is significant scope for the application of molecular biology in animal science in the improvement of our genetic stocks of animals and poultry, and in the development of vaccines. Current research on animal nutrition will enhance animal welfare and productivity.

There is considerable concern about the impact of pesticides on the environment and the presence of residues in food. Therefore, we have an urgent need for more research to reduce pesticide use through the adoption of alternative control measures designed to minimise disruption to natural ecosystems. Biological control measures will have an expanding role through integrated pest management.

The conservation of our soils depends on research by soil physicists, chemists and biologists and effective information transfer systems. All these are areas in which graduates in agricultural science can play vital roles. These scientists also have a key role in conserving and protecting our water resources and national parks.

The development of efficient processes for adding value to our primary products for export offers a major challenge to graduates in agricultural chemistry and food technology.

The sound management of agriculture requires more than good science. Economic research is needed to assess the social costs and benefits of alternative agricultural practices and to establish appropriate policies for utilising our natural resources. Agricultural economists are also needed to identify the opportunities for value-adding created by new technology in agricultural production, processing and marketing and in researching and developing market institutions that ensure that such opportunities are recognised and grasped. There are exciting challenges ahead for graduates interested in agricultural marketing and exports with new opportunities in Asia and the gradual breakdown of trade barriers.

The establishment of a Bachelor of Horticultural Science degree for the pre-existing specialisation in this field is in response to requests by graduates and industry and reflects the growing economic importance of the horticultural industry in the economy. First year students now have the choice between this new degree and the long established degrees of the Bachelor of Science in Agriculture and the Bachelor of Agricultural Economics.

The range of excursions which students elect has been increased to provide opportunities for students to undertake excursions to the three major agroclimatic regions of New South Wales, to the Northern Territory and to the tropical areas of Queensland and Southeast Asia. The Faculty also has an established Undergraduate Achievers' Program. These special programs, together with professional work experience, provide students with first-hand knowledge of our natural resources and rural enterprises.

Students have the opportunity to compete for places in the International Student Exchange Program. Our undergraduates in this program have recently studied for a year at the University of California, Davis Campus, and the University of Illinois, Urbana. Such experiences add to the academic record of students and are highly valued by employers.

Undergraduates receive training in the basic
sciences or economics, and it is this foundation which is a prerequisite for later years, when challenging courses are selected from various professional disciplines. Indeed, this thorough training in the basics, combined with specialisation in the final year, is a feature of our degrees which is well recognised by employers.

The Faculty of Agriculture has an outstanding international reputation for its teaching and research. It has extensive resources on the Sydney campus and at Camden where facilities are located for poultry and large animal research and for horticultural and agronomic research. In addition, a new Plant Breeding Institute at Camden provides teaching in advanced plant biotechnology. Teaching and research is also undertaken at the I.A. Watson Wheat Research Centre, Narrabri and Livingston Farm, Moree.

The Faculty is the largest Faculty of Agriculture in Australia, but is relatively small by University of Sydney standards. Students have greater access to staff than in larger faculties and the student body is an active and socially cohesive group. These features promote a warm and friendly atmosphere which is conducive to intellectual and social development. Students are encouraged to take advantage of the wide range of extracurricular activities available on campus.

This handbook provides general information about the Faculty and more specific details concerning courses available in each of the degree programs. Further information and advice can be obtained from the Faculty advisers and you are encouraged to make use of these various resources.

It is with great pleasure that I welcome you to the Faculty of Agriculture and extend my best wishes to each of you in your chosen career.

Lester W. Burgess
Dean

R.D. Watt Building
Undergraduate study

In this Faculty of Agriculture Handbook you will find most of what you need to know about the Faculty.

In particular, it will help you find out who the people in your Faculty are; the requirements for the bachelor degrees, and the ways these can be satisfied; what courses are offered and the books required for these courses; where to turn for more information, advice and help.

When making up your mind about your course of study, look at the first part of Chapter 2 for an overview of the Faculty, and then at Chapter 3, which sets out the requirements for the bachelor degrees.

Once you have a general impression of the requirements and courses available, refer to Chapter 4 on courses of study. You may need help in deciding on the best courses to take—and advice is available at the Faculty Office and from departments.

Chapter 5 contains special information relating to the Faculty. This section should be read in conjunction with the University of Sydney Diary. Included are the special enrolment instructions for Agriculture. You will see that when you enrol you will have the opportunity to consult a Faculty adviser before your enrolment is finally approved.

Postgraduate study

Information about postgraduate study within the Faculty is given in Chapter 6. Further information about the University generally is given in the Postgraduate Studies Prospectus, available from the Student Centre.
FACULTY

Dean
Lester W. Burgess

Pro-Dean
Peter R. Reeves

Associate Deans
Fredoun Z. Ahmadi-Esfahani
Robert L. Batterham
Robert A. Caldwell
Lindsay C. Campbell
Les Copeland

Secretary to the Faculty
Robert Jeffs, BA
Waterloo Lutheran University

Administrative Officer (Development)

Secretary to the Dean (Faculty Office)
Veronica Moschione

Administrative Assistant
Pamela J. Stern, BA U.N.S.W.

DEPARTMENTS

Agricultural Chemistry and Soil Science

Professor in Soil Science (Pedometrics)(Personal Chair)
Alexander B. McBratney, BSc PhD Aberd.
Appointed 1995

Personal Chair in Agricultural and Environmental Chemistry
Ivan R. Kennedy, PhD DSc(Agric) W.Aust., MRACI CChem
Appointed 1996

Associate Professors
*Les Copeland, BSc PhD, MRACI CChem
Anthony J. Koppi, BSc PhD Aberd.

Senior Lecturers
Robert A. Caldwell, MSc PhD, MRACI CChem
Harold R. Geering, MS Cornell
Edith M. Lees, BSc PhD Lond.

Honorary Appointment

Emeritus Professor
N. Collis-George, BSc Manc. PhD Camb. HonDScAgr, FRChem

Research Associate
Barry V.McCleary, PhD DScAgr

Agricultural Economics

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

Associate Professors
Robert L. Batterham, BAgEc N.E. MS PhD III.
Ross C. Drynan, BAgSc Qld PhD N.E.

Senior Lecturers
Fredoun Z. Ahmadi-Esfahani, BS Oregon MA San Francisco
State PhD Manl.
David P. Godden, BAgEc BA MEc N.E. PhD Lond.
Carolyn Tanner, BScAgr

Lecturer
Guang Hua Wan, BAgEc Nanjing Agric.Univ. MEc PhD N.E.

Associate Lecturers
Lynn A. Henry, BSc DipAgEc N.E.
Shauna L. Phillips, BAgEc

Honorary Appointment

Emeritus Professor
K.O. Campbell, AM PhD Chic. MPA Harv. HonDEc N.E.
HonDAgrSc BScAgr, FASSA

Animal Science

At Sydney

Professor
David Ross Fraser, PhD Camb. BVSc
Appointed 1986

Associate Professors
Gareth Evans, BA Oxf. PhD
Christopher Moran, PhD A.N.U. BSc
Frank W. Nicholas, PhD Edin. BScAgr
*Grant M. Stone, PhD BScAgr

Senior Lecturers
David L. Evans, BVSc PhD
W.M. Chisholm Maxwell, BScAgr PhD
Elizabeth J. Post, BSc PhD

Lecturers
Rosanne M. Taylor, BVSc PhD

Associate Lecturer
Michelle L. Hyde, BScAgr PhD

Honorary Appointments

Emeritus Professors
Clifford Walter Emmens, PhD DSc Lond. HonDVSd, FSS
FAA HonFACVSc FIBiol CBiol
Donald Alexander Titchen, MA PhD ScD Camb. BVSc

Honorary Associates
Peter J. Healy, BVSc PhD
Yun Cheung Kong, DSc Bruxelles, BSc Guangzhou
Ian C.A. Martin, BVSc PhD
Bruce L. Sheldon, BAgSc PhD

At Camden

Associate Professors
Derick Balnave, PhD DSoc Belf. FRScChem
Wayne L. Bryden, MMurSc DipEd N.E. PhD
James M. Gooden, BAgSc Adel. PhD
Roy C. Keilaway, BSc(Hort) Lond. PhD N.E. DTA W.I.

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1 Information correct as at December 1995

* Heads of departments
Garland Senior Lecturer
Bevan G. Miller, BVSc PhD

Senior Lecturers
Ian J. Lean, BVSc PhD Calif.
Peter C. Wynn, MRurSc DipEd N.E. PhD

Professional Officer
Yasin Mollah, BSc MSc(Chem) Dhaka MRurSc N.E. PhD

Honorary Appointment
Emeritus Professor
Ernest Frank Annison, PhD DSc

Crop Sciences

Agricultural Genetics and Plant Breeding
Professor of Plant Breeding
Donald Robert Marshall, PhD Calif. BScAgr
Appointed 1991

Senior Lecturers
Norman L. Darvey, PhD U.N.S.W. BSc
Peter J. Sharp, BAgSc PhD Adel.

Agronomy

Senior Lecturers
Lindsay C. Campbell, BSc PhD
Dennis R. de Kantzow, BScAgr DipAgrEc, FIAIS

Lecturer
Brent C. Jacobs, BScAgr PhD

Biometry

Associate Professor
Michael E. O’Neill, BA PhD

Lecturer
Peter C. Thomson, MSc MAppStat Macq. PhD

Entomology

Associate Professor
Frederick J.D. McDonald, MSc Tas. PhD Alta, FRES

Senior Lecturer
Harley A. Rose, MAgSc Qld PhD Cornell

Horticulture

Adjunct Professor in Urban Horticulture
Peter Marcus Martin, MScAgr PhD DipEd, FLS FIAIS
Appointed 1993

Reader
Peter B. Goodwin, PhD Nott. MScAgr

Senior Lecturer
Bruce G. Sutton, BScAgr Qld PhD A.N.U.

Plant Pathology

Professor
*Brian James Deverall, BSc Edin. PhD DIC Lond.
Appointed 1972

Associate Professor
Lester W. Burgess, BScAgr PhD DipEd

Senior Lecturer
John W. Bowyer, BAgSc PhD Qld

Honorary Appointments
Emeritus Professor
B.D.H. Latter, PhD Edin. BScAgr

Honorary Associates
G.M. Cunningham, BScAgr
N.F. Derera, AM DipAgrSc Royal Jozef Nador DipPlt Breeding
U.of Tech. Budapest, FAIAS
J.M. Fisher, BScAgr PhD
S.C. Morris, BScAgr PhD U.N.S.W.
E.S. Neilsen, MSc PhD Copenhagen
L.W. Smith, BAgSc Melb. MSc PhD Calif.
B.A. Summerell, BScAgr PhD

Research Affiliates
G. Constable, PhD N.E. MScAgr
P.S. Cornish, PhD N.E. MScAgr
J.L. Davidson, MAgSc Adel. PhD Nott.
D.J. Fletcher, MSc PhD S’ton
P.W. Michael, BAgSc PhD Adel.

Microbiology

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

Reader
Thomas Ferenci, BSc Lond. PhD Leic.

Senior Lecturers
Trevor Duxbury, BSc PhD Lit., MASM
Peter B. New, BAgSc Tas. PhD Adel.

Lecturers
Deidre A. Carter, BSc Otago PhD Lond.
Ilze Dalins, MSc
Ian Humphery-Smith, BSc PhD Qld

Associate Lecturers
Helen M. Agus, MSc U.N.S.W.
Disa J. Pryor, BMedSc

Honorary Appointments
Honorary Associates
Kai Yip Cho, BSc U.N.S.W. PhD A.N.U.
W.G. Murrell, PhD Oxf. DScAgr, FAIFST MASM

Plant Breeding Institute

Director and Professor of Plant Breeding
Donald R. Marshall, PhD Calif. BScAgr

At Narrabri

Director, I.A. Watson Wheat Research Centre
Lindsay O’Brien, MSc DipEd Melb. PhD Manit.

Senior Plant Breeder
Frank W.H. Ellison, MScAgr PhD

Principal Research Fellow
Daryl J. Mares, BSc PhD Melb.

Professional Officer Grade III
Stephen G. Moore, BSc N.E.

At Cobbitty

Professor in Cereal Genetics and Cytogenetics (Personal Chair) and Director of Rust Research
Robert A. McIntosh, MScAgr PhD
Senior Lecturers
Norman L. Darvey, PhD U.N.S.W. BSc
Peter J. Sharp, BAgSc PhD Adel.

Research Fellow
Robert F. Park, BSc LaT. PhD Qld

Professional Officer Grade IV
John D. Oates, BScAgr

TEACHING STAFF FROM OTHER FACultIES

Economics
Consult Faculty of Economics.

Science
Chemistry
Director of First Year Studies
Raymond K. Pierens, MSc PhD, MRSChem ARACI

Biology
Director of First Year Biology
Mary Peat, BSc Birm. PhD Brist.

Veterinary Science
Consult Faculty of Veterinary Science.
Careers for graduates of the Faculty

The Faculty of Agriculture has maintained remarkably high graduate employment rates of 90 per cent for both the BScAgr and BAgrEc degrees.

Four-year degrees and a required minimum of eighteen weeks of professional work experience are very attractive to prospective employers. These applied degrees provide for both flexibility and specialisation, a background suitable for a diversity of career options.

Graduates of the BScAgr degree gain employment as:
• research scientists in both private and public sectors, e.g. CSIRO, Departments of Agriculture, Forestry Commissions, soil conservation, national parks, museums, universities, pesticide companies, wine making, environmental projects, and overseas with FAO, WHO and other international organisations concerned with the development of agriculture in Third World countries (scientific research absorbs half of the BScAgr graduates);
• biometricians, statisticians, computing professionals;
• consultants, agronomists and extension personnel for Departments of Agriculture, in biosoil programs, water authorities, environmental protection groups, trainee managers in horticultural businesses;
• university lecturers, TAFE and secondary educators;
• agribusiness management, marketing;
• plant and animal breeders, biotechnologists, genetic engineers;
• journalists, media researchers;
• quality control, quarantine officers.

Graduates of the BAgrEc degree gain employment as applied economists with:
• merchant and trading banks;
• international agencies such as FAO, OECD and the World Bank;
• stock, commodity and futures broking firms;
• consulting, accounting, marketing and agribusiness firms;
• ABARE, CSIRO, Departments of Agriculture, and the Department of Primary Industry and Energy;
• State and Commonwealth government departments concerned with the rural sector;
• AMLC, Industry Commission, and the Australian Wheat Board;
• resource industries and the wider business community.

In some fields the possession of a higher degree is a decided advantage, especially where the work concerned is of a specialised nature. This applies particularly to research, in which positions are available in the CSIRO, the universities, government departments, research institutions and private industry. Many graduates continue their training by accepting scholarships to study for higher degrees and postgraduate diplomas. Often such postgraduate training is undertaken in overseas universities and institutions.

Undergraduate Scholarship Program

The Undergraduate Scholarship Program is designed to encourage and assist talented school leavers, especially from rural areas, to choose Agricultural Science, Horticultural Science or Agricultural Economics at the University of Sydney and to focus attention on career opportunities which stem from these degrees. A Talented Students Program is also offered. Further information is available from the Faculty Office.

Communication skills

As a result of completing any undergraduate course at the University of Sydney, graduates are expected to:
(i) be able to identify, access, organise and communicate knowledge in both written and oral English; and (ii) be able to collect, correlate, display, analyse and report observations. These skills are valued highly by employers and will be generally included as part of the evaluation of assessment tasks. In particular, completion of professional experience reports will be evaluated against criteria designed to assess the level of written and presentation skills. The Faculty aims to teach such communication skills within the context of the various academic disciplines.

University farms

The University has fifteen farms within 65 km of Sydney, which support the teaching and research activities of the Faculties of Veterinary Science and Agriculture. They total over 1500 ha and consist of three main centres. The Corstorphine Centre of 717 ha on which most of the teaching and research facilities are located, and the Bringelly Centre of 466 ha, which includes three farms, Wolverton, Coates Park and John Bruce Pye Farm, are only 10 km apart and complement each other. The third centre, which is situated 25 km from Corstorphine at Badgerys Creek, includes the McGarvie Smith Farm and Fleurs.

The Corstorphine Centre, about 6 km west of Camden, began in 1954 by donations of the farms Corstorphine and Mayfarm to the University by the Meat, Wool and Dairy Product Boards. The Centre has been enlarged by the purchase of adjoining land and five additional nearby properties. Lansdowne Farm is the horticultural field unit of the Department of Crop Sciences. Two research units (Horse and Animal Reproduction) have been developed on another of these properties. The Plant Breeding Institute is also located at the Centre.

The Bringelly Centre, 5 km from Bringelly and 10 km from Corstorphine, began in 1962 by a donation from the late Colonel John Bruce Pye of two separate but
nearby properties that totalled 354 ha. Further purchases by the University in 1974 of the original Coates Park homestead and additional small blocks, brought all the Bringelly farms into a single parcel of 466 ha with a much shorter access route to Corstorphine.

The Badgerys Creek Centre includes the McGarvie Smith Farm, which was the first farm acquired by the University of Sydney. It was purchased in 1936 with funds provided by the McGarvie Smith Trust. In 1977 the University purchased 153 ha surrounding the Fleurs synthesis radiotelescope, a facility developed by the Department of Electrical Engineering.

Together these farms carry more than 400 milking cows and, with beef cattle and replacement stock, a total of more than 1200 cattle. They also carry up to 2000 sheep, 30 horses, 170 deer, 3000 hens, 3500 broilers, 100 goats and 400 pigs.

Almost all this stock is used in one way or another for teaching or research purposes, but in addition it produces a commercial income that defrays the basic costs associated with holding the farms, and provides some funds for farm development, research and teaching.
As well as providing basic land, water and animal resources for a wide range of teaching and research in different departments, the farms serve the plant and animal industries by frequently acting as commercial testing sites for new plants, new fertilisers, new vaccines and antibiotics and new whole-farm management systems.

A student accommodation unit, Nepean Hall, is situated on Corstorphine. This gives students easy access to the many University departments conducting research on different farms in that area.

The progressive development of research facilities makes it possible for postgraduate as well as undergraduate students to be trained on the farms.

Livingston Farm, a 4766 ha property on the banks of the Meehi River about 8 km from Moree, came to the University as a bequest from the estate of K.S. Livingston. This farm is a commercial crop-growing venture, which earns income for the K.S.H. Livingston Cancer Research Fund, and provides a means of examining new farming practices and procedures on a large commercial scale. Currently about 3800 ha of dryland crops are grown each year. Additionally, there are 320 ha of irrigated land used for cereals in winter and soybeans in summer. This farm cooperates closely with the I.A. Watson Wheat Research Centre at Narrabri, both in testing of new lines under field plot and farm scale conditions and in increasing seed of new varieties for the benefit of local farmers.

Arthursleigh (5200 ha) and Mount Pleasant (2600 ha) at Marulan, 200 km south of Sydney, came to the University as a bequest from the estate of Eric Thomas William Holt in July 1979. They are being developed as large-scale sheep and beef properties. The farms are operated as a commercial venture and are also used by students for teaching and research in pasture agronomy.

The University Farms at Camden are under the control of a director, who is a member of both rural faculties and is responsible to the Director, Properties and Investments for the management of commercial farming enterprises and the support of teaching and research activities.

Nepean Hall
Since 1959 the University has provided limited accommodation for students at the Camden Farms. During 1964, additional accommodation was completed so that students from the Faculty of Agriculture completing their final year in the Department of Animal Science (formerly Animal Husbandry) could be accommodated for the entire year.

In 1964 the Senate resolved that the accommodation for students at the Camden Farm be a hall of residence and be known as Nepean Hall. The management of the Hall is vested in a Council appointed by the Senate.

Student membership of the Faculty
There is provision for up to four students enrolled for courses in the Faculty of Agriculture to be elected for one year to membership of the Faculty. Of the four, two must be enrolled as full-time candidates for either the degree of Bachelor of Science in Agriculture or Bachelor of Agricultural Economics and two, who are not otherwise eligible for membership of the Faculty, must be enrolled as full-time candidates for a postgraduate degree or diploma offered by the Faculty.

Open meetings
Any student enrolled for a degree or diploma in the Faculty or any member of its teaching or research staff, who is not a member of the Faculty is eligible to attend, but not to speak at or vote at, any meeting of the Faculty.

Students who intend to be present at a meeting must register that intention at the Faculty Office no less than seven days prior to the meeting, and complete a declaration. The Faculty Office may then issue an authority to attend. Only twenty such authorities will be issued in respect of any one meeting and authorities are valid for one meeting only. The agenda may have been edited to remove confidential items.

Addresses
University of Sydney (Camden),
425 Werombi Rd, Camden,
N.S.W. 2570 ........................................... (046) 55 2300

Nepean Hall, University of Sydney,
Camden Campus, 345 Werombi Rd,
Camden, N.S.W. 2570 ......................... (046) 55 0262
(Resident students) Old block ............ (046) 55 0282
.......................................................... (046) 55 0283
.......................................................... (046) 55 0284
.......................................................... (046) 55 2201
.......................................................... (046) 55 0281
.......................................................... (046) 55 0278

Corstorphine, 445 Werombi Road, Camden,
N.S.W. 2570 ........................................... (046) 55 0213

Plant Breeding Institute, 107 Cobbitty Road, Cobbitty
N.S.W. 2570 ........................................... (046) 51 2600

Mayfarm, Mayfarm Rd, Mt Hunter, Camden,
N.S.W. 2570 ........................................... (046) 54 5213

John Bruce Pye Farm, Greendale Road, Bringelly,
N.S.W. 2570 ........................................... (047) 74 8212

McGarvie Smith Animal Husbandry Farm,
Elizabeth Drive, Badgerys Creek,
Bringelly, N.S.W. 2171 ....................... (047) 71 8184

Wolverton Dairy Farm, Greendale Road,
Bringelly, N.S.W. 2171 ....................... (047) 74 8013

Livingston Farm, Moree,
N.S.W. 2400 ........................................... (067) 52 2855

Arthursleigh, Mount Pleasant, Marulan,
N.S.W. 2580 ........................................... (048) 57 5161

I.A. Watson Wheat Research Centre, Narrabri,
N.S.W. 7490 .............................. (067) 92 1588

Student membership of the Faculty
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3 Undergraduate degree requirements

Bachelor of Science in Agriculture

The Bachelor of Science in Agriculture degree covers the whole field of agricultural science. Regulations governing candidature for the BScAgr degree are set out in this handbook in resolutions of the Senate in the Statutes and Regulations section and in the Faculty resolutions section (see Appendix 1).

Progress through the years

If you fail to achieve a satisfactory standard in any course or courses, you may repeat that course or courses once before you have to show cause why you should not be excluded, provided that your overall progress for the year has been satisfactory (see 'satisfactory progress' under 'Exclusion' in Chapter 5). Students repeating courses which belong to the First, Second or Third Year groups of courses may, with the permission of the Faculty, enrol in one or more courses prescribed for the next higher year. The Faculty will normally grant permission for you to undertake courses from the next year when:

(i) the timetable arrangements are such that you can attend all lectures, practical classes, tutorials, seminars and excursions in all of the courses undertaken;
(ii) you have fulfilled all of the prerequisites; and
(iii) you can satisfy the corequisites for the courses belonging to the higher year group of courses.

Prerequisites are courses which you must pass before proceeding to another course. Corequisites are courses which should be studied in the same year as another course if you have not already passed in them.

In the year groupings which follow, prerequisites and corequisites for each of the specified courses 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 course. The onus is on students to consult the various departments as to the waivers which may be granted for each course. The approval of the Head of Department must be obtained before you can proceed to a course unless you have passed the necessary prerequisites.

Course structure

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Assumed knowledge</th>
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<tr>
<td><strong>First Year (Commenced in 1995)</strong></td>
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<tr>
<td>Agricultural Science</td>
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<tr>
<td>Biology</td>
<td>12</td>
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</tr>
<tr>
<td>Chemistry (Agriculture or 1A)</td>
<td>12</td>
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<tr>
<td>Biometry 1</td>
<td>6</td>
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<td></td>
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</tr>
<tr>
<td>Economic Environment of Australian Agriculture</td>
<td>6</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
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<td></td>
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</tr>
<tr>
<td>Agricultural Chemistry 2</td>
<td>8</td>
<td>Chemistry (Agriculture or 1A)</td>
<td></td>
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<tr>
<td>Agricultural Genetics 2</td>
<td>6</td>
<td>Biology and Biometry 1</td>
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<td>Agricultural Microbiology 2</td>
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<td>Animal Science 2</td>
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<td>Biometry 2</td>
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<td>Biometry 1</td>
<td></td>
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<tr>
<td>Crop Protection (New Res.)</td>
<td>4</td>
<td>Biology, Agricultural Science or Horticultural Science 1</td>
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<td>6</td>
<td>Biometry 1, Agricultural Science or Horticultural Science 1</td>
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</tr>
<tr>
<td><strong>Soil Science 2</strong></td>
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<td>6</td>
<td>Agricultural Science</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Biometry 1</td>
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</tr>
<tr>
<td><strong>Third Year (Many of these courses will not be available after 1996)</strong></td>
<td></td>
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</tr>
<tr>
<td>Agricultural Entomology and Mycology 3</td>
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<tr>
<td>Agricultural Genetics 3</td>
<td>6</td>
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<tr>
<td>Biometry 3</td>
<td>6</td>
<td>Biometry 1</td>
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<td>and a minimum of 30 units from Agribusiness Management</td>
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<td>Agricultural Chemistry 3</td>
<td>8</td>
<td>Agricultural Chemistry 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Chemistry and Biochemistry of Ecosystems)</td>
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<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
<td>Agricultural Chemistry 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Agricultural and Food Products)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Courses</td>
<td>Unit values</td>
<td>Prerequisites</td>
<td>Corequisites</td>
<td>Assumed knowledge</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------</td>
<td>--------------------------------</td>
<td>------------------------------</td>
<td>-------------------</td>
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<td>Agricultural Microbiology 3</td>
<td>8</td>
<td>Agricultural Microbiology 2</td>
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<td>Agronomy 3</td>
<td>8</td>
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<tr>
<td>Animal Anatomy</td>
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<td>Agricultural Microbiology 2</td>
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<td>Animal Science 3</td>
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</tr>
<tr>
<td>Applied Marketing</td>
<td>8</td>
<td>Economic Environment of</td>
<td></td>
<td></td>
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<td>Horticultural Science 3</td>
<td>6</td>
<td>Crop Science 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant Pathology 3</td>
<td>4</td>
<td>Agricultural Chemistry 2</td>
<td>Agricultural Entomology</td>
<td></td>
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<td></td>
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<td>Crop Science 2</td>
<td>Mycology 3</td>
<td></td>
</tr>
<tr>
<td>Production Economics</td>
<td>8</td>
<td>Economic Environment of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop Protection (Old Res.)</td>
<td>4</td>
<td>Agricultural Entomology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Science 3</td>
<td>8</td>
<td>Soil Science 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fourth Year (The method of listing Fourth Year courses will likely change in 1998)**

One of

- Agricultural Chemistry 4
- Agricultural Economics
- Agricultural Entomology 4
- Agricultural Genetics 4
- Agricultural Microbiology 4
- Agronomy 4
- Animal Production
- Biometry 4
- Farming Systems
- Horticultural Science 4
- Plant Pathology 4
- Soil Science 4
- Special Program

In addition, all students choose a total of 30 to 34 units in optional courses according to the following guidelines:

---

**Faculty resolutions relating to courses**

**In the BScAgr degree**

1. A candidate who has successfully completed a course prescribed in sections 1, 2 or 3 of the Senate resolutions may be granted exemption by the Faculty from taking the course of instruction and examination in such course again.

2. A candidate who has not completed all courses in the First or the Second Year may be permitted by the Faculty to take one or more courses from the next year, provided that the total unit load should not normally exceed 52 units.

3. A candidate in the Third Year may be granted permission by the Faculty to take one or more Fourth Year courses, provided that the candidate's complete Fourth Year course of study is approved by the Head of Department who will supervise the candidate's work in the Fourth Year.

4. A candidate who has not completed all courses in the Third Year may, in circumstances approved by the Faculty, be granted permission to enrol in the Fourth Year together with the remaining course or courses of the Third Year provided such courses do not exceed eight units.

5. The prescribed Fourth Year subjects shall be those set out in the preceding course structural chart.

---

**Third Year Course Combinations for entry to Fourth Year subjects**

All students must take the following core courses:

- Agricultural Entomology and Mycology 3 6 units
- Agricultural Genetics 3 6 units
- Biometry 3 6 units

Total: 18 units
<table>
<thead>
<tr>
<th>Fourth Year subject</th>
<th>Prerequisite</th>
<th>Additional units</th>
<th>Preferred options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Chemistry 4</td>
<td>Agricultural Chemistry 3 elective (8u)</td>
<td>22 to 26</td>
<td></td>
</tr>
<tr>
<td>Agricultural Economics</td>
<td>Agribusiness Management (8u) or Applied Marketing (8u) or Production Economics (8u)</td>
<td>22 to 26</td>
<td></td>
</tr>
<tr>
<td>Agricultural Entomology 4</td>
<td>Biometry 3 (6u)</td>
<td>30 to 34</td>
<td>Horticultural Science 3 (6u)</td>
</tr>
<tr>
<td>Agricultural Genetics 4</td>
<td>Biometry 3 (6u)</td>
<td>24 to 28</td>
<td></td>
</tr>
<tr>
<td>Agricultural Microbiology 4</td>
<td>Agronomy 3 (coreq)</td>
<td>18 to 22</td>
<td>Horticultural Science 3 (6u)</td>
</tr>
<tr>
<td>Agronomy 4</td>
<td>Biometry 3 (6u)</td>
<td>30 to 34</td>
<td>Plant Pathology 3 (4u)</td>
</tr>
<tr>
<td>Animal Production</td>
<td>Animal Anatomy (6u)</td>
<td>2 to 6</td>
<td></td>
</tr>
<tr>
<td>Biometry 4</td>
<td>Biometry 3 (6u)</td>
<td>24 to 28</td>
<td>Agronomy 3(8u)</td>
</tr>
<tr>
<td>Farming Systems</td>
<td>Agribusiness Management or Production Economics (8u)</td>
<td>22 to 26</td>
<td></td>
</tr>
<tr>
<td>Special Program</td>
<td>Horticultural Science 3 (6u)</td>
<td>18 to 22</td>
<td>Crop Protection (4u)</td>
</tr>
<tr>
<td>Horticultural Science 4</td>
<td>Biometry 3 (6u)</td>
<td>30 to 34</td>
<td>(Old Res.)</td>
</tr>
<tr>
<td>Plant Pathology 4</td>
<td>Plant Pathology 3 (4u)</td>
<td>26 to 30</td>
<td></td>
</tr>
<tr>
<td>Soil Science 4</td>
<td>Soil Science 3 (8u)</td>
<td>22 to 26</td>
<td></td>
</tr>
</tbody>
</table>

The combination of courses chosen must be permitted by the timetable.

**Bachelor of Horticultural Science**

The degree of Bachelor of Horticultural Science is available for those wishing to specialise in the field of horticultural science. Regulations governing candidature for the BHortSc degree are set out in resolutions of the Senate in the Statutes and Regulations section (Appendix 1).

The degree requires a minimum time of four years. The courses prescribed are summarised below.

**Course structure**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Assumed knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year (commenced in 1996)</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Biology</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biometry 1</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry (Agriculture or 1A)</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Environment of Australian Agriculture</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horticultural Science 1</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Chemistry 2</td>
<td>8</td>
<td>Chemistry (Agriculture or 1A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Genetics 2</td>
<td>6</td>
<td>Biology, Biometry 1</td>
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<td></td>
</tr>
<tr>
<td>Agricultural Microbiology 2</td>
<td>6</td>
<td>Biology, Chemistry</td>
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</tr>
<tr>
<td>Biometry 2</td>
<td>6</td>
<td>Biometry 1</td>
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</tr>
<tr>
<td>Crop Protection (New Res)</td>
<td>4</td>
<td>Biology, Agricultural Science or Horticultural Science 1, Agricultural Microbiology 2 Biometry 1, Agricultural Science or Horticultural Science 1</td>
<td>Agriculture Chemistry 2</td>
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</tr>
<tr>
<td>Crop Science 2</td>
<td>6</td>
<td>Agricultural Science or Horticultural Science 1, Agricultural Microbiology 2 Biometry 1, Agricultural Science or Horticultural Science 1</td>
<td>Crop Science 2</td>
<td></td>
</tr>
<tr>
<td>Horticultural Science 2</td>
<td>6</td>
<td>Agricultural Science or Horticultural Science 1 Biometry 1</td>
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</tr>
<tr>
<td>Soil Science 2</td>
<td>6</td>
<td>Agricultural Science or Horticultural Science 1 Biometry 1</td>
<td>Agriculture Chemistry 2</td>
<td></td>
</tr>
<tr>
<td><strong>Third and Fourth Years</strong></td>
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</tr>
<tr>
<td>Horticultural Science 3</td>
<td>6</td>
<td>Horticultural Science 2, Crop Science 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods in Horticultural Research</td>
<td>6</td>
<td></td>
<td>Horticultural Science 3</td>
<td></td>
</tr>
<tr>
<td>Ornamental Horticulture</td>
<td>6</td>
<td></td>
<td>Horticultural Science 3</td>
<td></td>
</tr>
<tr>
<td>Project and Thesis</td>
<td>24</td>
<td></td>
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</tr>
</tbody>
</table>

and a minimum of 54 units from Table 1 attached to these resolutions

A candidate may enrol in the course Project and Thesis only during the Fourth year.
TABLE 1: Courses from which Third and Fourth Year students select optional units

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agribusiness Management</td>
<td>8</td>
<td>Economic Environment of</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Australian Agriculture</td>
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</tr>
<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
<td>Agricultural Chemistry 2</td>
<td>-</td>
</tr>
<tr>
<td>(Agricultural and Food Products)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
<td>Agricultural Chemistry 2</td>
<td>-</td>
</tr>
<tr>
<td>(Chem and Biochem of Ecosystems)</td>
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<td></td>
</tr>
<tr>
<td>Applied Marketing</td>
<td>8</td>
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<tr>
<td>Plant Disease</td>
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<td>Agricultural Genetics 2,</td>
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<td></td>
<td></td>
<td>Crop Protection (New Res.)</td>
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<tr>
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<td>8</td>
<td>Soil Science 2</td>
<td>-</td>
</tr>
<tr>
<td>Turf Species and Varieties</td>
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<td></td>
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</tr>
</tbody>
</table>

Courses from the BScAgr degree

Subject to the approval of the Dean and the Head of the Department concerned.

Faculty resolutions relating to courses
In the BHortSc degree
(1) A candidate who has successfully completed a course prescribed in sections 1, 2 or 3 of the Senate resolutions may be granted an exemption by the Faculty from taking the course of instruction and examination in such course again.
(2) A candidate who has not completed all courses in the First or the Second Year may be permitted by the Faculty to take one or more courses from the next year, provided that the total unit load should not normally exceed 52 units.

Bachelor of Agricultural Economics

The degree of Bachelor of Agricultural Economics is available for those wishing to specialise in the field of agricultural economics. Regulations governing candidature for the BAgrEc degree are set out in resolutions of the Senate in the Statutes and Regulations section (Appendix 1).

The degree requires a minimum time of four years. The courses prescribed are summarised below.

Course structure

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
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</tr>
<tr>
<td>Agricultural Economics I</td>
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</tr>
<tr>
<td>Econometrics I</td>
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<td>Economics I</td>
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<td>-</td>
</tr>
<tr>
<td>and one of:</td>
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<td></td>
</tr>
<tr>
<td>Accounting I</td>
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<td>-</td>
</tr>
<tr>
<td>Agricultural Science</td>
<td>12</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Biology</td>
<td>12</td>
<td></td>
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</tr>
<tr>
<td>Commercial Law I</td>
<td>12</td>
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<td>-</td>
</tr>
<tr>
<td>Geography I</td>
<td>12</td>
<td></td>
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</tr>
<tr>
<td>Government I</td>
<td>12</td>
<td></td>
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<tr>
<td>Mathematics I (Life Sciences)</td>
<td>12</td>
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<tr>
<td>The Australian Economy</td>
<td>12</td>
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</tr>
<tr>
<td>Second Year</td>
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</tr>
<tr>
<td>Applied Commodity Modelling</td>
<td>8</td>
<td>Econometrics I</td>
<td>-</td>
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<tr>
<td>or</td>
<td></td>
<td></td>
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<tr>
<td>Econometrics IIB</td>
<td>8</td>
<td></td>
<td>Econometrics IIA</td>
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<td>Commodity Price Analysis</td>
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<td>Agricultural Economics I</td>
<td>-</td>
</tr>
<tr>
<td>Economics II</td>
<td>16</td>
<td>Economics I</td>
<td>-</td>
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<tr>
<td>Production Economics</td>
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<td>Agricultural Economics I</td>
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</tr>
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<td></td>
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</tr>
<tr>
<td>Table I</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural and Resource Policy</td>
<td>8</td>
<td>Production Economics</td>
<td>-</td>
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<tr>
<td>Economics III</td>
<td>16</td>
<td>Commodity Price Analysis</td>
<td>Economics II</td>
</tr>
<tr>
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<tr>
<td>Courses</td>
<td>Unit values</td>
<td>Prerequisites</td>
<td>Corequisites</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------</td>
<td>------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Quantitative Business Management and Finance</td>
<td>8</td>
<td>Production Economics</td>
<td>Applied Commodity Modelling or Econometrics IIB</td>
</tr>
<tr>
<td>Research Methods</td>
<td>4</td>
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<td>—</td>
</tr>
<tr>
<td><strong>and a minimum of 12 units from Tables 2 and/or 3</strong></td>
<td></td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Fourth Year**

Agricultural Economics IV 52

Students may count no more than two of the following subjects toward the degree: Accounting I, Agricultural Science, Biology, Commercial Law I, Geography I, Government I, Mathematics I (Life Sciences), The Australian Economy. Students may not count Accounting I and either Financial Accounting Concepts or Management Accounting Concepts towards their degree.

TABLE 1: Courses from which Second Year students select optional units

<table>
<thead>
<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting I</td>
<td>12</td>
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<td>—</td>
</tr>
<tr>
<td>Animal Science</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Asian Studies 1</td>
<td>8</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Asian Studies 2</td>
<td>8</td>
<td>Asian Studies 1</td>
<td>—</td>
</tr>
<tr>
<td>Commercial Transactions I</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Corporations Law</td>
<td>8</td>
<td>Commercial Transactions I or Commercial Law I</td>
<td>—</td>
</tr>
<tr>
<td>Crop and Pasture Agronomy</td>
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<td>—</td>
</tr>
<tr>
<td>Crop Science I</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Econometrics IIA</td>
<td>8</td>
<td>Econometrics I</td>
<td>—</td>
</tr>
<tr>
<td>Econometrics IIB</td>
<td>8</td>
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<td>Econometrics IIA</td>
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<td>Financial Accounting A</td>
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<tr>
<td>Forecasting for Economics and Business</td>
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<td>Geography I</td>
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<td>Government I</td>
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<td>Management Accounting A</td>
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<td>Sample Design and Analysis</td>
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<td>Trade Practices and Consumer Law</td>
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<td>Commercial Transactions 1</td>
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TABLE 2: Courses from which Third Year students select optional units

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<tr>
<th>Courses</th>
<th>Unit values</th>
<th>Prerequisites</th>
<th>Corequisites</th>
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<tr>
<td>Accounting I</td>
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<td>Agronomy</td>
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<td>Animal Science</td>
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<tr>
<td>Any Semester Course in Economic History*</td>
<td>8</td>
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<tr>
<td>Any Semester Course in Finance*</td>
<td>8</td>
<td>Consult Faculty of Economics Handbook</td>
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<tr>
<td>Any Semester Course in Government*</td>
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<td>Any Semester Course in Commercial Law*</td>
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<td>Any Semester Course in Marketing*</td>
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<td>Applied Econometrics</td>
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<td>Econometrics IIIA</td>
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<td>Economics III Additional</td>
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<td>Government III</td>
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<td>Government II</td>
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<tr>
<td>Horticultural Science</td>
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<td>Crop and Pasture Agronomy</td>
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<td>Management Accounting A</td>
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<td>Operations Research A</td>
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<tr>
<td>Any other Semester Course in Econometrics*</td>
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Courses from the BScAgr degree*  

*Subject to the approval of the Head of Department of Agricultural Economics and the Head of the Department concerned.

Faculty resolutions relating to courses  

In the B AgrEc degree  

(1) A candidate who has successfully completed a course prescribed in sections 1, 2 or 3 of the Senate resolutions may be granted an exemption by the Faculty from taking the course of instruction and examination in such course again.

(2) A candidate who has not completed all courses in the First or the Second Year may be permitted by the Faculty to take one or more courses from the next year, provided that the total unit load should not normally exceed 56 units.

(3) A candidate in the Third Year may be granted permission by the Faculty to take one or more Fourth Year courses, provided that the candidate's complete Fourth Year course of study is approved by the Head of the Department of Agricultural Economics.

(4) A candidate who has not completed all courses in the Third Year may, in circumstances approved by the Faculty, be granted permission to enrol in the Fourth Year together with the remaining course or courses of the Third Year.
4 Courses of study: undergraduate

Courses are subject to alteration
Courses and arrangements for courses, including staff allocated, as stated in this or any other publication, announcement or advice of the University are an expression of intent only and are not to be taken as a firm offer or undertaking. The University reserves the right to discontinue or vary such courses, arrangements or staff allocations at any time without notice.

Books
You are expected to own all books listed as Textbooks. However, you are not required to buy books listed as Reference books.

Changes sometimes occur in the selection of prescribed textbooks, or reference books, owing to supply difficulties, or the publication of new and more suitable works. Such changes will be announced by lecturers and it is prudent to check with the relevant lecturer before buying the books you expect to need.

Bachelor of Science in Agriculture

FIRST, SECOND AND THIRD YEAR COURSES

Agribusiness Management 8 units
Prereq Economic Environment of Australian Agriculture Classes Sem 1 or 2: (3 lec & 2 workshop)/wk Assessment one 3hr exam, assignments

This course is designed to introduce the economic principles and techniques of business management as they apply to farm and agribusiness firms. 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 rural credit market.

An integrated set of workshops is used to provide experience in firm planning utilising budgeting; gross margins analysis, linear programming, simulation methods and other techniques of analysis.

Textbooks
P. Kotler et al. Marketing: Australia and New Zealand (Prentice Hall, 1994)

Q. Paris An Economic Interpretation of Linear Programming (Iowa State U.P., 1991)
A.N. Rae Agricultural Management Economics (CAB, 1994)
R. Turvey Complan Handbook No. 8: Enterprise Budgets for North West N.S.W. (N.S.W. Department of Agriculture, 1988)

Agricultural Chemistry 2 (Introduction to Molecular Processes in Ecosystems) 8 units
Course coordinator Dr Caldwell
Lecturers Dr Caldwell, Dr Lees
Prereq Chemistry(Agriculture) or Chemistry 1A Classes Sem 1: (41 lec & 70 prac) Assessment one 3hr exam, prac, assignments

This is an introductory course consisting of aspects of chemistry and biochemistry relevant in studies of basic and applied biological sciences including agriculture and the environment. The course introduces students to biophysical, biological and environmental chemistry. Lecture topics include: energy in the biosphere; the interaction of radiation and matter; solutions of neutral solutes and electrolytes; emulsions, foams and gels; the biological chemistry of carbohydrates, lipids, amino acids and proteins (including enzymes), nucleic acids; the metabolism of simple sugars, fatty acids and amino acids; the mechanisms of energy release and transduction, the basic pathway of carbon fixation in photosynthesis. Emphasis is given to the theory, principles and practice of the basic analytical techniques which underpin the more advanced instrumental methods used in many laboratory-based disciplines. Laboratory classes include instruction in the safe handling of chemicals and safe practices in chemical laboratories.

Reference books
To be advised

Agricultural Chemistry 3 (Chemistry and Biochemistry of Ecosystems) 8 units
Course coordinator Dr Kennedy
Lecturers Prof. Kennedy, Assoc. Prof. Copeland, Dr Caldwell, Dr Lees
Qualifying course Agricultural Chemistry 2 Classes Sem 1: (3 lec & 5 prac)/wk Assessment one 3hr exam, prac, assignments

This is a course in environmental chemistry designed for students who intend to specialise in their 4th year in Agricultural Chemistry or Soil Science, or in environmentally-related areas of crop and animal sciences, entomology, horticulture, microbiology, plant and animal genetics and plant pathology. The specific objectives of the course are to (i) provide
students with an understanding of chemical and biochemical processes in ecosystems, in particular the various elemental cycles, inclusive of environmental impacts arising from disturbances in natural processes and contamination from other human activity, and (ii) teach students practical skills in chemical and biochemical methods of analysis used in environmental chemistry.

The course builds on students' basic knowledge of physical, organic and analytical chemistry, and biochemistry to develop knowledge and understanding of chemical and biochemical processes and cycles in ecosystems. It aims to teach the principles important in understanding and sustaining our national plant-soil resources, with an emphasis placed on the acquisition of relevant laboratory skills in chemical analysis.

The lecture topics will include: the biological/environmental carbon cycle; bioenergetics of autotrophy and heterotrophy, photosynthesis, fermentation, eutrophication; the mineral nutrient cycles, uptake and utilisation by organisms, pH balancing; the biological/environmental nitrogen cycle; ammonification, nitrification of ammonia, denitrification of nitrate, nitrogen fixation, ammonia and nitrate assimilation; the biological/environmental sulphur cycle; sulphate assimilation, sulphate reduction and dissimilation in soil and water; the role of the nitrogen and sulphur cycles in the acidification of ecosystems; effects of acidification on plants and animals; pesticides and herbicides, chemistry, modes of action, metabolism and detoxification; environmental chemistry and fate of pesticides; design of new pesticides and means of pest control; heavy metals and plants, mechanisms of tolerance, hyperaccumulators, halophytes.

The laboratory exercises will include sample preparation and analyses of environmental samples for organic and inorganic nutrients, products and contaminants including heavy metals and pesticides. Skills will be acquired in gas, liquid and ion chromatography, atomic absorption spectroscopy, electrochemical methods and the use of immunoassay.

Reference books
To be advised.

**Agricultural Chemistry 3 (Agricultural and Food Products)**

8 units

*Course coordinator* Assoc. Prof. Copeland  
*Lecturers* Assoc. Prof. Copeland, Dr Caldwell, Dr Lees, Prof. Kennedy

*Prereq* Agricultural Chemistry 2  
*Classes* Sem 2: (3 lec & 5 prac)/wk  
*Assessment* one 3hr exam, prac, assignment

This is a course in agricultural biochemistry designed for students who intend to specialise in their 4th Year in Agricultural Chemistry, or in areas of crop and animal sciences, entomology, horticulture, microbiology, plant and animal genetics, and plant pathology. The course covers the chemistry and biochemistry of agricultural and food products and aims to (i) develop in students an understanding at the molecular level of biosynthetic processes, including their regulation, (ii) provide students with knowledge of the biochemistry of agricultural products, and (iii) teach students practical skills in chemical and biochemical methods of analysis used in laboratories of enterprises concerned with agricultural production, the processing of agricultural products, and in the food and beverage industries.

The lecture topics will cover biosynthetic processes including photosynthesis, sucrose and other oligosaccharides, and starch and other storage and structural polysaccharides, amino acids, fatty acids and lipids; mechanisms of metabolic regulation, bioenergetics and transport processes, signal transduction pathways; post-harvest biochemistry of animal and plant products; seed biochemistry, seed storage proteins, mobilisation of reserves, nutritional and anti-nutritional constituents of cereal and legume seeds; characteristics of constituents in relation to quality of products; physical biochemistry of macromolecules, including properties in solution and physical methods of study, natural fibrous and gel-forming macromolecules, uses in foods and other commercial products.

The laboratory exercises will include sample preparation and analyses of foods and other biological materials using spectroscopic, enzymic, and chromatographic (including GC and HPLC) methods; analysis and structural studies of polysaccharides; techniques for separating biological macromolecules (including chromatography and electrophoresis); radiochemical methods.

Reference books
To be advised.

**Agricultural Entomology and Mycology 3**

6 units

*Coordinator* Dr Rose  
*Lecturers* Dr Rose, Prof. Burgess  
*Classes* Sem 1: (2 lec & 1 prac)/wk  
*Assessment* one 3hr theory exam, prac

An introduction to pests and fungal diseases and their importance to agriculture.

The entomological component of this course will give students a brief introduction to insects and related animals. Lectures will cover morphology and classification, physiology, ecology and behaviour, principles of control and toxicology of insecticides. Practical classes will deal briefly with the classification and identification of insect pests.

The mycology component will include an introduction to the fungi, and the principles of disease control in relation to typical disease cycles. A brief introduction to mycotoxicoses also will be included.

Textbooks and reference books
To be advised.

**Agricultural Genetics 2 (Sem 2)** 6 units

**Agricultural Genetics 3 (Sem 1)** 6 units

*Coordinator* Dr Sharp  
*Lecturers* Dr Darvey, Prof. Marshall, Assoc. Prof. Moran,
This lecture and practical course 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.

Textbooks and reference books
To be advised.

**Agricultural Microbiology 2**

**Coordinator**: Dr New

**Lecturers**: Dr Carter, Mrs Dalins, Dr Duxbury, Dr Humphrey-Smith, Dr New, Prof. Reeves

**Prereq**: Biology, Chemistry (Agriculture) or Chemistry 1A

**Classes Sem 2**: (3 lec, 2 prac & 1 tut)/wk

**Assessment**: one 3hr theory exam, one 3hr prac exam, prac, 2 assignments

This course aims to give students an understanding of the relevance of microorganisms to agriculture, as well as to introduce them to the main areas of microbiology.

Topics covered include history and scope of microbiology; methodology; comparison of major groups of microorganisms; detailed study of bacteria including growth and death; bacterial genetics, leading on to genetic engineering; microbiology of the natural environment including the soil, nutrient cycling and nitrogen fixation.

**Textbook**

L.M. Prescott *et al.* *Microbiology* (W.C. Brown, 1993)

**Agricultural Microbiology 3**

**Coordinator**: Dr New

**Lecturers**: Dr Carter, Mrs Dalins, Dr Duxbury, Dr Humphrey-Smith, Prof. Reeves

**Prereq**: Agricultural Microbiology 2

**Classes Sem 2**: (3 lec, 4 prac & 1 tut)/wk

**Assessment**: one 3hr exam, one 3hr prac exam, prac, 2 assignments

This is a course in molecular microbiology and applied microbiology for students wishing to gain more knowledge in microbiology or those wishing to specialise in Microbiology in Fourth Year.

Molecular microbiology of bacteria, including genetics and gene regulation, prokaryote structure, taxonomy and evolution; human and animal health and disease; food microbiology; industrial microbiology.

**Textbook**

As for Agricultural Microbiology 2.

**Agricultural Science**

**12 units**

**Coordinator**: Dr Jacobs

**Lecturers**: Dr Jacobs, Ms Sharma, Mr de Kantzow, Prof. Burgess, Dr Maxwell

**Classes Yr**: (3 lec & 3 prac)/wk

**Assessment**: two 2hr exams, prac, plant collection, reports

This course introduces the principles and practices of modern agriculture. The course examines the relationship between the plants, animals and natural resources which combine to make up agricultural production systems. The concepts of environmental and economic sustainability of agricultural production will be introduced.

Topics covered include Australian farming systems, regional agricultural industries, farming operations, plant identification, climatology and agricultural ecology. Field practical sessions allow 'hands-on' experience with the tillage, sowing and harvesting equipment used by Australian farmers.

**Reference books**


**Agronomy 3**

**8 units**

**Coordinator**: Mr de Kantzow

**Lecturers**: Dr Bennett, Mr de Kantzow, Dr Campbell, Mr Cunningham

**Classes Sem 1**: (3 lec & 2 tut/prac)/wk

**Assessment**: one 2hr exam, one 4000w essay, class work

The central theme is the sustainable management of natural resources used in agriculture with irrigation being given special attention. The dryland and irrigated farming systems of the major regions of Australia are examined to identify key features which can be managed to achieve a more productive and sustainable use of their resources. Each student prepares a report on a region which examines these issues with special attention being given to the total catchment management approach.

The biological basis and technical practice of irrigation is examined in some depth. The use of computer-based models of agricultural systems, from management decision support systems such as irrigation scheduling or long-range weather forecasts to complex resources analysis programs is introduced in the context of its potential to produce more sustainable farming systems for the future.

**Reference books**

P.S. Cornish and J.E. Pratley *Tillage, New Directions in Australian Agriculture* (Inkata, 1987)

M.E. Jensen *Design and Operation of Farm Irrigation Systems* (ASAE, 1980)
Animal Anatomy 6 units
Lecturers Prof. Bryden, Dr Shea
Classes Sem 1: 3 lec/wk; Sem 2: 3 hr of prac/wk
Assessment one 3 hr written exam, one 30 min prac exam

The anatomy of farm animals with particular emphasis on animal production. The course includes lectures with associated demonstrations of anatomical structure, and a series of practical classes involving dissection of calves, pigs and chickens.

Textbooks
K.M. Dyce et al. Textbook of Veterinary Anatomy (Saunders, 1987)
J.E.M. Smallwood An Introductory Study of Bovine Anatomy (Smallwood, 1973)

Animal Physiology 9 units
Lecturer Dr Taylor
Prereq Agricultural Chemistry 2, Animal Science 2
Classes Sem 1: (1 lec & 2-4 prac)/wk; Sem 2: (1 lec & 2-4 prac)/wk
Assessment one 3 hr exam/Sem 1, one 3 hr exam/Sem 2

This course will extend the introductory lectures given during Second Year. Special attention will be paid to the physiology of production animals. Practical classes will amplify principles covered in the lecture course. Students will work in pairs or teams and keep detailed records of experiments. It is expected that students will purchase a course handbook during the first practical class of the year.

Textbook

Animal Science 2 6 units
Coreq Agricultural Chemistry 2
Prereq Agriculture Science 1
Classes Sem 2: 50 lec & 34 hr of prac
Assessment 80% exam (one paper, 2.5 hr), 20% assignments

The course is an integrated one designed to cater for students terminating studies in animal sciences at the end of Second Year and to provide the basis for students intending to specialise in animal production in later years. The lectures will be as outlined below:

Animal Industries
Dr Maxwell, Assoc. Prof. Gooden (plus Camden staff)

A course of lectures which describes the characteristics of the animal production industries. Lectures will be reinforced by practical classes to be held at Camden.

Animal Structure and Function
Dr Taylor, Assoc. Prof. Bryden, Dr Hyde

A course of lectures, tutorials and practical classes which describes the structure and function of agricultural animals.

Textbooks
W.O. Reece Physiology of Domestic Animals (1991)


Animal Science 3 7 units
Coordinator Dr J. Mercer
Prereq Agricultural Chemistry 2, Animal Science 2
Classes Yr
Assessment one 1 hr exam, assignments (nutrition), one 2 hr exam, assignments (reproduction)

Nutrition
This part of the course comprises lectures and practical classes and is an extension of the Second Year course. The lecture course will complement the practical course and will be directed toward the assessment of nutritional adequacy and with solving nutritional problems.

Reference book

Reproduction
This is an advanced course on mammalian reproduction and its control, with particular reference to farm animals. Topics covered will include cycles in reproduction, oogenesis, spermatogenesis, fertilisation, pregnancy, parturition, artificial control of reproduction.

Practical classes are designed to provide students with an understanding of the anatomy of the male and female reproductive organs, fertilisation and embryonic development, semen collection and handling, artificial insemination.

Reference books
E.S.E. Hafez (ed.) Reproduction in Farm Animals (Lea & Febiger, 1987)
G. Evans and W.M.C. Maxwell Salamon’s Artificial Insemination of Sheep and Goats (Butterworths, 1987)
Others to be advised.

Applied Marketing 8 units
Prereq Economic Environment of Australian Agriculture
Classes Sem 1: (3 lec & 1 tut/excursion)/wk
Assessment one 3 hr exam, assignments

This course will provide an understanding of the operation and principles of marketing, with practical applications focussed on the food and fibre markets.

The main topics covered will include: firm-level marketing mix and marketing strategy decision making; marketing management and planning; market research and information; futures markets and other risk sharing devices. The course will also address the organisation and trends of food and fibre marketing in Australia; food and fibre industrial marketing, including value-adding and power in the supply chain; market efficiency; and international marketing by agribusiness firms.

Textbook
Biology

Lecturers: Biological Sciences staff

A Kn HSC Science, Biology 2-unit core course

Classes: Yr: (3 lec & 3 prac)/wk

Assessment: exam/sem, prac, assignments

Several main areas of biological investigation are covered: cell biology, structure and function of plants (mainly flowering plants) and animals, organisms and environment, genetics, and some agricultural topics.

Textbook


Notes to accompany the lectures are issued each semester. Notes for semester 1 should be obtained from the Carslaw Building, during the Orientation period. For further information, consult Information for Students in First Year Biology, available from the Faculty of Agriculture office during the Orientation period.

Biometry 1

6 units

A Kn HSC Mathematics, 2 units

Classes: Yr: (1 lec & 2 tut/prac)/wk, class work

Assessment: one 3hr exam (open book), class work

This course explores methods for collecting, describing and analysing biological data from agricultural experiments. It includes a discussion of biological variability and of simple statistical techniques available for comparing treatments. It examines mathematical techniques useful in agricultural science, such as differentiation and integration as applied to growth curves and simple modelling. It considers methods of data plotting and curve fitting.

Practical classes will involve extensive use of personal computers. There will be general introductions to computers, file management and software as they relate to agriculture. The package Minitab will be used for data and mathematical analyses. Practice with word processors, spreadsheets and databases will be achieved using Microsoft Word, Excel and Access.

Biometry 2

6 units

Prereq: Biometry 1

Classes: Sem 1: (3 lec & 2 prac & 1 tut)/wk

Assessment: one 3hr exam (open book), class work

(For 1996, a transitional year, these two courses are identical.)

This course extends the techniques considered in Biometry 1, and considers problems of statistical design and analysis encountered in research in the biological, agricultural and veterinary sciences. In practical classes the computer packages Minitab, Microsoft Word and Excel are used extensively to analyse and summarise experimental data.

The first part of the course covers: describing biological data and variability in statistical terms, some theory of sampling and estimation, framing biological hypotheses; theory of hypothesis testing; estimating and testing a single treatment via a t-test, and extending to tests of two or more treatments using an F-test. The second part considers practical experimental design: randomisation and replication; the concept of experimental units; controlling variability in experimental material by pairing and blocking; applications of the analysis of variance; completely random and randomised complete block designs; Latin square designs; factorial treatment designs; missing data problems. The third component covers: linear relationships (regression, correlation) between two biological measurements; multiple linear regression model relating a biological variable to a number of predictor variables; some non-linear models; analysis of covariance; introduction to the general linear model.

Reference book


Chemistry

12 units

A Kn HSC 2-unit Chemistry or Chemistry component of 3- or 4-unit Science

Classes: Yr: (3 lec & 3 prac)/wk

Assessment: theory exam at end of each semester, other assessment to be advised

The course Chemistry is offered at two levels:

• Chemistry 1 (Advanced) is available to students with a good school record in Science or Chemistry, and who could subsequently pursue in-depth studies in areas such as Agricultural Chemistry or Soil Science.

• Chemistry (Agriculture) provides a sound grounding in the subject at the secondary level.

Fully detailed information about the courses is available from the Chemistry School.

Textbooks

• Chemistry 1 Advanced and 1

Students should obtain a booklist from the School during the Orientation period.
Crop Protection (New Resolutions— 2nd yr)  
Coordinator Prof. Burgess  
Prereq Agricultural Science or Horticultural Science 1, Biology  
Coreq Agricultural Microbiology 2  
Classes Sem 2: (2 lec & 2 prac) / wk  
Assessment one 2hr theory exam, laboratory work

This course considers the impact of weeds, insects and other invertebrates and disease on plant production and the various strategies for protecting plants from resulting damage. Environmental issues associated with pest control are emphasised. Topics covered in the course include crop loss assessment and economic threshold of damage, the origins of pest and disease problems and epidemiology, the major pest and disease problems in Australia, the use of pesticides and resistance to them, legislative aspects and the role of quarantine and biological control agents for weeds, insects and pathogens. Laboratory work includes the biology of important fungal plant pathogens, the technology of spray application and case studies in integrated pest management.

Crop Protection (Old Resolutions— 3rd yr)  
4 units  
Coordinator Dr Rose  
Lecturers Dr Rose, Prof. Burgess, Prof. Deverall, Dr Bowyer  
Classes Sem 2: 4 lec / wk  
Assessment one 3hr exam, one 2000w essay

The course covers weeds, diseases and insect pests of crops. The topics covered in this introductory course on the principles of crop protection are population dynamics; loss assessment; strategies, including thresholds; biocontrol; legislation, including quarantine; pesticide use; resistance to pesticides; future directions. There will be contributions from invited speakers.

Crop Science 2  
6 units  
Coordinator Dr Bowyer  
Prereq Agricultural Science or Horticultural Science 1, Biometry 1  
Coreq Agricultural Chemistry 2  
Classes Sem 2: (3 lec & 3 prac) / wk  
Assessment one 3hr exam, lab work, assignment

This course introduces students to the various aspects of plant physiology and its relevance to the production of crops and pastures. The major sections of the course deal with:
(i) the physiology of seeds in the context of crop establishment;
(ii) cellular structure and anatomy of plants and their relevance to the physiology of the whole plant;
(iii) the processes of crop growth, including the capture of light, the use of water and the role of nutrients;
(iv) the physiology of reproductive development of plants.

The practical classes include laboratory, glasshouse and field activities. They are designed to complement the lecture topics and to enable students to acquire skills in the design, analysis and reporting of experiments.

Reference books  
To be advised.

Economic Environment of Australian Agriculture  
6 units  
Classes Yr: (2 lec & 1 tut) / wk  
Assessment one 1hr exam / Yr 1, one 2hr exam / Yr 2, class work, one 1500w essay

This course is designed to give students an understanding of some basic economic principles and to introduce the characteristics of the economic environment in which Australian agriculture operates. After outlining the historical setting of Australian agriculture, the current market, business management and political environments in which agriculture operates are discussed. The topics discussed include: the historical development of Australian agriculture; the changing nature of Australian agriculture over time; agricultural adjustment in the world economy; the place of agriculture in the Australian economy; the place of Australian agriculture in the world economy; factors affecting the location of agricultural production; factors affecting the demand, supply and price of agricultural products; trends in agricultural prices; market structure; agricultural marketing; the nature of international markets; problems in agricultural trade; introductory principles of farm management and production economics; the farm business; taxation; constitutional, political and administrative institutions affecting Australian agriculture; the Australian agricultural policy setting; means of achieving government objectives for the farm sector.

Textbooks
K.O. Campbell and B.S. Fisher Agricultural Marketing and Prices (Longman Cheshire, 1991)
D.J. Epp and J.W. Malone Introduction to Agricultural Economics (Macmillan, 1981)

Horticultural Science 3  
6 units  
Coordinator Dr Goodwin  
Prereq Crop Science 2 or Crop and Pasture Agronomy  
Classes Sem 2: (2 lec, 2 workshops & 2 prac) / wk  
Assessment one 2hr exam (60%), assignments (30%), class quiz (10%)

The course introduces students to the scientific basis of perennial fruit and annual horticultural crop production. Lecture topics include: factors which determine fruit crop locations, training systems and rootstocks; the physiology of propagation, flowering and fruit growth; time of harvest and postharvest handling of fruit; the establishment of annual horticultural crops; water management; micro-environmental modification and the strategic management of fertilisers and pesticides. The practical
Plant Pathology 3

4 units

Coordinator Dr Bowyer
Lecturers Dr Bowyer, Prof. Burgess, Prof. Deverall
Prereq Agricultural Chemistry 2, Agricultural Entomology 3, Agricultural Microbiology 2, Crop Science 2
Classes Sem 2: (2 lec & 2 prac)/wk
Assessment one 2hr theory exam & one 1hr prac exam, class work

This course provides an introduction to plant disease as a limiting factor in agricultural production, to bacteria, viruses and nematodes as causes of plant disease, the physiology of infection and the nature of host resistance, parasitic specialization, epidemiology and the principles of disease control.

Reference book

Production Economics

8 units

Prereq Economic Environment of Australian Agriculture
Classes Sem 2: (3 lec & 1 tut/lab session)/wk
Assessment one 1.5hr exam, one 1.5hr practical exam, class work

Production economics is concerned with production decisions on resource allocation at the firm, industry and economy levels. The topics include: the nature of agricultural and resource industry production; production functions; factor substitution; principles of enterprise combination and multi-product production; firm objectives; constrained and unconstrained optimisation; factor demand; cost functions and other duality relationships; economies of scale and size in farming; production over time; productivity and technical change; production under risk and the illustration of the principles involved through the use of practical applications and exercises involving both the agricultural and resource industries.

Textbooks
D.L. Debertin Agricultural Production Economics (Macmillan, 1986)
J.P. Doll and F. Orazem Production Economics: Theory with Applications (Wiley, 1964)
Reference books
B.R. Beattie and C.R. Taylor The Economics of Production (Wiley, 1985)
B.R. Binger and E. Hoffman Microeconomics with Calculus (Scott, Foresman, 1988)

Soil Science 2

6 units

Coordinator Assoc. Prof. Koppi
Lecturers Assoc. Prof. Koppi, Mr Geering, Prof. McBratney
Prereq Agricultural Physics, Biometry 1

This course 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 course 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.

Reference books
D.L. Rowell, Soil Science: Methods and Applications (Longman, 1994)
R.E. White Introduction to the Principles and Practice of Soil Science 2nd edn (Blackwell Scientific, 1987)
A. Wild (ed.) Russell's Soil Conditions and Plant Growth 11th edn (Wiley, 1988)

Soil Science 3

8 units

Coordinator Mr Geering
Lecturers Assoc. Prof. Koppi, Prof. McBratney, Mr Geering and staff from Geography Department
Prereq Soil Science 2
Classes Sem 2: (4 lec & 3hr prac)/wk; 5 days in the field in last week mid-year break
Assessment one 3hr exam, reports on field and lab work

Lectures on classification of soil, soil survey, pedological processes, geomorphology and soil stratigraphy, aerial photography, geostatistics and their application to land evaluation for rural purposes, the forms of land degradation occurring in Australia, the management of the soil environment and processes and management conducive to sustainable soil husbandry.

Five days' field work in the last week of the mid-year break will take place at a country location and involves landscape description and the description, mapping and sampling of soil profiles for the purpose of assessing land-use capability and field variability of soil properties. The field-work component is a compulsory part of the course.

Thirty-six hours of laboratory work involves routine physical, chemical and statistical analyses of samples taken in the field relevant to assessment of the land use potential and the quantification of the soil variability and soil degradation at the survey site.

Reference books
FOURTH YEAR COURSES

Agricultural Chemistry 4

Prereq Agricultural Chemistry 3 (Chemistry and Biochemistry of Ecosystems) or Agricultural Chemistry 3 (Agricultural and Food Products)

The course will include:

Research Methods in Agricultural and Biological Chemistry 8 units

Students prepare two essays each of 5000 words on topics of their choice selected from a list which covers a wide range of basic and applied areas of biological, environmental and food chemistry.

Chemistry and Biochemistry of Agricultural and Food Products and the Environment 16 units

An advanced course of lectures and laboratory classes in biological and environmental chemistry and agricultural biochemistry. The areas covered will depend on which of the optional Agricultural Chemistry 3 courses students have completed.

Research Project 24 units

Students carry out a short research project under close supervision of a member of the staff. Projects are usually available in one of the following areas of research interest within the Department: carbohydrate and nitrogen metabolism in a variety of crop plants; symbiotic nitrogen fixation; biochemistry of herbicides and pesticides; nutritional aspects of seed proteins; organic and inorganic residues in agricultural products. Students who are interested in working in another area are invited to discuss their ideas with a member of the staff. As an alternative to the research project, students may elect to undertake an extended program of advanced laboratory experiments in biological chemistry, the analysis of food and agricultural products and soil chemistry.

Agricultural Economics

Prereq Applied Marketing, Agribusiness Management or Production Economics

In addition to completing five courses from those listed below, students undertake a small research project, on which they write a report, and attend seminars as required.

Agricultural and Resource Policy

The topics discussed include: basic theoretical 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; microeconomic 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 for this course.

Applied Commodity Modelling

The application of methods of data analysis to the agricultural and resource sectors is the focus of this course. Topics covered will include: formulation and econometric estimation of production relationships; demand; supply; expectations models and simple simultaneous representations of commodity sectors; time series forecasting applied to commodity and futures markets; and a suitable selection from an introduction to dynamic multipliers, dynamic elasticities, and econometric simulation. Use will be made of a variety of data analysis and econometric computer packages. Emphasis will also be placed on electronic and graphical approaches to data analysis along with consideration of the limitations and problems of the particular techniques.

Commodity Price Analysis

The topics covered will include: the nature of agricultural and resource commodity markets, market supply relationships, market demand relationships, price determination, marketing margin relationships, spatially related markets, market dynamics, derived demand for inputs, price expectations, non-competitive market forms and contestable markets. Applied examples from agriculture and the resource industries will be used throughout the course as illustrations of the principles involved.

Natural Resource Economics

A course in natural resource economics of relevance to agriculture and the resource industries. Issues discussed are: the environment as a source of environmental services; socially efficient resource allocation and Pareto welfare economics; market failure and characteristics of environmental services; benefit cost analysis of public projects, including the modification of environmental services; non-depletable resources and pollution; depletable resources; irreversibility; sustainability. Applications include land degradation, fisheries, forestry, land-use planning, greenhouse effect.

Quantitative Business Management and Finance

The application of applied optimising methods to decision-making in the agricultural and resource sectors is the focus of this course. Topics covered include: an overview of the applications of optimising models; the mathematical basis for constrained optimisation; basic linear, quadratic and nonlinear programming; farm modelling; agricultural sector...
models; transport and location models; spatial equilibrium systems; introduction to general equilibrium models; and model validation and verification. In addition, basic decision analysis will be introduced including basic concepts of probability; concepts of utility; utility functions and elicitation of preferences. Issues of financial analysis and control, financial relationships, investment, capital budgeting, risk management and risk in investment decision making will also be covered.

Applied Commodity Trade
In this course 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; trade policies of importing and exporting nations, including issues such as food aid and surplus disposal programs; economic integration and impacts on international commodity trade; international trade policy making, including GATT; trade policies of the centrally planned economies and developing countries; the impact of exchange rates and other macroeconomic variables on international trade in commodities.

Applied Marketing
This course will provide an understanding of the operation and principles of marketing, with practical applications focussed on the food and fibre markets. The main topics covered will include: firm-level marketing mix and marketing strategy decision making; marketing management and planning; market research and information; futures markets and other risk sharing devices. The course will also address: the organisation and trends of food and fibre marketing in Australia; food and fibre industrial marketing, including value-adding and power in the supply chain; market efficiency; and international marketing by agribusiness firms.

Optional course
With the approval of the Head of the Department of Agricultural Economics, students may undertake a course, such as Economics I, offered by the Faculty of Economics.

Agricultural Entomology 4
A full-year specialisation which is comprised of the following courses:

Anatomy and Taxonomy of Insects
The internal and external structure of insects is studied in detail. The anatomy of major orders is compared and contrasted. Classification to family level of all orders is included in the practical course.

Textbook

Ecology
This course is given by the School of Biological Sciences

Reading course
This list covers areas in entomology that are not covered in other sections of the course and allows students to concentrate on areas of interest.

Project
Students undertake research projects throughout the year under supervision by staff members.

Insect collection
Students are required to make a small but representative collection of insects.

Agricultural Genetics 4
Prereq Biometry 3

The coursework is designed for students wishing to concentrate on those areas of genetics or breeding which are seen as most relevant to their present interests and career prospects. Students should consult with the relevant departments in determining course combinations. Courses at Cobbitty may be run as intensives either during or between semesters.

(a) Cytogenetics (Cobbitty) 6 units
Lectures in cytology and cytogenetics, with special emphasis on cereals and the application of chromosome engineering to plant breeding. The laboratory course includes routine cytological procedures and tissue culture technology.

(b) Plant Breeding (Cobbitty) 6 units
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.

(c) Population Genetics and Animal Improvement (Camden) 8 units
A course of lectures and practical periods, dealing with population genetics, quantitative inheritance and animal breeding given by the Department of Animal Science.

(d) Prokaryote and Eukaryote Molecular Genetics (Main Campus) 12 units
Lectures and laboratory classes given in the School of Biological Sciences.

(e) Plant Genetic Engineering (Cobbitty) 6 units
Lectures and laboratory work covering the structure and functions of plant genomes and genes, the technology and results of DNA transformation, and the analysis of agronomic traits by both molecular techniques and by genetic mapping using RFLP and other genetic markers.
(f) Animal Genetics (Main Campus) 4 units
A course of lectures covering those aspects of genetics that are relevant to animals, with particular emphasis on the genetic basis of animal disease. Topics include biochemical disorders, chromosomal abnormalities, non-Mendelian disorders, immunogenetics, pharmacogenetics, genetic variation in pests, parasites and pathogens, and genetic and environmental control of disease.

(g) Project (compulsory) 6-18 units
Any other 6-unit course with the approval of the Head of Department.

Agricultural Microbiology 4
Coordinator Dr New
The coursework for this subject follows substantially the same syllabus as the senior course for science students, Microbiology 3, which comprises 81 lectures, 189 hours of practical work, and 59 hours of a variety of other course-related activities. The other activities include workshops on library searches and laboratory instrumentation, mini lectures on data handling and laboratory safety, and poster presentations, skills testing and tutorials. The course covers three general areas:
- Medical Microbiology — medical bacteriology, virology and serology
- Molecular Microbiology — bacterial growth, metabolism, genetic regulation and physiology; bacterial and phage genetics; molecular pathogenesis
- Applied and Environmental Microbiology — microbial ecology; plant-microbe interactions; food microbiology; pollution microbiology and bioremediation

The practical course complements the lecture course and includes project work and excursions to industrial and medical institutions. As far as possible, agriculture students will be given essays and other assignments on topics of importance to agriculture.

In addition to the coursework, valuable experience is gained by undertaking a research project in conjunction with a member of staff, the project accounting for roughly half of the final mark of the course.

Reference books
To be announced.

Agronomy 4
Coreq Agronomy 3, Biometry 3
Agronomy is the science of growing plants — from creating on-farm opportunities to developing policies for ecosystem management. This course provides a substantially deeper appreciation of particular fields such as plant physiology, nutrition and experimentation. Extensive opportunities are provided for field work. There will also be residential study periods in rural locations where studies of crop and pasture industries are applied to active field situations. A personal research project is part of the program. This contributes approximately one-third of the course units for the year and can be selected from a wide variety of topics; data may be gathered before or during the academic year itself.

Core courses:
- Crop Agronomy 8 units
- Crop Physiology and Nutrition 8 units
- Pasture Agronomy 6 units
- Research Project 6, 12 or 24 units

plus courses to total 48 units as approved by the Head of Department. Recommended options are Agribusiness Management or Methods in Horticultural Research, although students with particular interests may choose a course in Farming Systems, Plant Breeding, Soil Biology, or courses in Agricultural Economics.

Crop Agronomy 8 units
Coordinator Mr de Kantsow
Classes Yr Assessment one 3hr exam, review paper

A field-based course on crop management with particular reference to grain legume and fibre crops. Analyses will be in the context of (i) their ecology: underlying physiology and nutrition; (ii) their farming system, including technical and economic analysis of their management and their roles and restrictions within existing and imaginable farming systems; and (iii) their end uses, and how to better meet the technical needs of markets. Remote sensing and geographic information systems technology are used to monitor crop area production, computer-based decision support systems to assist crop management, and professional diagnosis of hypothetical problems in crop production to develop analytical skills.

Crop Physiology and Nutrition 8 units
Coordinator Dr Campbell
Classes Yr Assessment examination, assignment, seminar

The course develops physiological and nutritional principles for agricultural production and for environmental protection. This course emphasises techniques with appropriate experiments, communication skills and team management. Can plants obtain their nutrients from waste? The role of C/N ratio, heavy metal uptake and quality of nutrient inputs for plant growth is considered. Some of the major physiological components of plant growth are examined. Practicals cover an integrated series of experiments on growth of a crop as affected by nutrition, the physiology of nutrient distribution during growth, diagnosis of nutrient deficiencies, C/N ratios, carbon fixation, hydroponics and the role of ethylene. Students set up and monitor their own experiment on waste management or control of nutrients to the environment.
Excursions deal with waste management issues in the Sydney region, how useful agricultural products are produced, and utilisation of by-products.

Textbooks

Pasture Agronomy 6 units
Classes Yr
Assessment one 3hr exam, consultancy report

Pasture ecology and management with particular emphasis on plant adaptation and the management of plant communities and their long-term dynamics. Identification of management problems and opportunities within farming systems taking account of both ecological and social aspects of grazing systems in the coast, tablelands and central west of N.S.W. Classes may be based in Sydney, Camden or Orange, with a field trip of approximately 4 days.

Research Project and Thesis 6, 12 or 24 units
Supervised research on a topic chosen by the student in the area of cropping systems, cereals production, plant nutrition, or pasture and weed ecology.

Turf Management 6 units
Coordinator Prof. Martin
Classes Sem 1
Assessment one 2hr exam, assignments

Lectures, workshops and field visits centred on the theme of 'turf: a self-contained system'. Students address the scientific issues underlying the design, construction, grassing and maintenance of turf facilities; construction of desired soil profiles, nutrition, micro- and macro-environment of turf, water management, physiology of growth under turf conditions. Environmental legislation and emerging issues for turf management.

Animal Production
Coordinator Assoc. Prof. Gooden
Prereq Animal Anatomy, Animal Physiology, Animal Science 3 and Data Management 3
Location Werombi Road, Camden

The year is devoted to advanced Animal Production and a certain degree of specialisation by medium of project work is compulsory. Students are in residence at the University Farms, Camden, for a whole year, where advanced lecture and practical courses are taken in the following subjects: meats, poultry, genetics, dairying, wool, and control of animal diseases. About 20 per cent of the time available is spent on project work, for which students undertake projects in the various sections of the Department of Animal Science at Camden.

Reference books
Agricultural Research Council The Nutrient Requirements of Farm Livestock,
—No. 1: Poultry 2nd edn (1975)
—No. 2: Ruminants (1980)
—No. 3: Pigs (1981)
G. Alexander and O.B. Williams The Pastoral Industries of Australia (Sydney U.P., 1979)
P.B. English et al. The Sow, Improving her Efficiency (Farming Press, 1977)
D.C. Falconer Introduction to Quantitative Genetics 2nd edn (Longman, 1981)
C.W. Holmes and G.F. Wilson Milk Production from Pastures (Butterworths, 1984)
D.R. Lindsay and D.I. Pearce Reproduction in Sheep (Australian Academy of Sciences, 1984)
I.M. Reit Essential Immunology 2nd edn (Blackwell, 1974)
D. Sainsbury Poultry Health and Management 3rd edn (Blackwell, 1992)
G.W. Salisbury and N.L. van Denmark Physiology of Reproduction and Artificial Insemination of Cattle 2nd edn (Freeman, 1978)

Other textbooks to be advised.

Biometry 4
Prereq Biometry 3 or Data Management 3

This course trains people for careers as biometricians or statisticians. Much of the applied work encountered in Biometry 1 and 3 is synthesised into a more formal statistical framework. Some of the Fourth Year courses are undertaken in the School of Mathematics and Statistics, and supplemented with additional work in Biometry.

The program consists of a 12- to 18-unit project, a selection of courses offered in the Department of Crop Sciences, and a selection of courses offered in the School of Mathematics and Statistics.

Core courses:
Research Project 6, 12 or 18 units
Biometrical Methods 6 units
Matrix Algebra and Linear Models 6 units
Statistical Consulting 6 units

plus 12 to 24 units chosen from:
Biometrical Computing 6 units
Experimentation 6 units
Multivariate Analysis 6 units

or from other courses approved by the Head of Department.

Biometrical Computing 6 units
Coordinator Assoc. Prof. O'Neill
Classes Sem 2
Assessment assignments

This course delves into a number of computing packages, languages and systems useful to a consulting or research biometrician. Statistical packages include Minitab, Genstat, SAS, S, Word and Excel. Programming languages such as Basic, Fortran, Pascal and C are studied as they relate to biometrical problems.
Biometrical Methods 6 units
*Coordinators* Assoc. Prof. O’Neill, Dr Thomson
*Classes* Sem 1
*Assessment* assignments

This course introduces students to essential statistical and mathematical theory that should be at the fingertips of practising statisticians. Topics include bivariate and multivariate distribution theory, maximum and residual maximum likelihood estimation, likelihood ratio tests and Taylor expansions. The theory is extended to more difficult design problems, such as nearest neighbour designs and intercropping experiments.

Matrix Algebra and Linear Models 6 units
*Coordinator* Dr Thomson
*Classes* Sem 1
*Assessment* assignments

This course provides the necessary matrix knowledge underlying many of the standard statistical tests. A general linear model approach is adopted as the underlying framework for tests such as t-tests, analysis of variance F-tests and regression F-tests.

Multivariate Analysis 6 units
*Coordinator* Dr Thomson
*Classes* Sem 2
*Assessment* assignments

This course generalises univariate tests to multivariate situations. Topics include multivariate regression, multivariate analyses of variance, principal component analyses and canonical variate analyses. Emphasis in this course is on applications to agricultural problems.

Statistical Consulting 6 units
*Coordinators* Assoc. Prof. O’Neill, Dr Thomson
*Classes* Yr
*Assessment* reports

Students are exposed to problems in agricultural and veterinary science that are referred to the professional officer in Biometry. Students work with the scientist involved to provide, under supervision, appropriate biometrical advice. In addition, students are placed in a government department or statutory body one day per week for a period of time to gain first-hand experience with these organisations.

Farming Systems
*Prereq* Production Economics or Agribusiness Management
*Coreq* Agronomy 3

This is an interdisciplinary program offered jointly by the Department of Agricultural Economics and the Department of Crop Sciences. It is designed for students with a general training in agricultural science who seek to understand farming systems and their managerial aspects within the wider agribusiness environment. Students will complete a minimum of 48 units including a project.

Core courses:
- Crop Agronomy 6 units
- Pasture Agronomy 6 units
- Agricultural and Resource Policy 8 units
- Natural Resource Economics 8 units
- Project 8 units

plus units from the following courses:
- Accounting I or 12 units
- Financial Accounting Concepts and Management Accounting Concepts 12 units
- Advanced Soil Chemistry 6 units
- Agribusiness Management 8 units
- Applied Commodity Trade 8 units
- Applied Marketing 8 units
- Crop Protection 4 units
- Plant Pathology 3 4 units
- Research Methods 4 units
- Soil Science 3 8 units

and other courses approved by the Head of Department concerned, up to 8 units.

The project will involve an evaluation of an agribusiness/farming systems/farm management proposal & result in a 10 000-word report. Students will be assisted in the selection of a suitable project.

To pass the year, students must perform satisfactorily in the project, in subjects of an economics nature and in subjects of a science nature.

**Course and component descriptions**
For those of an economics nature, see under Agricultural Economics. For those of a science nature, see under Agronomy 4, Horticulture 4, Soil Science 4, or the specific course or component stated above.

Horticultural Science 4
*Prereq* Horticultural Science 3, Data Management 3

A full-year course offering an advanced treatment of the scientific and technical basis of horticultural production. The application of current scientific developments to the improvement of the efficiency of production is discussed, with some emphasis on a physiological approach and on the mastery of appropriate scientific techniques.

Core courses:
- Ornamental Horticulture 6 units
- Methods in Horticultural Research 6 units
- Research Project 18 units
- plus any others courses approved by the Head of Department.

Ornamental Horticulture 6 units
*Coordinator* Dr Goodwin
*Coreq* Horticultural Science 3
*Classes*: Yr: Sem 1: (2 lec & 1 prac)/wk + three 5hr prac; Sem 2: 2 prac/wk
*Assessment* classwork 15%, diary 10%, viva 10%, assignment 15%, one 1hr exam 15%, one 1.5hr exam 35%
A lecture and practical course on the production and postharvest handling of nursery and cut flower crops, the use of plants in landscaping, and the identification and properties of ornamental plants. The practical component emphasises the measurement of plant characteristics related to propagation efficiency, and of potting media characteristics related to plant performance.

**Methods In Horticultural Research**

*Coordinator* Dr Goodwin  
*Coreq* Horticultural Science 3  
*Classes*: Sem 1: 14 lec & seven 6hr prac; Sem 2: 4 day residential short course, mid-semester break  
*Assessment*: two 1hr exams (60%), assignments (25%), laboratory book (15%)

Lectures and practicals on methods used in research on the physiology of ornamental and fruit crops. The course includes the use of controlled environment rooms to elucidate the control of flowering, and advanced tissue culture methods. The fruit crop segment of the course (2 units) will be given as a one-week residential course at Dareton.

**Postharvest Horticulture**

*Coordinator* Dr W.B. McGlasson (University of Western Sydney, Hawkesbury, where the course will be given)  
*Classes*: Sem 1: 13 lec & thirteen 5hr class (1 day/wk)  
*Assessment*: lab report, assignment, seminar

This course will develop the skills required to ensure integration of postharvest needs with production and marketing requirements of fruit, vegetables, cut flowers and florists' stocks. Students will conduct experiments and a case study within the system Market-Grower-Market. A representative range of seasonal products will be used and where possible students will undertake all operations from harvesting to consumer evaluation. Assessment will be by means of laboratory reports (50%), a take-home examination paper (30%) and a seminar on a selected postharvest topic (20%).

**Plant Pathology 4**  
*Coordinator* Prof. Deverall  
*Prereq* Plant Pathology 3

A full-year specialisation comprising the following component courses:

**Myecology and Fungal Physiology**  
A lecture and practical course on the fungi with reference to their activities as plant pathogens. Comprises lectures and associated practicals on classification, systematics, population analysis, variability and problems of nomenclature with special emphasis on pathogenic members of the following groups: Fungi Imperfecti, *Fusarium* spp., *Colletotrichum* spp., Ascomycetes, the lower fungi, rusts, smuts and other Basidiomycetes. Also lectures and practicals on fungal nutrition and the physiology of reproduction and spore germination.

**Soil Biology**  
A lecture and practical course on the ecology of the soil with special reference to the activities of plant-pathogenic fungi and nematodes. Includes consideration of the effect of physical factors such as water potential and temperature on the survival, growth, and infectivity of fungi in soil.

**Bacteriology and Virology**  
A course of lectures and associated practical work on the plant-pathogenic bacteria and viruses and their interactions with plants. Includes symptoms of disease, the purification, transmission, characterisation, detection, ecology and taxonomy of plant viruses, and principles of control. The practical work emphasises advanced analytical techniques in virology.

**Physiology of Plant Disease**  
A course of lectures, tutorials and practicals on the processes involved in the interaction between plant cells and parasitic fungi and bacteria. Includes an introduction to the genetic basis of host resistance and parasitic specialisation. Covers the physiology of infection, host responses, roles of enzymes and toxins in parasitism, defence mechanisms of plants and the physiological basis of specificity.

**Research Project**

The majority of the second semester will be devoted to a research project in an aspect of one of the above subjects. Time would be available for students to attend the 52-hour optional course Crop Protection, which normally forms part of the third year for undergraduates in Agricultural Science.

**Textbooks**

- L. Bos *Introduction to Plant Virology* (Longman, 1983)
- D.M. Griffin *Ecology of Soil Fungi* (Chapman & Hall, 1972)
- S. Issac *Fungal-Plant Interactions* (Chapman & Hall, 1992)

**Reference books**


**Soil Science 4**  
*Prereq* Soil Science 3

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 prerequisite for this course is Soil Science 3. Students are required to complete a relevant 24-unit research project and take at least three of the following four modules: Advanced Soil Chemistry, Advanced Field and Laboratory Soil Physics, Advanced Methods of Soil Analysis and Advanced Pedology, and any other 6-unit modules approved by the Head of Department.
Advanced Field and Laboratory Soil Physics  

**Coordinator** Prof. McBratney  
**Lecturer** Prof. McBratney  
**Classes** Sem 1: (2 lec, 1 tut & 5hr prac)/7 wks, 5 days in the field (1st half)  
**Assessment** one 2hr exam, field and prac reports, problem sets, essay

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 fundamentals of numerical computer modelling of soil physical processes.

Five days' field-work, in the week prior to the beginning of Semester 1, involves field measurement of soil physical properties such as shear and tensile strength, electrical resistivity, hydraulic conductivity and infiltration rates and moisture content.

**Reference books**  
G.S. Campbell *Soil Physics with BASIC* (Elsevier, 1985)  
J. Richter *The Soil as a Reactor* (Catena, Cremlingen, 1987)

Advanced Pedology  

**Coordinator** Assoc. Prof. Koppi  
**Lecturer** Assoc. Prof. Koppi  
**Classes** Sem 1: (2 lec, 1 tut & 8hr prac)/7 wks, 5 days in the field (2nd half)  
**Assessment** one 2hr exam, prac reports, essay

This course centres on a weathering study which traces the changes from a rock parent material up through the soil profile. The methods of study include particle-size analysis and extraction of a fine-sand fraction for optical identification and quantification of the mineral species present. Thin sections of the rock and profile are prepared, examined and the main features identified and quantified. The data from the sand analysis, micromorphological investigations and clay mineral assessments are used to provide an understanding of the pedogenesis of the particular soil. A field trip to study the variety of soil types in their environmental setting is made in the mid-semester break.

A detailed study, including exercises, is made of the USDA soil classification system, Soil Taxonomy.

**Reference books**  
E.A. FitzPatrick *Soils* (Longman, 1980)  
E.A. FitzPatrick *Micromorphology of Soils* (Chapman & Hall, 1984)

Advanced Methods of Soil Analysis  

**Coordinator** Mr Geering  
**Lecturers** Mr Geering  
**Classes** Sem 2: (3 lec, 1 tut & 5hr prac)/7 wks (2nd half)  
**Assessment** one 2hr exam, lab report, problem sets, essay

Approaches to scientific investigation and methods of literature survey followed by tutorial on computer search techniques.

**Physical**. Particle Size Analysis (PSA) of clay fraction and fractionation by centrifugation techniques, specific surface area measurements by BET Thermocouple methods for field measurements of moisture. Thermal conductivity methods for soil moisture content, gamma and neutron probe methods for field measurements of moisture content and bulk density and time-domain reflectometry.

**Physico-chemical**. Measurement of oxidation-reduction status, O₂ diffusion rate and O₂, CO₂ concentrations in soil, selective ion-electrodes for measurements of ion activities in soil solution.

**Geotechnical**. Mechanical measurements of soil properties including Atterberg limits, unconfined compression, penetrometer, Proctor and compaction, torsion shear box, dynamometer, rupture-test and drop shatter test, sampling and testing procedures for determining physical properties of swelling soils.

**Soil structural**. Soil structure and stability tests in relation to aggregate size and soil micro-aggregates. Fractionation of soil organic matter and determination of principal functional groups COOH, OHH involved in CEC and complexation of heavy metals.

**Reference books**  
J. Loveland (ed.) *Methods of Analysis for Irrigated Soils* Technical Communication No. 54 (Commonwealth Agricultural Bureaux, 1974)  

Advanced Soil Chemistry  

**Coordinator** Head of Department  
**Lecturers** Mr Geering, Prof. Kennedy, Prof. McBratney, Assoc. Koppi, Assoc. Prof. Copeland  
**Classes** Sem 2: (3 lec, 1 tut & 8hr prac)/6 wks (1st half)  
**Assessment** one 2hr exam, lab report, problem sets, essay

Topics include clay mineralogy, cation exchange capacity and pH dependent charge, soil charge characteristics, soil chemical analyses and their interpretation, formation of acid soil — Al and Mn toxicities, chemistry and adsorption/desorption of K, P and S in soil, soil solution and speciation of ionic components, soil salinity, oxidation/reduction reactions in soil, chemistry of soil organic matter and nitrogen, soil enzymology and solute movement.

**Reference books**  
J. R. Sparks (ed.) *Agricultural Chemistry* (Chapman & Hall, 1989)  
Reference books
S.A. Barber *Soil Nutrient Bioavailability* (Wiley, 1984)
D.J. Greenland and M.H.B. Hayes *The Chemistry of Soil Constituents* (Wiley, 1978)

Special Program
Students may enrol in Special Program after consultation with, and with the approval of, the Dean. This interdisciplinary course structure is available for students who wish to undertake Fourth Year optional course combinations which are not offered by any individual department.

**Bachelor of Horticultural Science**

**FIRST, SECOND, THIRD AND FOURTH YEAR COURSES**

**Crop Protection (New Resolutions)**

*4 units*

Coord: Prof. Burgess

*Prereq* Agricultural Science or Horticultural Science 1, Biology, Agricultural Microbiology 2

*Classes* Sem 2: (2 lec & 2 prac)/wk

*Assessment* one 2hr theory exam, laboratory work

This course considers the impact of weeds, insects and other invertebrates and disease on plant production and the various strategies for protecting plants from resulting damage. Environmental issues associated with pest control are emphasised. Topics covered in the course include crop loss assessment and economic threshold of damage, the origins of pest and disease problems and epidemiology, the major pest and disease problems in Australia, the use of pesticides and resistance to them, legislative aspects and the role of quarantine and biological control agents for weeds, insects and pathogens. Laboratory work includes the biology of important fungal plant pathogens, the technology of spray application and case studies in integrated pest management.

**Horticultural Science 1**

*12 units*

Coord: Dr Jacobs

*Lecturers* Dr Jacobs, Dr Sharma, Mr de Kantzow, Prof. Burgess, Dr Maxwell

*Classes* Yr: (3 lec & 3 prac)/wk, excursion

*Assessment* two 2hr exams, prac, plant collection, reports

This course provides a general introduction to horticulture with a particular emphasis on the role of climate, and provides a scientific basis for the study of horticultural science.

The excursion component is compulsory and will be done outside the weeks set aside for classes and examinations. However, the excursion will count as one week of the 18 week professional experience requirement of the degree.

Reference books

**Horticultural Science 2**

*6 units*

*Prereq* Horticultural Science 1 or Agricultural Science

*Coreq* Crop Science 2

*Classes* Sem 2 (3 lec & 3 prac)/wk

*Assessment* one 3hr exam, assignments, prac book

Covers topics on the physiology and the irrigation of broadacre and intensive horticultural crops. It includes the physiology of growth and development of fruit and of fleshy root, stem and leaf crops. The scientific basis of irrigation practice, and the application of these principles to the efficient and ecologically sound management of irrigation systems are discussed.

Reference book
M.E. Jensen *Design and Operation of Farm Irrigation Systems* (American Society of Agricultural Engineers, 1980)

(See alphabetically under First, Second and Third Year courses for the BScAgr degree for course descriptions for the following courses.)

**Methods in Horticultural Research**

*6 units*

Coord: Dr Goodwin

*Coreq* Horticultural Science 3

*Classes*: Sem 1: (14 lec & seven 6hr prac); Sem 2: 4 day residential short course, mid-semester break

*Assessment* two 1hr exams (60%), assignments (25%), laboratory book (15%)

Lectures and practicals on methods used in research on the physiology of ornamental and fruit crops. The course includes the use of controlled environment rooms to elucidate the control of flowering, and advanced tissue culture methods. The fruit crop segment of the course (2 units) will be given as a one-week residential course at Dareton.
Ornamental Horticulture 6 units
Coordinator Dr Goodwin
Coreq Horticultural Science 3
Classes: Yr : Sem 1: (2 lec & 1 prac)/wk + three 5hr prac; Sem 2: 2 prac/wk
Assessment classwork 15%, diary 10%, viva 10%, assignment 15%, one 1hr exam 15%, one 1.5hr exam 35%

A lecture and practical course on the production and postharvest handling of nursery and cut flower crops, the use of plants in landscaping, and the identification and properties of ornamental plants. The practical component emphasises the measurement of plant characteristics related to propagation efficiency, and of potting media characteristics related to plant performance.

Plant Disease 8 units
Coordinator Dr Bowyer
Prereq Agricultural Genetics 2, Crop Protection (New Res.), Crop Science 2
Lecturers Dr Bowyer, Prof. Burgess, Prof. Marshall, Dr Wellings
Classes: Sem 1: (4 lec & 4 prac)/wk
Assessment one 3hr theory exam, one 1hr prac exam, assignment, 3 short written quizzes

This course provides an introduction to the common types of plant disease which limit agricultural and horticultural production and to the principles of plant pathology. Topics include: symptoms and recognition of diseases in the field and laboratory, and the procedures for establishing the cause of disease; biology of the major groups of pathogens (fungi, bacteria, and other prokaryotes, viruses, nematodes) and associated diseases; abiotic causes of diseases; distinction between lifecycles of pathogens and disease cycles; epidemiology of diseases; disease resistance and parasitic specialisation from genetic and physiological perspectives; breeding for disease resistance; prospects and approaches for use of biotechnology in manipulating natural resistance mechanisms in plants.

Reference books
J.G. Manners Principles of Plant Pathology 2nd edn (Cambridge University Press, 1993)
D. Penley (ed.) Diseases of Fruit Crops (DPI Publications, 1993)
D. Penley (ed.) Diseases of Vegetable Crops (DPI Publications, 1994)

Research Project and Thesis 24 units
A candidate may enrol in the course Project and Thesis only during the Fourth Year.

Bachelor of Agricultural Economics

FIRST, SECOND, THIRD AND FOURTH YEAR COURSES

Accounting I 12 units
This course consists of two parts, Accounting IA and Accounting IB. BAgrEc students must enrol in Accounting I, not in each part separately.

Accounting IA
Classes Sem 1: (2 lec, 1 tut & 2 prac)/wk
Assessment one 3hr exam, 2 tests/sem, weekly assignments


Accounting IB
Classes Sem 2: (2 lec, 1 tut & 2 prac)/wk
Assessment one 3hr exam, 2 tests/sem, weekly assignments

Follows on from Accounting IA and examines the detailed disclosure of information derived from the accounting information system; that is, it introduces key issues in financial accounting. Covers accounting for partnerships, companies and basic financial statement analysis. Accounting standards. Continued work on spreadsheet applications on computer for financial accounting. Further development of written and oral communication skills.

Reference books
References to be advised in class.

Agribusiness Management 8 units
Prereq Production Economics
Classes Sem 1 or 2: (3 lec & 2 workshop)/wk
Assessment one 3hr exam, assignments

The course is designed to introduce the economic principles and techniques of business management as they apply to farm and agribusiness firms. 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 rural credit market.

An integrated set of workshops is used to provide practical experience in firm planning utilising budgeting, gross margins analysis, linear programming, simulation methods and other techniques of analysis.

Textbooks
P. Kotler et al. Marketing: Australia and New Zealand (Prentice Hall, 1994)
Q. Paris An Economic Interpretation of Linear Programming (Iowa State U.P., 1991)
A. N. Rae Agricultural Management Economics (CAB, 1994)
R. Turvey Complan Handbook No 8: Enterprise Budgets for North West N.S.W. (N.S.W. Department of Agriculture, 1988)

Agricultural and Resource Policy 8 units
Prereq Production Economics and Commodity Price Analysis
Classes Sem 1: (3 lec & 1 tut)/wk
Assessment one 3hr exam and assignments

The topics discussed include: basic theoretical 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; microeconomic 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 for this course.

Textbook
D. Godden Farming the Government: Propagating Policies for Agricultural Uses of Australian Natural Resources (Department of Agricultural Economics, 1996)

Agricultural Economics I 12 units
Classes Yr: (3 lec & 1 tut)/wk
Assessment one 1hr exam/Sem 1, one 3hr exam/Sem 2, assignments

An introductory course serving as a foundation for other units in agricultural and resource economics. The basic structure and nature of the resource and agricultural industries are outlined and the principles underlying economic analysis for these industries are considered. Topics will include: the structure of the Australian agricultural and resource sectors; the changing nature of these industries; their international context; problems of structural adjustment and technical change; and government intervention. Basic economic principles are introduced and illustrated both graphically and mathematically, as they relate to the management of farm firms, the operation of agricultural and resource industry markets and the impacts of macroeconomic factors on the agricultural and resource sectors. Students are expected to make use of microcomputers in completing class work submitted for assessment.

Textbooks
K. O. Campbell and B. S. Fisher Agricultural Marketing and Prices (Longman Cheshire, 1991)
C. A. Tisdell Microeconomics of Markets (Wiley 1982)

Reference book
V. J. Pollard and W. J. Obst Practical Farm Business Management (Inkata Press, 1986)

Agricultural Economics IV 52 units
The fourth year of the BAgrEc degree is comprised of the following:
• Research Project (16 units)
• Contemporary Issues in Agricultural Economics (4 units)
• Other coursework as approved by the Head of the Department of Agricultural Economics (32 units).

The components of Agricultural Economics IV taught by the Department of Agricultural Economics are:

Research Project
Details supplied by Department of Agricultural Economics.

Contemporary Issues in Agricultural Economics
A series of 54 hours of seminars during the year on the following topics: recent developments in agricultural economic theory; current economic issues in the Australian and world agricultural and resource industries; appraisal of current Australian agricultural and resource policy.

In choosing 32 units of other courses, each student shall include 16 units from the following four courses:

Agribusiness Management 8 units
Applied Commodity Trade 8 units
Applied Marketing 8 units
Natural Resource Economics 8 units

See course descriptions elsewhere in this section.

Agronomy 8 units
This course is the same as Agronomy 3. (See alphabetically under First, Second and Third Year courses for the BScAgr degree.)

Animal Science 6 units
Classes Sem 2: 2 lec/wk & 9 prac/wk in wks 5-14
Assessment one 2hr exam

A course of lectures which describes characteristics of the animal production industries – locations, breeds
of animals, management practices, products, marketing. Lectures will be reinforced by practical classes, to be held at Camden. Lectures and practical classes form a portion of the course Animal Science 2 undertaken in the BScAgr degree.

**Applied Commodity Modelling** 8 units

*Prereq* Econometrics I  
*Classes* Sem 1: 3 lec & 1 tut/lab session)/wk  
*Assessment* one 1.5hr exam, 1.5hr prac exam, assignments

The application of methods of data analysis to the agricultural and resource sectors is the focus of this course. Topics covered will include: estimation of production relationships; demand; supply; expectations models and simple simultaneous representations of commodity sectors; time series forecasting applied to commodity and futures markets; and a suitable selection from an introduction to dynamic multipliers, dynamic elasticities, and econometric simulation. Use will be made of a variety of data analysis and econometric computer packages. Emphasis will also be placed on electronic and graphical approaches to data analysis along with consideration of the limitations and problems of the particular techniques.

*Textbook*


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**Applied Commodity Trade** 8 units

*Prereq* Commodity Price Analysis  
*Classes* Sem 2: (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, assignments

In this course 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; trade policies of importing and exporting nations, including issues such as food aid and surplus disposal programs; economic integration and impacts on international commodity trade; international trade policy making, including GATT; trade policies of the centrally planned economies and developing countries; the impact of exchange rates and other macroeconomic variables on international trade in commodities.

*Textbooks*

J.P. Houck *Elements of Agricultural Trade Policies* (Macmillan, 1986)  

*Reference book*


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**Applied Econometrics** 8 units

*Prereq* Econometrics IIIB

**Coreq** Econometrics IIIA

*Classes* (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, assignments, tests

Application of simultaneous and multivariate equation models to various aspects of economics. Research papers involving empirical research will be examined and students will be required to undertake related empirical work. Topics may include: systems of consumer demand functions, systems of factor demand and output supply functions, macroeconomic models, empirical general equilibrium models and Monte Carlo experiments.

**Applied Marketing** 8 units

*Prereq* Commodity Price Analysis  
*Classes* Sem 1: (3 lec & 1 tut/excursion)/wk  
*Assessment* one 3hr exam, assignments

This course will provide an understanding of the operation and principles of marketing, with practical applications focussed on the food and fibres markets.

The main topics covered will include: firm-level marketing mix and marketing strategy decision making; marketing management and planning; market research and information; futures markets and other risk sharing devices. The course will also address the organisation and trends of food and fibre marketing in Australia; food and fibre industrial marketing, including value-adding and power in the supply chain; market efficiency; and international marketing by agribusiness firms.

*Textbook*


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**Asian Studies 1** 8 units

*Classes* Yr: two 1hr classes/wk, 2 wk full-time intensive course/July vacation. Attendance is required at all lectures and classes.  
*Assessment* assigned exercises and quizzes 15%, 2hr exam/semester 40%, intensive course component 25%, book review 20%

The course is designed as the first in a three-year course series in Asian studies. As such, the emphasis will be on establishing the basic language skills without which a higher level of proficiency, including familiarity with applied Japanese for specific purposes, cannot be attained. Japanese culture will be introduced through reading materials and lectures.

*Textbooks*

Tsukuba Language Group *Situational, Functional Japanese* (Bonjinsha, 1991)
Asian Studies 2  
*Prereq* Asian Studies 1  
*Classes* Yr: two 1hr classes/wk, 3wk study tour of the country being studied/July vacation. Students unable to participate in the study tour will have alternative class work assigned. Attendance is required at all lectures and classes.  
*Assessment* assigned exercises and quizzes 20%, 2hr exam/sem 40%, oral presentation 20%, written report on study tour of Japan 20%.

As with Asian Studies 1, this course will focus predominantly on language acquisition. Japanese business culture will be dealt with in more depth than in the previous year. A three-week in-country training program in Japan in the semester break will provide students with a first-hand look at the way the Japanese culture operates today.

Textbook  
Tsukuba Language Group *Situational, Functional Japanese* (Bonjinsha, 1991)

### Asian Studies 3  
*Prereq* Asian Studies 2  
*Classes* Yr: business culture 1 hr/wk, reading 1.5 hr/wk, business conversation 1.5 hr/wk  
*Assessment* business culture 30%, reading 30%, business conversation 30%, class performance 10%  

This course builds on the first two years of the Asian Studies program. Language classes will enhance students’ skills in technical reading as well as promoting proficiency in Japanese conversation in business contexts. Tutorials on Japanese business culture form an integral part of the course.

Textbooks  
Selected contemporary readings on Japanese business

### Biology  
12 units  
(See alphabetically under First, Second and Third Year courses for the BScAgr degree.)

### Commercial Law  
Any semester course in Commercial Law. Refer to the *Faculty of Economics Handbook*. Students cannot repeat courses completed previously.

### Commercial Law I  
12 units  
This course consists of two parts, Commercial Transactions I and Trade Practices and Consumer Law. First Year BAgriEc students must enrol in Commercial Law I, not in the parts separately. Students in higher years may enrol in Commercial Transactions I and Trade Practices and Consumer Law separately.

### Commercial Transactions I  
6 units  
*Classes* Sem 1: (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, one test, essays, classwork  

This course 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 the provisions in the Commonwealth Constitution relevant to business and commercial activities. Basic elements of criminal law and the law of torts (in particular, negligence and negligent mis-statement) are then examined before the course continues with a detailed study of the law of contract. Agency, contracts for the sale of goods, partnerships and trusts are also discussed.

### Trade Practices and Consumer Law  
6 units  
*Coreq* Commercial Transactions I  
*Classes* Sem 2: (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, essays, classwork  

This course is primarily concerned with the provisions in the Trade Practices Act 1974 (Cwth) dealing with restrictive trade practices, unconscionable conduct, consumer protection and liability for defective goods. Topics to be studied in depth include: anti-competitive agreements, misuse of market power, exclusive dealing, resale price maintenance, price discrimination, mergers and acquisitions, unfair practices, product safety and product information, conditions and warranties in consumer transactions, liability of manufacturers and importers, unconscionable conduct. The consumer sale provisions of the Sale of Goods Act 1923 (N.S.W.) are also studied.

### Corporations Law  
8 units  
*Coreq* any 4 full semester first year courses  
*Coreq* Commercial Transactions I  
*Classes* Sem 1: (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, one test, essays, classwork  

This course begins with a brief comparison of business entities especially partnership. The legislative background to the Corporations Law and its administrative framework is explored. The concept and process of incorporation are examined. After exploring the background to the Australian legislation and the current administrative framework, the topics discussed include the position of shareholders and their remedies, the duties of directors, company meetings and accounts, methods of company financing, companies in financial difficulty, securities regulations and company takeovers.

### Commodity Price Analysis  
8 units  
*Coreq* Economics II  
*Classes* Sem 1: (3 lec & 1 tut)/wk  
*Assessment* one 3hr exam, classwork  

The topics covered will include: the nature of agricultural and resource commodity markets, market
Students will learn to:

- understand patterns of crop and pasture management opportunities provided by a farm or region of their choice. The students will be required to identify the soil and climate resources and the region of their choice. The students will be required to identify the soil and climate resources and the supporting infrastructure and bring these together to create and recommend farming and grazing enterprises for the future.

References

- J.E. Pratley (ed.) *Principles of Field Crop Production* (Sydney U.P., 1988)
- P.V. Charman and B.W. Murphy *Soils: Their Properties and Management* (Sydney U.P., 1991)

Crop Science 1  
**6 units**

**Classes**  
Sem 1: (2 lec & 1 prac)/wk; one full-day excursion;  
Sem 2: (3 lec & 3 prac)/wks 1-5  
**Assessment** one 2hr exam, reports

This course deals with the botany and ecology of important agricultural and horticultural plants. Students will learn to:

- recognise common crops, pastures, weeds, vegetables and fruit and ornamental trees; know where these plants originated, where they are now grown in Australia, and what they are used for;  
- know botanical terms with which we describe plant parts, e.g. the fine structure of a flower and a grass inflorescence;  
- know how to use a botanical key to identify a plant not seen before;  
- understand patterns of crop and pasture development: the development of organs of plants and particularly how grains and fruits develop, and why an understanding of the environmental control of these things is so important to Australian agriculture.

**Textbooks**

- *Crop Science Handbook*, available from the Department  

**Assessment**

- one 3hr exam, tests, assignments

An introduction to quantitative methods used in economics and related disciplines is provided. Two separate, but related, quantitative methods are developed. The first is mathematics, which provides a very efficient and instructive way of formulating and analysing models of behaviour. Topics include: review of algebra, functions and logic, mathematics of finance, matrices, differential calculus, and integral calculus. The second is the methodology of statistics, which is concerned with the analysis of data. Methods available for handling, analysing, and interpreting probability distributions, sampling theory, descriptive statistics (including time series and price indices), estimation, hypothesis testing, simple regression models, multiple regression, and applications. Instruction and experience are also provided in the use of electronic computers and statistical software as an aid in the analysis of data. Applications to economics and related disciplines in the social sciences are provided.

**Assessment**

- one 3hr exam, tests, assignments

This course is concerned with regression theory and its application to problems in economics. An essential component is the development of various mathematical methods. Importantly, matrix algebra is used extensively to present the classical multiple regression model and its extensions. Those extensions...
that are particularly relevant in the economic sphere
include the treatment of autocorrelation, lagged
relationships, qualitative variables, multicollinearity
and heteroskedasticity. Practice will be given in the
application of various methods to realistic problems
through the use of the computer and statistical
software.

**Econometrics IIB**
8 units

Coreq: Econometrics IIA
Classes: Sem 2: (3 lec & 1 tut)/wk
Assessment: one 3hr exam, tests, assignments

Illustrates how regression models can be applied
to economic data to estimate relationships, forecast
and test hypotheses that arise in economics. The
links between the economics and the econometrics
are stressed. Consequently, it is necessary to develop
mathematical models for the behaviour of economic
agents and to illustrate how they can be translated
into econometric models. A fundamental component
of this development is the discussion of unconstrained and constrained optimisation
problems and of comparative statics. The theoretical
and data aspects of various empirical research papers will be discussed, and students will be
required to undertake related empirical work. Topics
may include consumption, investment, production
and cost, consumer demand, labour supply, money
demand, and import functions.

**Econometrics IIIA**
8 units

Prereq: Econometrics IIA
Classes: Sem 1: (3 lec & 1 tut)/wk
Assessment: one 3hr exam, tests, assignments

Develops the theory of simultaneous equations and
multivariate regression models. Central to this
development is a significant component of statistics
especially as it relates to principles of estimation and
hypothesis testing and the distinction between finite
sample and asymptotic theory. This facilitates the
discussion of issues such as: identification, structural
versus reduced form, single and simultaneous
equation estimation, small and large sample
properties, testing procedures, simulation and
forecasting, dynamic models, and policy evaluation.
Practice will be given in the application of various
methods to economic problems.

**Economic History**
8 units

Any semester course in Economic History II/III. Refer
to the Faculty of Economics Handbook.

**Economics I**
12 units

AKn: HSC Mathematics 2-unit course.
Classes: Yr: (3 lec & 1 tut)/wk
Lectures are repeated twice on the same day. Students need
only attend one of these lectures per day.

As economic issues are pervasive in contemporary
Australian society, politics and public debate, the
study of economics provides a language and a
theoretical framework which are indispensable to the
understanding of these issues. Hence, whatever one's
career intentions, coming to grips with economic ideas
is essential for understanding society, business and
government. Economics I provides a comprehensive
introduction to these ideas and also prepares the
student for the advanced study of economics in
subsequent years.

Beginning with a historical account of the evolution
of economic ideas, the student is then introduced to
the dominant contemporary theory. The examination
of this theory begins with a model which focuses on
the question of how individuals, firms and institutions
make choices concerning the allocation of scarce
resources among competing uses. This is then followed
by a series of lectures which focus on a range of market
structures, the concept of market power, the range of
factors which determine the level of competitive
pressure which individual firms experience within
different market structures, and the influence of this
competitive pressure on pricing and output decisions
of firms. The first semester concludes by applying this
framework to the opportunities available to and
choices made by firms and workers in the labour
market. This concludes the series of lectures on
microeconomics. Macroeconomics is the subject matter
of the whole of the second semester.

The second semester begins with an examination of
the main factors which determine the overall levels of
production and employment in the economy,
including the influence of government policy and
foreign trade. The analysis is then extended to explore
the implications of money, interest rates and financial
markets which enables a deeper examination of
inflation, unemployment and economic policy. Finally,
the course examines fundamental controversies in
economic policy and theory, e.g., the respective roles
of markets and governments, causes of and cures for
inflation, the explanation of income distribution.

A summary of the course is as follows:

**Introduction**
(1 week) including:
- the historical background to modern economics
- overview of the course.

**IA.1 Constrained Optimisation and the
Foundations of Demand and Supply**
(6 weeks) including:
- the concept of constrained individual optimisation
- optimal consumer choice and individual
commodity demand curves
- income and substitution effects; normal and inferior
commodities; elasticity
- production and optimal choice of technique
- production and cost
- industrial demand and supply curves; supply
elasticity
- applications and policy
- controversies and alternative views.
IA.2 Firms, Market Structures and Industry
Supply and Demand
(4 weeks) including:
• market interdependence, market structures and the economic concept of market power
• profit maximisation and pricing and output decisions; the distinction between the short and long run
• perfect competition and monopoly; introduction to oligopoly and imperfect competition
• applications and policy
• controversies and alternative views.

IA.3 Labour market, Income Distribution, Factor Pricing and Employment
(3 weeks) including:
• price flexibility, competition and equilibrium in factor markets
• labour markets, determinants of supply and demand
• the microeconomics of factor pricing and employment, in relation to macroeconomics
• applications and policy
• controversies and alternative views.

IB.1 Aggregate Expenditures, Outputs and Employment
(4 weeks) including:
• national accounting identities
• 2, 3, 4 sector income expenditure models
• macroeconomic equilibrium balances
• fiscal policy and other multipliers
• inflation and income-expenditure models
• applications and policy
• controversies and alternative views.

IB.2 Output, Employment, Interest and Money
(5 weeks) including:
• product market equilibrium (IS)
• money demand, money supply and interest (LM)
• money supply multipliers
• IS-LM and inflation
• introduction to Phillips Curve analysis (see Module IIB.1)
• introduction to open economy IS-LM (see Module IIB.2)
• applications and policy
• controversies and alternative views.

IB.3 Fundamental Issues in Economic Analysis and Policy
(4 weeks) including:
• role of markets in relation to resource allocation; competing claims and their reconciliation
• role of government and governmental agencies in production, distribution, demand and inflation.

Textbooks and reference books
Information will be provided at the beginning of the year.

Economics II
16 units
Prereq Economics I
Classes Yr: (3 lec & 1 tut)/wk — lectures are repeated once

The first semester is primarily microeconomics and covers applications and extensions of the theory of consumer choice; firm behaviour and market structure; factor demand and supply; general equilibrium; welfare economics; intertemporal choice; behaviour under uncertainty; and the role of government. Applications of the theory will be developed during the course to allow students to gain an appreciation of the way in which microeconomic theory provides insights into economic behaviour and market phenomena. Some emphasis will be given to trade theory, drawing upon its microeconomic foundations. The micro-foundations of macroeconomics are explained in a way that may help you to understand the widespread interest and pitfalls in theorising about aggregate phenomena. Specific macroeconomic relationships, covering consumption, investment, money and employment, are explored.

The second semester is mainly concerned with macroeconomics and begins with an overview of first year analysis. This part of the course develops models of the goods, money and labour markets, and in this context examines issues in macroeconomic policy. Macro-dynamic relationships, especially those linking inflation and unemployment, are considered in some detail. Exchange rates and open economy macroeconomics are addressed so introducing questions of both theory and policy. The lectures include an examination of Australian economic policy in relation to balance of payments performance and foreign debt. In the last part of the course topics include the determinants and theories of economic growth, productivity and technology, the dynamics of the business cycle, countercyclical policy, economies of effective demand and the relationship between micro and macro policy in the context of recent Australian experience.

In each semester, you will receive separate handouts that give details on topics, readings and tutorial seminar questions.

A summary of the course is as follows:

IIA.1 General, Equilibrium, Welfare and International Trade
including:
• recapitulation of Module IIA.1
• 2 x 2 general competitive equilibrium
• welfare axioms and market failure
• social choice and Arrow Impossibility Theorem
• 2 x 2 x 2 general equilibrium with trade
• trade and welfare
• comparative advantage and II-O-S
• applications and policy
• controversies and alternative views.

IIA.2 Advanced Topics in Microeconomic Theory
including:
• choice under risk and uncertainty
• expected utility theory
• interdependent economic decisions and strategic choice
• oligopoly and game theory
• applications and policy
• controversies and alternative views.
IIA.3 From Microeconomics to Macroeconomics
including:
• microeconomics of consumption, saving and interest (intertemporal) choice
• theories of investment; the role of expectations
• consumption, investment and macroeconomics
• the microfoundations of macroeconomics
• applications and policy
• controversies and alternative views.

IIB.1 Unemployment and Inflation
including:
• IS-LM and the labour market
• AD/AS models
• short run and long run Phillips Curves
• theories of unemployment
• the quantity theory, monetarism and other theories of inflation and deflation
• applications and policy
• controversies and alternative views.

IIB.2 International Finance and The Open Economy
including:
• open economy IS-LM with fixed and flexible exchange rates (see 1B.2)
• open economy AD/AS models
• foreign exchange markets and parities
• inflation and the open economy
• keynesianism, monetarism and the open economy
• applications and policy
• controversies and alternative views.

IIB.3 Growth and Economic Policy
including:
• introduction to growth theory
• structural adjustment and micro policy, in an open economy
• pros and cons of counter-cyclical policy; rules vs. discretion
• micro policy, macro policy and economic growth
• the relation between micro and macro policy
• controversies and alternative views.

Textbooks and reference books
Information will be provided at the beginning of the year.

Economics III
16 units
Prereq Economics II
Classes Yr: 2 lec/wk per option

Candidates are required to take four options from the list of options approved for this course.

The purpose of this course is to offer students scope for developing interests in particular spheres following required courses in the first two years. Each option comprises two one-hour lectures per week for one semester. Each candidate will be expected to satisfy examiners at an examination, held at the end of each semester.

Subject to restrictions imposed by prerequisites, a candidate may take the necessary number of options to qualify for completion of Economics III during one or other semester. The recommended procedure is to take two options in each semester.

Some options are linked by a prerequisite of an option in Semester 1 before attempting an option in Semester 2. Other options may be linked in a sequence but there is no compulsion to follow that pattern.

The treatment of policy themes is a requirement for all the options wherever the subject lends itself to such interpretations and development of ideas about policy. This approach is deemed central to the ways of looking at the application of concepts and techniques for analysis.

The list of options shown below is based generally upon successful performance in Economics II though some options listed below provide for entry from Economics II(P). Not all these options will be offered in any one year or repeated in both semesters of an academic year. The available options will be announced prior to the beginning of the academic year and any changes prior to the start of the second semester.

<table>
<thead>
<tr>
<th>Option</th>
<th>Prerequisite</th>
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<tr>
<td>III.01 International Trade: Theory and Policy</td>
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<td>02 International Finance and Open Economy Macroeconomics</td>
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<td>03 Business Enterprise</td>
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<td>04 Corporate Structure and Strategy</td>
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<td>05 History of Economics: Classical Economics</td>
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<td>06 History of Economics: Modern Developments 1860-1960</td>
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<td>07 Financial Economics</td>
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<td>08 [deleted]</td>
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<td>09 Industrial Organisation</td>
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<td>10 Australian Industry Policy</td>
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<td>15 Public Finance A: Taxation and Revenue</td>
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<td>17 Labour Economics A</td>
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<td>18 Labour Economics B</td>
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<td>19 Economic Systems</td>
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<td>21 Bargaining, Contracts and Social Choice</td>
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<td>22 Health Economics</td>
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<td>23 Housing Economics</td>
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<td>24 Monetary Policy and the Australian Financial System</td>
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<td>25 Banking Institutions Management</td>
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Note: For each course semester timing will be announced at the beginning of the academic year.

Students who have completed Quantitative Economics I as part of Economics II Honours may be permitted to take Quantitative Economics II, being part of Economics III Honours in lieu of two options for Economics III, should they not be enrolled in Economics III Honours.
Students may substitute one option in the list of courses of third year Economics (P) for two options in Economics III.

These provisions for substitution apply for 1996 but may not apply in subsequent years.

Any two of these Economics III options are equivalent to one course in Economics III(P). The descriptions of these courses are shown in the Economics III(P) section of this handbook.

Economics III Options in 1996
The position with options in 1996 will be as follows: The number of options to be offered will be determined on an administrative basis reflecting priority in allocation of staff to maintain required courses at the undergraduate and postgraduate levels.

Economics III.01: International Trade: Theory and Policy
This course provides a systematic analysis of the theory of international trade and trade policy. It addresses some fundamental questions. Why do countries trade and what are the gains from trade? Is there a role for protection? What is the role of GATT and what are the effects of the world dividing up into regional trading blocs such as the EC and possibly APEC?

Initially differences between countries are emphasised as the source of trade and the gains from trade. Models which 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 section on the theory of international trade 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. The course concludes with an analysis of trading blocs.

Textbooks
To be advised.

Economics III.02: International Finance and Open-Economy Macroeconomics
This course examines the international economy with particular reference to:
1. the principles governing the operation of the international monetary system; and
2. the role, significance and methods of international finance.

It is designed to provide an understanding of macroeconomic analysis and policy in an internationally integrated economy; global economic adjustment; and international money and globally integrated financial markets. Current issues of significance for discussion may include: Australia's current account deficit and foreign debt; the choice of exchange rate regime; the European Monetary System and the international debt crisis.

Topics covered include:
1. the variety of international financial instruments; the behaviour of international financial flows and their relation to foreign exchange markets and exchange rates;
2. the absorption, elasticities and monetary approaches to the determination of the balance of international payments, under fixed and flexible exchange rates;
3. portfolio balance approaches to exchange rates and the current account balance;
4. the organisation of the international monetary system and the mechanism of international adjustment;
5. macroeconomic policy in an open economy and issues in international economic policy.

Textbooks
To be advised.

Economics III.03: Business Enterprise
This course is concerned with the economics of business enterprise. It begins with an examination of classical and modern analyses of the role of the entrepreneur and attributes of the entrepreneurial personality. It then considers theories of business organisation and the concept of agency, focusing on the resolution of conflicts between managers and shareholders. Contests for corporate control are the theme of the concluding section of the course, with emphasis on the motivation for and effect of hostile takeovers and leveraged buyouts.

Economics III.04: Corporate Structure and Strategy
This course commences with a discussion of the evolution of the modern business enterprise, with specific attention to U-form, M-form and conglomerate organisational structures. It then examines aspects of strategic decision-making, including issues of internal vs external growth and diversification vs strategic focus. The final section is devoted to Asian corporate structure and strategy. The major focus here is on distinctive features of the Japanese corporation, with attention also given to corporate forms and strategies in other Asian economies.

Economics III.05: History of Economics: Classical Economics
This course deals with the classical economics system as it emerged during the seventeenth and eighteenth centuries to come to fruition in England in the contents of Smith’s Wealth of Nations (1776), Ricardo’s Principles of Political Economy (1817) and ultimately, Marx’s Capital (1867). Two weeks of lectures each are devoted to these major authors. The remaining fourteen lectures are devoted to the foundations of classical economics in mercantilism and in moral/political philosophy, to some specific forerunners (Petty, Locke, Cantillon and Hume, Quesnay, Turgot and Stuart) and some major writers between Smith and Ricardo (namely, Malthus and James Mill). Emphasis in lectures is on their contributions to the theories of value, distribution and growth. This course provides a useful introduction to History of Economics (Modern Developments 1860-
Economics III.06: History of Economics: Modern Developments 1860-1960

This course examines the modern developments in economics flowing from two major shifts in research programs which took place after 1860. The first is the marginalist theory which gained ascendancy from the 1890s; the second is the development of macroeconomics which grew out of the Keynesian revolution of the 1930s. The former attempted to provide a general theory of prices in the goods and factor markets as well as of the level of output as a whole within a general supply/demand framework. This was developed within a general equilibrium (Walras/Pareto) and partial equilibrium framework (Marshall/Pigou). Its starting point in England was criticism of the classical system as developed by John Stuart Mill in his Principles of Political Economy, revealing some inconsistencies in that framework which became the point of departure for Jevons and Marshall. The course examines these developments and subsequent work in capital theory, distribution theory, welfare economics and the theory of the firm. In addition, it looks at the Keynesian revolution in its various manifestations and developments in growth and cycle theory by the writers (Schumpeter, Hicks/Harrod). Although History of Economics (Classical Economics) provides a useful introduction to this course, it is not a prerequisite. The course is free standing and suitable for all those interested in learning about the intellectual foundations of contemporary economics.

Textbook
There is no suitable text for this course. A detailed reading guide is provided at the start of lectures. Students intending to take the two History of Economics courses could usefully purchase William J. Barber A History of Economic Thought (Penguin, 1967) — still in print.

Economics III.07: Financial Economics

The semester will reflect the following topics:
1. Inter-temporal choice and capital markets: the certainty case
2. Investment decisions and capital budgeting: the certainty case
3. Theory of choice under uncertainty
4. State preference theory
5. Mean - variance uncertainty
6. Asset pricing models
7. Contingent claims
8. Futures contracts and markets.

Textbooks
Copeland and Weston Financial Theory and Corporate Policy 3rd edn (Addison-Wesley, 1988)

Economics III.08: Applied Corporate Finance

Coreq Economics III.07

The semester will reflect the following topics:
1. Efficient capital markets
2. Tests of semi-strong and strong form capital market efficiency
3. Capital structure and the cost of capital
4. Dividend policy: theory and evidence
5. Mergers, restructuring and corporate control

Textbooks
Copeland and Weston Financial Theory and Corporate Policy 3rd edn (Addison-Wesley, 1988)

Economics III.09: Industrial Organisation

The semester will reflect the following topics:
1. Theory of the firm
2. Competition, monopoly and externalities
3. Dominant firm with a competitive fringe
4. Cartels
5. Non-cooperative oligopoly
6. Product differentiation and monopolistic competition
7. Limit pricing, predation and strategic behaviour
8. Price discrimination
9. Nonlinear pricing
10. Vertical restrictions and vertical integration
11. Information, advertising and disclosure
12. Durability
13. Patents and technological change
14. Regulation and antitrust policy.

Economics III.10: Australian Industry Policy

This course examines aspects of industry policy in the context of the international competitiveness of Australian industry. It examines industry assistance and the prevalence of foreign multinationals in Australia. Attention is given to industry regulation, trade practices legislation, privatisation and microeconomic reform. A distinctive feature of the course is the strong emphasis on the changing structure of Australian industry and on policies aimed at developing high-technology industries.

Economics III.11: Contemporary Economic Issues

This option treats contemporary economic issues emphasising the Australian experience though not to the exclusion of international economic issues. Attention is devoted to policy issues and experiences so that economic performance is matched against policy prescriptions. This means a heavy reliance on official papers to explore the policy announcements and books and journals for critical appraisals.

Topics to be treated in this option reflect concerns for macroeconomic features of the Australian experience including historical perspectives on contemporary issues. With such a setting the current economic position may be placed in the context of policy developments over previous decades.

Other topics may include employment and unemployment, balance of payments on current account and capital account including matters about
Economics III.12: Capital and Distribution
Throughout the history of economics, theories about the forces which govern income distribution in a capitalist economy have been intimately bound up with the concept of 'capital'; in particular, its definition and measurement and how this concept relates to the determination of prices in a capitalist economy. The purpose of this course is to examine the modern version of the classical approach to capital and distribution and also to draw out its wider implications for the theory of output and employment and for economic policy.

The major topics covered are:

1. The Modern Classical Approach to Capital, Distribution and the Rate of Profit: circular production processes; the relation between relative prices, the rate of profit and the real wage; income distribution and the choice of technique;
2. Extensions of the Modern Classical Approach to Capital and Distribution: rents and non-renewable resources; joint production, fixed capital and distribution; exogenous influences on distribution; disequilibrium pricing and stability of equilibrium in the classical approach to value and distribution;
3. Capital, Distribution and Economic Theory: A Wider Perspective: marginalist views of capital and distribution and the choice of technique; controversy in capital theory and the critique of demand and supply approaches to distribution; capital distribution, effective demand and the theory of output and employment; value, distribution and economic policy.

Textbook
To be advised.

Economics III.13: Monetary Economics
This course surveys the role of money in historical and modern theories of monetary economics. The main focus is on monetary aspects of macro-economic modelling and policy. We begin with some micro foundations of money demand and supply. We describe popular macro models, showing how money manifests itself through interest rate, wealth and inflation effects. This leads to an analysis of the causes and consequences of inflation and then to a discussion of the theory of expectations and their use in various models, e.g. Monetarist, New Classical and New Keynesian. Various issues may be considered such as debt neutrality, fiscal policy and inflation, credibility in the context of optimal monetary policy, the efficiency of asset markets, the theory of the term structure of interest rates, and the problem of instruments, targets and goals of monetary policy. The course integrates closed and open economy issues - for example, interest rate policy and foreign exchange intervention policy are analysed in tandem. Throughout this course, we relate the development of the theory of empirical studies and the evolution of financial institutions.

The following textbooks have been used in recent years:
with a supplementary reference being:

Economics III.14: Economic Growth
This course deals critically with growth economics. The complexity of economic growth is so great that a single approach which tries to incorporate all the dynamic and structural complications would be incompressible. Accordingly, a variety of growth models have been constructed, each examining some small selection of dynamic forces. A critical review of some of those economics and models will be provided with a major emphasis on 'new' growth theories which attempt to accommodate structural change, innovation and human learning. The current revival of growth economics, after an eclipse of almost two decades, is both timely and important. It is now increasingly recognised that intelligent macroeconomic policies have to be formulated in the context of a growing economy over the medium or long-term period. The course is recommended to students interested in growth economics, structural change and macroeconomic policy.

General references
J. Halevi et al. (eds) Beyond the Steady State (Macmillan, 1992)

Economics III.15: Public Finance A: Taxation and Revenue
The semester will reflect the following topics:
1. Welfare economics and public finance
2. Taxation: theory
3. Public utility pricing
4. The Australian revenue system.

Economics III.16: Public Finance B: Public Expenditure
Prereq Economics III.15
The semester will reflect the following topics:
1. Welfare economics and public finance
2. Public goods
3. Public choice theory
4. Externalities
5. The Australian expenditure system.

Economics III.17: Labour Economics A
This is a practically oriented course which aims to provide an understanding of labour markets issues - work conditions, pay and employment levels. Whether you are interested in the functioning of the individual firm, the national economy or issues of equity and social justice, an understanding of how labour markets work is essential. A range of economic theories will be
examined, some of which also draw on industrial relations. The emphasis will be on practical issues, on the realities of the Australian situation, and current issues. Among these are the complex issue of enterprise bargaining, what role if any should more centralised bargaining play, and the question of how to design a sustainable highly productive work environment. Although the course centres on the Australian experience, overseas experience is addressed when relevant.

**Economics III.18: Labour Economics B**

Using material introduced in Labour Economics A, this option develops a number of themes concerning the functioning of the Australian labour market and the relationship to the labour market of a range of demographic groups within Australian society. Particular attention is given to the problems of persistent unemployment and consequences flowing from it. A profile of unemployment in Australia since the 1950s is presented, as is an assessment of the competing theoretical explanations as to why unemployment has become such a persistent problem. This is followed by an examination of the labour market status of particular demographic groups, e.g., youth, migrants, older workers, Aborigines, sole parents, and the links between labour market status and poverty.

The second part of the semester is devoted to examination of policy prescriptions designed to improve the functioning of the labour market and/or the labour market outcomes of disadvantaged individuals. Attention is given to, among other things, (i) the links between the education system and the labour market, (ii) the links between immigration policy and the labour market, and (iii) specific labour market programs designed to assist the process of skills acquisition and retraining of the labour force.

**Economics III.19: Economic Systems**

The primary purpose of this course is to show that an economy will function and perform in the way it does partly for reasons of the environment, partly as a result of policies, decisions and actions of its participants, and partly for 'systemic' reasons. Although much emphasis will be placed on systemic factors, the student will be made aware of the common features of modern economic systems in order to avoid the tendency in the conventional comparative economics literature of giving undue importance to those factors.

The course is divided into two major parts. Part I consists of a general theoretical framework for classifying and analysing economic systems, using as far as possible a system-free terminology (free from bias). The aims of this part of the course are to define precisely the nature and structure of contemporary economic systems and to develop an alternative classification of the world's economies to the conventional classifications which have become increasingly obsolete labels for describing the fundamental properties and *modus operandi* of modern economies. Part II examines the dynamic development of economic systems and their chronological relationship, focusing on the evolution of market economies and the transition from centrally planned to market-oriented economies.

The course is highly recommended for those students who wish to acquire a deeper understanding of the systemic changes that are currently taking place in Eastern Europe and elsewhere.

As the lectures do not follow the general pattern of the conventional comparative economics literature, no single textbook is set for this course. However, students are strongly advised to consult the following references:

**General references**

J.M. Montias *The Structure of Economic Systems* (Yale, 1976)

**Economics III.20: Strategy, Risk and Rationality**

Strategy, Risk and Rationality offers a comprehensive critical introduction to the increasingly popular theory of games and illustrates how this relatively recent development has enabled economists to claim that they hold the key, not only to the questions of competition and cooperation, but also to a unifying theory of the social sciences. The course begins with a critical revision of the basic tenets of rational choice theory under circumstances of parametric risk and uncertainty. The next step is to introduce strategic uncertainty; i.e. uncertainty due to the fact that one's fate depends on what others think she/he will think that they will expect her/him to do. After examining all the important concepts of game theory (e.g., dominance, rationalisabilty, Nash equilibria, mixed strategies, subgame perfection, sequential equilibria etc.), the course will scrutinise the legitimacy of game theory's claims both within economics and social theory (in particular we will look at its implications for the liberal philosophy of the State). Finally the course will turn to evolutionary game theory (a blend of game theory and biology) and the expanding use of laboratory experiments for the purpose of testing the theory's propositions.

**Economics III.21: Bargaining, Contracts and Social Choice**

**Prereq** Economics III.20

*Bargaining, Contracts and Social Choice* is a natural extension of *Risk, Strategy and Rationality*. The first part of the course starts with simple bargaining games before building a theory of bargaining based on the solution-concepts developed by *Strategy, Risk and Rationality*. Two types of approaches to bargaining are examined: (a) axiomatic models (which examine the characteristics of agreements and contracts without...
modelling the process of negotiations which brings them about), and (b) extensive form bargaining models (in which the analysis focuses on the negotiations step by step). The examination of both types of analysis culminates in a critique of traditional bargaining theory. The second part of the course (i.e. the one referred to by the inclusion of Social Choice in the title) begins with the traditional analytical move by liberal political philosophers: thinking of society and the State as a negotiated entity, i.e. as a large scale contract between individuals (the so-called Social Contract). Suddenly the whole spectrum of political, social and economic debates becomes part of this course. Initially the issues discussed are straightforward extensions of the bargaining problem: how does a collective agency (e.g. the State, an environmental protection agency, the Civil Aviation Authority, etc.) decide between policies given that each alternative policy will favour some groups at the expense of the others? Finally the focus shifts to larger issues such as the evolution of social institutions and the history of the distribution of social roles in society.

**Economics III.22: Health Economics**

This course will provide a general introduction to health economics and to the use of economics in understanding current health issues in Australia. Amongst the topics covered will be the following: scope of health economics; health care as a commodity; market failure in health care; the Australian health care system; the concept of health and need; health care insurance and its failure; the utilisation of health care; demand for health; the supply of medical services; alternative methods of paying doctors; the hospital as a firm; paying hospitals; economic evaluation in health care; costing health care; measuring health effects (economics and epidemiology); valuing human life; QALYS—a measure of benefit; designing an economic evaluation; disease costing in policy; equity in health care; different approaches to health care systems; and the Australian health strategy review.

At the end of the course students should be able to describe the key features of health economics as a sub-discipline, discuss health care issues from an economics perspective and discuss some of the current controversial issues within health economics. During the course students will be introduced to some of the 'classic' articles in health economics and will learn something of the other disciplines with which economists have to become familiar when working in health.

**Economics III.23: Housing Economics**

This course will cover some of the economic analysis used to provide an understanding of housing markets and housing policy. Where possible the Australian situation will be placed in a broader context by comparing the outcomes here with those in other countries.

The first part of the course will concentrate on providing background information. It will cover such topics as the nature, structure and operation of housing markets, including the determinants of the demand for and supply of housing, factors affecting house prices, rents and tenure choice. The second part will focus on the interaction between housing and finance markets and on the nature and effect of the ways in which housing is financed. The third part of the course will concentrate on the institutional framework within which Australia's housing policies are implemented. It will examine the characteristics of the various housing tenures or sub-markets which exist; viz. owner-occupation, private rental and public rental, provide an overview of the types of policies directed towards each of these tenures in the post-war period in Australia, examine the outcomes of those policies and discuss the policy options being considered by, and available to the government.

At the end of this course, you should have a clear understanding of the complexities involved in analysing housing markets; you should have increased your ability to apply the theoretical constructs of first and second year to analysing real world issues; you should understand the meaning and implications of housing tenure; you should be able to critically evaluate current housing policies and policy proposals.

**Economics III.24: Monetary Policy and the Australian Financial System**

Students are provided with an opportunity in this course to examine the impact and operation of monetary policy within the context of the Australian financial system. The course focuses on the institutions through which Australian monetary policy is affected. Topics covered include:

1. Overview of the Australian monetary/financial system
2. The operation of monetary policy
3. The Reserve Bank of Australia
4. The short term money market and authorised dealers
5. The role of commercial banks
6. Other providers of investment finance
7. The impact of deregulation
8. Recent policy experience.

**Economics III.25: Banking Institutions Management**

The main focus of this option is the behaviour and performance of banks and other deposit-taking intermediaries. The initial segment examines the traditional nature of their product activity in the context of the financial services sector. The aim is to clarify the main purposes of these intermediaries. These purposes embrace the managing of risk through the pooling of risks across all their customers as well as the provision of services for managing of individual risks. A substantial part of the option is devoted to measurement of risks besetting financial intermediation. Those risks include interest, foreign exchange, liquidity, credit, sovereign, technology and operational ones. The final segment is devoted to the management of those risks.

**Economics III.26: Financial Intermediation**

Financial Intermediation attempts to examine the economic function and theory of the workings of the financial system from an institutional point of view. It begins with the theory of intermediation, how the size and form of financial flows are determined and why
intermediaries emerge in the process of savings allocation among investment possibilities. The various types of intermediaries, their precise functions and behaviour, are considered within the context of the Australian economy. Some consideration is also given to the prudential regulation of these institutions and the problems regulation poses for them and the financial system as a whole.

Topics covered include:
1. Overview of the financial system
2. Theory of financial intermediation
3. Commercial banks and thrift institutions
4. Money market corporations and finance companies
5. Insurance and superannuation
6. Brokers, mutual funds and collective investments
7. Regulation
8. Information, disclosure and supervision.

**Economics III Additional**
Coreq Economics III

This course consists of four options (two hours each per week for one semester), not already taken, from the list of options provided for Economics III. One course from Economics III(P), which is equivalent to two options in Economics III, may be included.

**Economics III Supplementary**
Prereq Economics II
Coreq Economics III

This course consists of any two options (two hours each per week for one semester), not already taken, from the list of options provided for Economics III.

**Finance 201: Corporate Finance I**
Prereq Accounting IA or Financial Accounting Concepts, Economics I, Econometrics I

Classes Sem 1: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments

This course provides an introduction to corporate finance, including investment decision-making. The first part of the course deals with the analytical techniques necessary to make investment decisions, both when cash flows are known and when they are uncertain. The second part of the course deals with the corporation and the Australian capital market, the raising of capital, including equity versus debt, and allocating capital, including dividends, internal investments and takeovers. As far as possible, the course will attempt to link theory to practical applications via examples, exercises and assignments.

**Finance 202: Corporate Finance II**
Prereq as for Finance 201
Coreq Finance 201

Classes Sem 2: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments

This course builds on Finance 201: Corporate Finance I, but is more applied in that it is concerned with the actual workings of financial markets. It examines the operation of financial markets from both a theoretical and practical perspective, concentrating mainly but not exclusively on Australian financial markets. The course deals with the economic role of capital markets and theories of capital market behaviour. The operations of equity and derivative markets in Australia, including options and futures, are examined along with foreign exchange and debt markets. A new and important area of study known as 'market microstructure' is introduced and a number of issues in corporate governance and take-overs are examined.

**Financial Accounting A**
8 units
Mr Lee
Prereq Accounting IA, IB
Classes Sem 2: (3 lec & 1 tut)/wk
Assessment one 3hr exam, one 1000w essay, weekly assignments

Accounting and reporting practices of companies, particularly listed public companies. Emphasis is placed on developing an understanding of, and the ability to evaluate critically, the various regulatory requirements (professional and statutory) governing financial reporting. The economic significance of management's ability to choose between alternative techniques for recording/reporting a given transaction or event is also considered from within a 'costly contracting' framework. Issues covered include accounting for taxes, leases, intangibles, extractive industries. Consideration of off-balance sheet liabilities and owner's equity. Introduction to intercorporate investments.

**Financial Accounting Concepts**
8 units
Prereq Economics II

Classes Sem 1: (2 lec, 1 tut & 1 workshop)/wk
Assessment one 3hr exam, mid-sem test

Provides an introduction to the theory and practice of accounting. Designed primarily for students who are not majoring in accounting. The aim is to develop skills in preparing and analysing financial statements. Topics include: the institutional arrangements in Australia and overseas, balance sheet equation, current assets (including inventory, accounts receivable), income measurement, financial statement preparation and analysis.

**Forecasting for Economics and Business**
8 units
(Not offered in 1996)
Coreq Econometrics IIA

Classes Sem: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments, tests

The need to forecast or predict future values of economic time series arises frequently in many branches of applied economic and commercial work. It is, moreover, a topic which lends itself naturally to econometric and statistical treatment. The specific feature which distinguishes time series from other data is that the order in which the sample is recorded is of relevance. As a result of this, a substantial body of statistical methodology has developed. This course
is intended to provide a first course in methods of time series analysis and forecasting. The material covered will be primarily time domain methods designed for a single series and will include the building of linear time series models, the theory and practice of univariate forecasting and the use of regression methods for forecasting. Throughout the course a balance will be maintained between theory and practical application.

**Geography 1** 12 units

*Lecturers* Dr Short, Assoc. Prof. Connell, Assoc. Prof. Warner

*Classes* Yr: (3 lec & 2 hr prac)/wk

*Assessment* (one 3 hr exam, 1500w report or another 3 hr prac exam)/sem

**Morning or afternoon course**

The course extends over two semesters with three lectures and two hours of laboratory work weekly. Morning lectures are repeated in the afternoon. All students do the same course.

**First semester: A systematic approach to the understanding of physical environmental processes**

A systematic approach to modern physical geography with emphasis on processes in geomorphology and interactions of climate with weathering, soils and vegetation.

**Second semester: Introduction to Human Geography**

An introduction to the principles of human geography illustrated by an analysis of development problems in the south-west Pacific and a study of the location and distribution of economic activities including resource use.

**Geography 2** 16 units

The course extends over two semesters with three lectures and the equivalent of nine hours' assignment work (which may comprise tutorials and/or individual coursework including fieldwork) weekly. The following courses are offered:

- Principles of Geomorphology
- Environment and Resources
- Human Geography

In addition there is an integrated field methods course which will examine skills associated with the acquisition, manipulation and presentation of data used in geographical analysis of a region. The region will be studied in the field during a compulsory one week excursion. Skills developed within courses studied in the first semester will be applied to the collection and analysis of data obtained during the excursion.

**Principles of Geomorphology**

*Lecturers* Dr Short, Dr Thomas, Dr Cowell

*Classes* Yr: (3 lec & 1 tut)/wk

*Assessment* (one 3 hr exam, two 1000w essays, tut papers, 5 days fieldwork)/sem

A two-semester course designed to introduce students to the principles of geomorphology. It involves an examination of the major earth surface landforms and the theories which have been developed to explain landform genesis. Earth surface processes are examined; there is an emphasis on systems theory to provide an understanding of the processes over a wide range of spatial and temporal scales.

**First semester: Global and Regional Landforms**

An examination of the major earth surface landforms and the theories which have been developed to explain landform genesis.

**Second semester: Fluvial and Coastal Geomorphology**

This course provides:

1. An introduction to hydrogeomorphology and is concerned with processes and morphologies associated with rivers; and
2. An introduction to the principles of coastal geomorphology assessing the role of endogenic (lithosphere) and exogenic (atmosphere and ocean) forces in shaping coasts.

**Environmental Geography and Resource Management**

*Lecturers* Dr Dragovich, Dr Chapman, Dr Davey

*Classes* Yr: (3 lec & 1 tut)/wk

*Assessment* (one 3 hr exam, two 2000w essays, tut papers, 5 days fieldwork)/sem

A two-semester course designed to evaluate the interaction of the physical environment and human use of the earth's surface. The first part of the course examines the role of the physical environment in influencing human activities. The second studies resources from social, political and economic perspectives.

Particular attention is given to two aspects of physical systems: soil erosion and natural hazards. Resource management problems are investigated at a range of scales with some emphasis being given to the changing relationship between people and environment in tropical areas.

**Principles of Human Geography**

*Lecturers* Dr Gough, Dr Greenberg

*Classes* Yr: (3 lec & 1 tut)/wk

*Assessment* (one 3 hr exam, two 2000w essays, tut papers)/sem

The course introduces concepts concerned with explaining the peopling of the earth by examining processes at various scales and the dynamics of systems over time.

Levels of human activity, from the global through to the urban, are considered through an examination of basic economic and social processes.

**Geography 3** 16 units

This course extends over two semesters with three lectures and the equivalent of nine hours' assignment work (which may be comprised of tutorials and/or individual coursework including fieldwork) weekly. All students are required to attend a five-day field excursion. The traditional excursion may be replaced...
with fieldwork (up five days in each semester) conducted locally in association with courses being offered in 3P and 3M.

Three 12-unit courses are offered: Geography 3P (Physical), Geography 3M (Environmental) and Geography 3E (Human). Students may elect to do one or two of these three courses. It would be assumed that those doing Geography 3P would have undertaken Principles of Geomorphology in second year; those doing Geography 3M would have undertaken Environment and Resources in second year; and those doing Geography 3E would have undertaken the Human Geography course in second year.

To complete Geography 3 a student must select four options, two per semester. Each option is equivalent to 3 units. A student's choice of options within the 3P, 3M or 3E courses is to be from themes or sequences which are related to the systematic development of research skills in the Department. These sequences are only a guide for the selection of courses. Any variation of these sequences must have the approval of the Head of Department. Students should consult with the course coordinator before selecting options. Not all options are offered in any given year.

**Geography 3P: Advanced Geomorphology**
The course examines the evolution of the landscape involving the history of landforms and vegetation in association with tectonic forces, climatic change and biological factors. Physical, chemical and biological weathering processes are studied and there is an emphasis on pedogeomorphology.

- **Coastal Systems**
The course deals with the relationships between coastal morphologies and the processes responsible for them. The focus is on the general principles of morphodynamic adjustment, particularly as applied to the coastal boundary layer operating on the inner shelf, shoreface and in estuaries. Form and process relationships that generate the world's major coastal depositional environments are studied.

- **Fluvial Systems**
The focus is on short-term development and changes in fluvial systems; channel stability and instability, adjustments or channel metamorphosis, and the role of fluvial thresholds are considered.

**Geography 3M: Advanced Environmental Geography**
The course focuses on: coastal zone environmental management and environmental geomorphology. Critical physical systems and natural hazards in the coastal zone are examined and the ways in which decisions are made about resource management are studied. The practical uses of geomorphological concepts to solve problems are discussed.

- **Environmental Geomorphology and Information Systems**
Geomorphological concepts are applied to solve problems where landforms are transferred and where there is some use of or change to superficial processes. The techniques of geographic information systems analysis are illustrated and applied.

**Geography 3E: Advanced Social and Economic Geography**
The course examines the contemporary economic geography of the richer capitalist countries. It examines the social and economic dynamics of industrial change in a regional context.

- **Dynamics of the Asia-Pacific Region**
The general structure and growth patterns of the region are considered. Special topics include agricultural processes, population, migration and urbanisation.

- **Urban and Regional Geographic Systems**
Development theories and their relationship to rural development and natural resources development, the role of aid and the structure and role of international capital flows are examined. Social structures and their relationship to resolving conflicts over development aims and environmental management are studied.

**Government I**
12 units
Government I is organised into two semester courses. They are both introductory courses, and are essential prerequisites for later year courses in the Department. Both must be passed before a student may proceed to Government II. They will not necessarily be offered in the order set out below.

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

- **Introduction to International and Comparative Politics**
This course aims to introduce students to the major concepts and approaches in international and comparative politics. It will examine the role of the state and of non-state actors in interactions—military, economic and political—between states. It will also introduce the variety of non-Western political systems and the uses and problems of comparative methods. The course will examine the interactions between the internal and external influences on state behaviour, and how these can interact to produce radical change in both spheres. There will be a strong emphasis on theoretical and normative issues in international and comparative politics.

**Government II**
16 units
Prereq Government I
Students in Government II must take two semester courses (one in each half of the year) from the list of semester courses given in the Faculty of Economics Handbook.

**Government III**  
**Prereq** Government II

Students in Government III must take two semester courses (one in each half of the year) from the list in the Faculty of Economics Handbook. Students cannot repeat courses completed previously.

**Horticultural Science**  
6 units

This course is the same as Horticultural Science 3. (See alphabetically under First, Second and Third Year courses for the BScAgr degree.)

**Management Accounting A**  
8 units

**Prereq** Accounting IA, IB  
**Coreq** Econometrics I  
**Classes** Sem 1: (2 lec, 1 tut & 1 prac)/wk  
**Assessment** one 3hr exam, weekly assignments

This course provides students with an introduction to the basics of management/cost accounting. Areas specifically covered include: cost terms and purposes, cost behaviour, cost-volume-profit analysis, cost estimation via regression analysis and other means, basic and alternative product costing methods, detailed study of the budgeting process (master budgets, flexible budgets, standard costing and variance analysis) and cost allocation.

**Management Accounting Concepts**  
6 units

Ms Pickering  
**Classes** Sem 2: (2 lec, 1 tut & 1 workshop)/wk  
**Assessment** one 3hr exam, mid-sem test

The aim is to explain how management accounting information is used by managers. Topics include: estimating cost functions, relevant costing, cost allocation and discounted cash flow analysis.

**Marketing 201: Marketing Principles**  
8 units

**Prereq** Economics I, Econometrics I  
**Classes** Sem 1: (1 lec & 1 tut)/wk  
**Assessment** two 2hr exams, assignments

Introduction to the terminology and functions of marketing in modern business practice. Market forces and opportunities, with reference to the role of social, economic, political and global influences and trends. Macro (societal) and micro (individual and firm) implications of the market process and marketing decision-making.

**Marketing 202: Consumer Behaviour**  
8 units

**Coreq** Applied Marketing or Marketing 201: Marketing Principles  
**Classes** Sem 2: (1 lec & 1 tut)/wk  
**Assessment** two 2hr exams, assignments

The role of marketing and the marketing function within retail and service organisations. Special marketing issues involved in these organisations. Course includes case study and research practicum.
Marketing 304: New Products Marketing 8 units

Prereq Applied Marketing or Marketing 201: Marketing Principles, Marketing 203: Marketing Research I, Economics II
Coreq Marketing 301: Marketing Research II
Classes Sem 2: (1 lec & 1 tut) /wk
Assessment two 2hr exams, assignments

Development and marketing of new consumer and industrial products and the role of the marketing function in that process. Identification of potentially profitable target markets and demand estimation. Dynamics of new product introductions. Course includes case study and research practicum.

Mathematics I (Life Sciences) 12 units

AKr HSC 2-unit Mathematics
Classes Yr: (4 lec & tut) /wk
Assessment (two 2hr exams & 4 assignments) /sem, computer project

Content
This is a one-year course in mathematics intended to give a rounded view of mathematics and particularly designed for students intending to major in the life and social sciences. Topics covered include differential and integral calculus, linear algebra and statistics. There are comprehensive details of the Mathematics 1 (Life Sciences) course in the Mathematics First Year Handbook, distributed at the time of enrolment.

Assumed knowledge
Knowledge equivalent to the 2-unit HSC course is assumed. Students who do not have this knowledge are strongly advised to attend a bridging course conducted by the School in February.

Natural Resource Economics 8 units

Prereq Production Economics, Commodity Price Analysis
Classes Sem 2: (3 lec & 1 tut) /wk
Assessment one 3hr exam, assignments

A course in natural resource economics of relevance to agriculture and the resource industries. Issues discussed are: the environment as a source of environmental services; socially efficient resource allocation and Pareto welfare economics; market failure and characteristics of environmental services; benefit cost analysis of public projects, including the modification of environmental services; non-depletable resources and pollution; depletable resources; irreversibility; sustainability. Applications include land degradation, fisheries, forestry, land-use planning and greenhouse effect.

Textbook
T. Tietenberg Environmental and Natural Resource Economics (HarperCollins, 1992)

Operations Research A 8 units

Prereq Econometrics IIA
Classes Sem 1: (3 lec & 1 tut) /wk
Assessment one 3hr exam, assignments, tests

The theory and application of linear programming models to economic problems is the main concern of this course. Topics include: formulation skills, algorithms, duality, sensitivity analysis, parametric programming, goal programming, integer programming with heuristics, network models and dynamic programming. The theoretical material is illustrated with several substantial case studies and a discussion of available computer software.

Operations Research B 8 units

Coreq Operations Research A
Classes Sem 2: (3 lec & 1 tut) /wk
Assessment one 3hr exam, assignments, tests

The work of Operations Research A is extended in two important directions with the consideration of non-linear and stochastic models. Topics include: quadratic programming, gradient methods, separable methods, chance constrained programming, stochastic programming, inventory control theory, queuing theory, simulation, decision theory, and stochastic processes. The theoretical material is illustrated with several substantial case studies and a discussion of available computer software.

Production Economics 8 units

Prereq Agricultural Economics I
Classes Sem 2: (3 lec and 1 tut/lab session) /wk
Assessment one 1.5hr exam, one 1.5hr pract exam, assignments

Production economics is concerned with production decisions on resource allocation at the firm, industry and economy levels. The topics include: the nature of agricultural and resource industry production; production functions; factor substitution; principles of enterprise combination and multi-product production; firm objectives; constrained and unconstrained optimisation; factor demands; cost functions and other duality relationships; economies of scale and size in farming; production over time; productivity and technical change; production under risk and the illustration of the principles involved through the use of practical applications and exercises involving both the agricultural and resource industries.

Textbooks
D.L. Debertin Agricultural Production Economics (Macmillan, 1986)
J.P. Doll and F. Orazem Production Economics: Theory with Applications (Wiley, 1984)

Reference books
B.R. Beattie and C.R. Taylor The Economics of Production (Wiley, 1985)
B.R. Binger and E. Hoffman Microeconomics with Calculus (Scott, Foresman, 1988)

Quantitative Business Management and Finance 8 units

Prereq Production Economics and Applied Commodity Modelling
Classes Sem 2: (3 lec & 1 tut/lab session) /wk
Assessment one 3hr exam, assignments
The application of applied optimising methods to decision-making in the agricultural and resource sectors is the focus of this course. Topics covered include: an overview of the applications of optimising models; the mathematical basis for constrained optimisation; basic linear, quadratic and nonlinear programming; farm modelling; agricultural sector models; transport and location models; spatial equilibrium systems; introduction to general equilibrium models; and model validation and verification. In addition, basic decision analysis will be introduced including basic concepts of probability; concepts of utility; utility functions and elicitation of preferences. Issues of financial analysis and control, financial relationships, investment, capital budgeting, risk management and risk in investment decision making will also be covered.

Textbooks
S.M. Lee et al. Management Science (Wm C. Brown, 1990)
Q. Paris An Economic Interpretation of Linear Programming (Iowa State U.P., 1991)

Reference books

Research Methods 4 units
Classes Sem 2: (2 lec & 1 tut/workshop)/wk
Assessment one 2hr exam, assignments

Topics covered will include: report preparation; techniques and methods of report writing; seminar and workshop presentation methods; visual methods including overhead slides, projected slides and video; time management techniques; research as an orderly process of enquiry; hypothesis formulation and testing; preparation of research proposals; the role of the economist; sources and collection of agricultural data; primary versus secondary data; agricultural surveys; questionnaire construction and interviewing techniques; and methods of analysis of survey data.

Textbook

Reference book

Sample Design and Analysis 8 units
Coreq Econometrics IIA
Classes Sem 2: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments, tests

The twin problems of cost and efficiency in sampling lead to the development of different methods of sampling (stratified, cluster, multistage, replicated samples, probability proportional to size) and to different estimators (for example, ratio). Non-response in a survey may lead to biased estimation, and procedures must be developed to overcome this potential bias. The analysis of survey data leads to a consideration of the estimation of the sampling variance from the complex samples. The use of survey data in regression analysis and Chi-square tests raises several problems that are addressed. Special topics may include: panels, sampling rare populations, optimal experimental design and telephone interviewing.

The Australian Economy 12 units
Classes Yr: (3 lec & 1 tut)/wk

This terminating course provides a comprehensive review of the workings of the Australian economy. The emphasis in this course is on applied themes with theory introduced only where necessary to sustain the analysis. The aim is to show the interdependencies between the main sectors of the Australian economy and the rest of the world. The course offers a broad appraisal of how the Australian economy operates and the main policy issues bearing upon it. The main sections of the course are as follows:

1. Australia in an international economic setting
2. National economic structure:
   (a) national income and expenditure
   (b) financial flows
3. Foreign sector and the balance of payments
4. Financial activity: institutions and markets
5. Business sector: incorporated and unincorporated business enterprises and their markets
6. Government sector: federal and state functions on revenue and expenditure, and the provision of services
7. Households: composition and distribution of income and expenditure
8. Labour markets and wage determination
9. Policies for development:
   (a) agriculture
   (b) resources
   (c) industry: manufacturing and services
10. Economic policy:
    (a) goals and instruments
    (b) policy issues and controversies

Reference books
Australian Bureau of Statistics Australian Year Book (A.B.S. current edn)
F.H. Gruen (ed.) Surveys of Australian Economics (Allen & Unwin, current edn)
State of Play: The Australian Economy Today (Allen & Unwin)
An Indecis Economics Special Report
5 Other Faculty information

This chapter of the handbook contains information specific to the Faculty of Agriculture 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, see the *University of Sydney Diary*, available free from the Student Centre and student Union outlets.

Enrolment

*New students and re-enrolling students who do not satisfy the pre-enrolment conditions* collect their enrolment forms from the Faculty Office in the McMillan Building where they choose courses and lodge a registration form.

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 subjects 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 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 subject in which you are enrolled;

discontinue a subject; or

discontinue enrolment totally

you should apply at the Student Centre or Faculty Office for the appropriate form and then at the Faculty Office to obtain approval. Your record at the University will not be correct unless you do this. *It is not sufficient for instance to tell the lecturer, associate lecturer or even the departmental office that you discontinued a subject*. Unless an enrolment change is approved formally at the Faculty Office it will not be accepted by the University and in some cases will incur a financial liability under HECS.

Regulations

Discontinuation of enrolment and re-enrolment after discontinuation—undergraduate

All Faculties and Boards of Studies

1. A candidate for a degree of Bachelor who ceases attendance at classes must apply to the Faculty or Board of Studies concerned and will be presumed to have discontinued enrolment from the date of application, 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.

2. A candidate for a degree of Bachelor who at any time during the first year of attendance discontinues enrolment in all courses shall not be entitled to re-enrol for that degree unless the Faculty or Board of Studies concerned has granted prior permission to re-enrol or the person is re-selected for admission to candidature for that degree.

3. Subject to subsections (i) and (ii) of section 1, no candidate for a degree of Bachelor may discontinue enrolment in a course or year after the end of lectures in that course or year.

4. The Dean, Pro-Dean or an Associate Dean of a Faculty or the Chairperson of a Board of Studies, may act on behalf of that Faculty or Board of Studies in the administration of these resolutions unless the Faculty or Board of Studies concerned decides otherwise.

Withdrawal from full-year and first semester courses

5. A candidate for a degree of Bachelor who discontinues enrolment in a full-year or First Semester course on or before 31 March in that year shall be recorded as having withdrawn from that course.

Withdrawal from second semester courses

6. A candidate for a degree of Bachelor who discontinues enrolment in a Second Semester course on or before 31 August in that year shall be recorded as having withdrawn from that course.

All Faculties and Boards of Studies except the Faculty of Engineering

Discontinuation

7. (1) A discontinuation of enrolment in a course shall be recorded as 'Discontinued with Permission' when the discontinuation occurs after the relevant withdrawal period and

(a) on or before the Friday of the first week of Second Semester for a full-year course, or

(b) up to the last day of the seventh week of teaching in a one semester course.

(2) A discontinuation of enrolment in a course shall be recorded as 'Discontinued' when the discontinuation occurs.

*Note that 'Faculty' includes for these purposes a 'College Board'.*
Examinations

Periods
There are three formal examination periods each year.

<table>
<thead>
<tr>
<th>Period</th>
<th>when held</th>
<th>approximate duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>First semester</td>
<td>June</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Second semester</td>
<td>November</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Supplementary</td>
<td>January</td>
<td>1 week</td>
</tr>
</tbody>
</table>

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, etc. Some departments do not examine during the first semester.

The following information applies to the Bachelor of Science in Agriculture, Bachelor of Horticultural Science and the Bachelor of Agricultural Economics degrees.

Completion of course
Except by permission of the Dean, no student shall 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 are excluded from examination. No excuse for absence from lectures, demonstration or practical work shall be received unless tendered in writing to the Faculty Office within one week after attendance is resumed.

Notification of examination results
The results of annual examinations are displayed on noticeboards in the Main Quadrangle and posted directly to you at the end of the year.

Disclosure of examination marks
Final marks will appear on your annual result notice. Marks may also be obtained from your department 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 and any other assessment material may be retrieved within a reasonable time after the completion of assessment in each course. This does not apply to examination papers which involve the repeated use of the same material in successive examinations.

Examination grades
Each subject taken will be allotted one of the following grades at the annual examinations:

<table>
<thead>
<tr>
<th>Grade</th>
<th>per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Distinction</td>
<td>85-100</td>
</tr>
<tr>
<td>Distinction</td>
<td>75-84</td>
</tr>
<tr>
<td>Credit</td>
<td>65-74</td>
</tr>
<tr>
<td><em>Pass</em></td>
<td>50-64</td>
</tr>
<tr>
<td><em>Fall</em></td>
<td>below 50</td>
</tr>
</tbody>
</table>

*See section on concessional passes.

Award of honours at graduation

Extract from resolutions of the Faculty
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 heads of departments and sections concerned.
3. All candidates 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 or Bachelor of Agricultural Economics unless the candidate has completed the course in the minimum time. Notwithstanding the previous condition, students 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.

4A. For the BAgriSc degree. For the assessment of an aggregate mark for the award of honours at the end of the Fourth Year—

(a) Each of the courses provided for in the resolutions in Second and Third Years shall be weighted according to unit value and a weighted mean obtained. The combined examination results of the Second and Third Years shall be given a weighting of 50 per cent.

(b) The Fourth Year mark shall be given a weighting of 50 per cent.

4B. For the BScAgr degree. For the determination of the overall honours mark for the award of honours at the end of the Fourth Year—

(a) Each of the courses provided for in the resolutions in Second and Third Years shall be weighted according to unit 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 course shall be the mark used. A supplementary examination mark is not considered a first attempt at a course.
6A. For the BAgrEc degree. For the award of a particular level of honours a candidate, except in special circumstances, must obtain the relevant minimum aggregate mark and the minimum WAM in Second and Third Year courses set out in the following table:

<table>
<thead>
<tr>
<th>Level of honours</th>
<th>Minimum aggregate mark</th>
<th>Minimum weighted average mark in Second and Third Year courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Class II Division 1</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>Class II Division 2</td>
<td>65</td>
<td>62</td>
</tr>
</tbody>
</table>

In the event of a recommendation for the award of honours that departs from these standards, it shall be incumbent upon the head of department 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 courses undertaken outside the Faculty of Agriculture.

6B. For the BScAgr degree. 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:

<table>
<thead>
<tr>
<th>Level of honours</th>
<th>Minimum overall honours mark</th>
<th>Minimum Fourth Year mark</th>
<th>Minimum WAM in Second and Third Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>75</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Class II Division 1</td>
<td>66</td>
<td>70</td>
<td>63</td>
</tr>
<tr>
<td>Class II Division 2</td>
<td>61</td>
<td>65</td>
<td>56</td>
</tr>
</tbody>
</table>

In the event of a recommendation for honours that departs from these standards, it shall be incumbent upon the head of department and section concerned to make out a substantial case for such a departure. Admission to honours that departs from these standards, it shall be incumbent upon the head of department 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 courses undertaken outside the Faculty of Agriculture.

7. The Board of Examiners 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.

8A. For the BAgrEc degree. A university medal may be awarded, on the recommendation of the Head of the Department of Agricultural Economics, to a student who has a mark of at least 85 in the Fourth Year course, an aggregate mark of at least 80 and a Second/Third Year WAM of at least 75.

8B. For the BScAgr degree. A university medal may be awarded, on the recommendation of the Head of Department concerned, to a student who has a mark of at least 85 in the Fourth Year course, an overall honours mark of at least 80 and a Second/Third Year WAM of at least 75.

Supplementary examinations and further tests for the BAgrEc degree

1. Supplementary examinations are normally not awarded to candidates for the BAgrEc degree.
2. Further tests may be awarded by the examining department where the candidate has been prevented by sufficient and duly certified illness or misadventure from completing the assessment for a course. Such further tests are privileges and not rights.
3. Further tests may also be awarded in a course where the examiner requires further evidence to reach a final assessment of a candidate who has failed a course and whose performance is borderline.
4. Where possible and practicable, all further tests will be administered and results finalised before the Board of Examiners' Meeting.

Senators resolution

Students should note the following resolution of the Senate:
(a) Supplementary examinations should be regarded by both teacher and taught as distinct privileges granted to worthy students and not as rights.
(b) Boards of Examiners shall determine which students shall be allowed to take supplementary examinations. Due notice should be taken of certified illness or misadventure.

Award of supplementary examinations for the BScAgr and BHortSc degrees

Where a candidate fails to secure 50% in one or more courses the Faculty shall reserve the right to award supplementary examinations.

(a) Normally such awards shall be subject to the following restrictions:
(i) No candidate shall be awarded a supplementary examination in any course in which less than 40% was secured;
(ii) Supplementary examinations shall only be awarded to a candidate who has passed 50% or more of the units attempted at the annual examinations;
(iii) A candidate attempting a course for the second time at the annual examinations, who fails to pass in that course, shall not normally be eligible for the award of supplementary examinations.

(b) In cases of misadventure or duly certified illness the Board of Examiners shall determine each case individually on its merits.

A candidate awarded supplementary examinations under this rule will normally be permitted to count the supplementary examinations as annual examinations and they will be entered as annual examinations on the academic record.

Supplementary examinations and further tests for the BAgrEc degree

1. Supplementary examinations are normally not awarded to candidates for the BAgrEc degree.
2. Further tests may be awarded by the examining department where the candidate has been prevented by sufficient and duly certified illness or misadventure from completing the assessment for a course. Such further tests are privileges and not rights.
3. Further tests may also be awarded in a course where the examiner requires further evidence to reach a final assessment of a candidate who has failed a course and whose performance is borderline.
4. Where possible and practicable, all further tests will be administered and results finalised before the Board of Examiners' Meeting.

1 For students coming within this rule who have achieved a weighted average mark (WAM) greater than 50 or who failed in only one course, each case would be considered on its merits.
5. Incomplete results at the time of the Board of Examiners are recorded by the symbol ‘V’ (result to come). Any incomplete result not finalised by the commencement of First Semester in the next academic year will be altered to ‘Fail’, on the approval of the Associate Dean (Agricultural Economics) in consultation with the Head of Department offering the subject.

6. The Head of Department is responsible for the awarding, timetabling and conduct of further tests, which may take such form as the Head of Department directs. Students in a course 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.

7. 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.

8. In respect to the notification of students referred to in sections 6 and 7, students will be deemed to have been notified by the Department as a result of the posting of information by the due date on official noticeboards as advised by the Department concerned.

9. It is the responsibility of the student to provide written evidence of illness or misadventure to the appropriate Head of Department 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, it will only be considered by the Head of Department where there is sufficient reason why it has not been presented by that date.

10. The highest grade of award following a further test is Pass, except where the further test is granted on the grounds of illness or misadventure.

Concessional passes
The Faculty reserves the right to award a concessional pass to candidates at the December examinations. A candidate awarded a concessional pass at the December Board of Examiners’ Meeting may attempt to upgrade the result to a pass at the supplementary examinations, but a concessional pass is deemed to fulfil any requirements for the student to continue in the degree course unhindered.

Award of concessional passes
The concessional pass is not available for candidates in the BAgEc degree.

The following conditions shall normally guide the Board of Examiners in the award of a concessional pass to candidates in the BScAgr degree:

(a) A candidate’s performance in all other courses attempted shall be considered by the Board of Examiners.

(b) To be eligible for a concessional pass a candidate shall have—

(i) obtained a weighted average mark of at least 52% at the first attempt at First Year courses, and in subsequent examinations a weighted average mark of at least 55%;

(ii) been examined in at least 36 units of coursework;

(iii) only one course which has a contributing mark between 49% and 45% (inclusive);

(iv) no course with a mark of less than 45%.

(c) Students taking the Fourth Year examinations shall not be eligible for the award of a concessional pass.

(d) A candidate will not be awarded both the right to sit a supplementary examination in one course and a concessional pass in another course concurrently.

(e) A candidate who is attempting a course for the second time at the annual examination shall not be eligible for the award of a concessional pass in that course.

Having awarded a concessional pass to a candidate, the Faculty shall not alter the mark awarded to the candidate by a department. This mark shall be entered in the candidate’s record and recorded as a concessional pass on the academic record.

Illness or misadventure
You may apply to the Faculty in writing for special consideration of your examination performance on grounds of illness or misadventure. In the case of illness a medical certificate should be provided. The minimum requirements of a medical certificate are that it:

(a) be submitted and signed by your own medical practitioner and indicate the dates on which you sought attention;

(b) certify unambiguously a specified illness or medical disability for a definite period;

(c) indicate the degree of your incapacity, and express a professional opinion as to the effect of your illness on your ability to take an examination.

Certificates in connection with annual or supplementary examinations should be submitted prior to the examinations, unless the illness or misadventure takes place during the examinations, in which case the evidence must be forwarded as soon as practicable, and in any case before the close of the examination period. There is a special form available at the Student Centre and at the University Health Service for submission with medical certificates.

For consideration on the grounds of misadventure, your application must include a full statement of circumstances and any available supporting evidence.

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, of the University Counselling Service, and of the University Health Service, are all available for consultation and can give advice on appropriate action to take.
Restriction upon re-enrolment

There are certain circumstances in which you could be asked to show good cause why you should be permitted to repeat any previously attempted study. Liability for exclusion from re-enrolment is determined by academic attainment during the immediate past one or two academic years (depending upon the faculty or board of studies concerned). The resolutions of the Senate restricting re-enrolment may be found in Statutes and regulations, indexed under 'Re-enrolment'. You should acquaint yourself with the studies in which you are enrolled. If you are in any doubt about your liability for exclusion following academic failure or discontinuation of courses you should ask advice of the Exclusions Officer in the Records Services Unit.

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.

Extract from resolutions of the Senate relating to the Faculty of Agriculture

10. (1) The Senate authorises the Faculty of Agriculture to require a student to show good cause why he/she should be allowed to re-enrol in the Faculty of Agriculture if, in opinion of the Faculty, he/she has not made satisfactory progress towards fulfilling the requirements of the degree.
   (2) Satisfactory progress cannot be defined in all cases in advance but a student who has -
   (i) twice failed, or discontinued enrolment to count as a failure, any course as defined in sections 1, 2, 3 and 4 relating to the degrees of Bachelor of Science in Agriculture and Bachelor of Agricultural Economics, and sections 1, 2 and 3 of the Bachelor of Horticultural Science degree or
   (ii) at the annual examinations in the second or any subsequent year of enrolment, failed more than sixty per cent of the units for which enrolled and has also obtained a weighted average mark of less than fifty per cent in the total number of units for which enrolled in the two most recent years of enrolment, shall be deemed not to have made satisfactory progress.
   (3) In cases where the Faculty permits the re-enrolment of a student whose progress has been deemed unsatisfactory, the Faculty may require the completion of specified courses 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.

Professional experience

The Faculty of Agriculture regards the professional experience which, under Senate resolutions, it requires its students to undertake in University vacations, as an integral and essential part of their overall training. The Faculty resolutions relating to this professional experience are listed below.

Faculty resolutions (BScAgr, BHortSc and BAgriEC)

1. Candidates must complete 18 weeks of professional experience. Each component of the experience must be approved by the Dean before it is undertaken.
2. A total of two weeks may be gained (one week per excursion) by:
   (i) attendance at the First Year Faculty excursion and submission of an acceptable report on an aspect of the region visited;
   (ii) satisfactory completion of the excursion for the course Horticultural Science 1;
   (iii) attendance at the Second Year or Third Year Faculty excursion, one of which is compulsory, and submission of an acceptable report on an aspect of the region visited;
   (iv) attendance at the Faculty Senior Years excursion and submission of an acceptable report.
3. At least 6 weeks' experience must be gained on commercial farms, not owned by the student's parents. This must include experience in at least 2 regions, in at least 2 rural industries, with a maximum of 6 weeks on any one farm. An appropriate detailed report will be required from Second, Third or Fourth Year students for one period of professional experience.
4. Additional experience to a total of 18 weeks must be completed on other commercial farms or in professional activities appropriate to the candidate's particular academic interests. The maximum period permissible on any one farm or in any other professional activity is 6 weeks and up to 4 weeks may be approved on an enterprise owned by the candidate's parents or by the University.
5. Approved professional experience will not be credited until satisfactory reports have been submitted. A report will be required for every visit.
6. Students normally should complete six weeks of professional experience by the beginning of Second Year, twelve by the beginning of Third Year and eighteen by the beginning of Fourth Year.
7. Students wishing to graduate at the principal agriculture graduation ceremony must complete all professional experience requirements by 31 January after their final year.
Excursions
The Faculty, and some departments within the Faculty, conduct excursions to farms and to a variety of other facilities related to agriculture. The Faculty conducts three excursions, each having a duration of one week. The first excursion is for First Year students who attend on a voluntary basis. It is compulsory to attend one of the other two excursions for Second or Third Year students. There is also a compulsory excursion which is part of the course Horticultural Science I.

The credit granted is set out under 'Professional experience'.

Scholarships and prizes
See also the section on financial assistance in the University of Sydney Diary.

Cadetships
Students interested in applying for government cadetships should enquire at the nearest branch of the Commonwealth Employment Service.

Matriculation scholarships and prizes
In addition to assistance granted by the Australian Government there are a number of matriculation scholarships and prizes. Details of matriculation scholarships available by application may be obtained from the Scholarships Office (closing date: 31 March each year).

Martin Mcllrath Scholarships are tenable in the First Year in the Faculty of Agriculture. James Murphy Bursaries, which are tenable by sons of Catholic parents, cover collegiate fees at St John's College. Others include the Services Canteen Trust Fund scholarships, the Soldiers' Children Education Scheme scholarships and the Gowrie scholarship. Some are tenable by students of any faculty, some are restricted to the Faculty of Agriculture.

University bursaries
Bursaries are awarded on the combined grounds of financial need and academic merit and application may be made at any time to the Financial Assistance Office (open Monday to Thursday from 9.30 am to 2.30 pm). In addition interest-free loans are available to students who are able to demonstrate financial need.

University scholarships and prizes
Details may be obtained from the Scholarships Office. Some scholarships and prizes may be awarded to students of any faculty; others to students in specified faculties.

Other scholarships and prizes
A summary of the details of scholarships and prizes available to students in the Faculty of Agriculture is given below. Note that scholarships marked * require the applicant to submit an application. For further information, contact the Scholarships Office.

Prize compositions
Details of these may be obtained from the Scholarships Office with whom applications generally close in the first week of Second Semester.

Faculty resolutions
A candidate who presents for re-examination in any subject shall not normally be eligible for any prize or scholarship awarded in connection with such examination.

<table>
<thead>
<tr>
<th>Prize or scholarship</th>
<th>Value</th>
<th>Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABARE Prize</td>
<td>300</td>
<td>Highest honours aggregate at graduation in BAgriEc</td>
</tr>
<tr>
<td>Australian Farm Management Trophy</td>
<td>Proficiency in field of farm management in Fourth Year</td>
<td></td>
</tr>
<tr>
<td>Society Prize</td>
<td>300</td>
<td>Proficiency in First Year</td>
</tr>
<tr>
<td>Belmore Scholarships</td>
<td>300</td>
<td>Proficiency in Chemistry I</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>Proficiency in Second Year</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>Proficiency in Soil Science 2 and Agricultural Chemistry 2</td>
</tr>
<tr>
<td>Brian G. Davey Memorial Scholarships in Soil Science</td>
<td>350</td>
<td>Proficiency in Soil Science 2 and 3</td>
</tr>
<tr>
<td>Bruce Davidson Prize in Resource Economics</td>
<td>tba</td>
<td>Proficiency in an essay or thesis in natural resource economics</td>
</tr>
<tr>
<td>John Arthur Cran</td>
<td>75</td>
<td>Proficiency in HSC</td>
</tr>
<tr>
<td>Dairy Research Foundation</td>
<td>400</td>
<td>Proficiency in Fourth Year Animal Production</td>
</tr>
<tr>
<td>John Neil Downing Memorial</td>
<td>500</td>
<td>Proficiency in professional experience</td>
</tr>
<tr>
<td>John and Beatrice Frogatt</td>
<td>950</td>
<td>Proficiency in (a) Anatomy and Taxonomy of Insects and (b) Physiology and Toxicology taken either as part of Agricultural Entomology 4 or Biology 3</td>
</tr>
<tr>
<td>W.W. Froggatt Memorial</td>
<td>110</td>
<td>Proficiency in Agricultural Entomology 4 project</td>
</tr>
<tr>
<td>Golden Jubilee Scholarship in Agricultural Science</td>
<td>450</td>
<td>Proficiency in Third Year</td>
</tr>
<tr>
<td>Clifford Dawson Holliday</td>
<td>150</td>
<td>Proficiency in Third Year Examinations</td>
</tr>
<tr>
<td>D.L. Jackson</td>
<td>150</td>
<td>Proficiency in Crop Science I</td>
</tr>
<tr>
<td>F.C. McCleery Memorial Award</td>
<td>150</td>
<td>Fellowship and Leadership in the Faculty (Third Year students)</td>
</tr>
<tr>
<td>*Martin Mcllrath Scholarships</td>
<td>490</td>
<td>Proficiency in HSC and First, Second and Third Years (men only)</td>
</tr>
<tr>
<td>Theresa G. Makinson</td>
<td>85</td>
<td>Preference to sons of ex-servicemen</td>
</tr>
<tr>
<td>National Farmers' Federation</td>
<td>150</td>
<td>Proficiency in Horticultural Science 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proficiency in Fourth Year in degree of Bachelor of Science in Agriculture or Bachelor of Agricultural Economics</td>
</tr>
</tbody>
</table>
Badham Library
See also the section on libraries in the University of Sydney Diary.

Badham Library holds most of the current material needed by Agriculture staff and students, especially in the later years of their courses.

The Library covers the fields of agriculture, plant industry and agricultural economics, biological science, botany, zoology, genetics, veterinary science and food technology.

Other libraries containing material of use to the students of Agriculture are the Fisher Library (First Year students), the Geography Library and Wolstenholme (Economics) Library.

Books, but not periodicals, may be borrowed from these libraries. Use of reserve material is for limited periods only.

Mathematics Learning Centre
Lecturer-in-charge Jacqueline M. Nicholas, MSc Hull

The Mathematics Learning Centre offers help to 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, courses 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 tutors, and small tutorials are arranged for students who are having difficulties. Introductory and bridging courses are organised during the summer and throughout the year.

Location
The Centre is on the fourth floor of the Carslaw Building (go to the fourth floor via the stairs opposite Stephen Roberts Theatre). Any student seeking assistance should call at the Centre, or phone 351 4061.

Faculty societies

The Sydney University Agricultural Society
The Agricultural Society is an association of the undergraduates of the Faculty of Agriculture which controls the social and sporting functions associated with the Faculty. The function and organisation of the Society will be explained in detail at the official welcome to new students held in the orientation period.

Membership
There is an annual subscription for society membership. This fee entitles you to the privilege of voting and holding office, enables you to take part in the many social and sporting activities organised by the Society.

A membership card is presented to each new member.

Benefits of membership
The Society receives an annual grant from the Students’ Representative Council, the size of which depends on the number of members. Membership of many faculty societies is compulsory. This is not the case in Agriculture, yet last year there was over 90% membership. This is an indication of the ‘esprit de corps’ for which the small and close Faculty of Agriculture is noted.

The main benefits from membership of the Society are derived from participation in the various functions held throughout the year.

Special activities include the ball and dinner, which tend to be formal functions, together with barbecues, wine-tastings, car rallies, harbour cruises and other informal occasions.

The Society fields teams in as many of the interfaculty sports as possible. Both men’s and women’s sports are catered for.

Sydney University Agricultural Graduates’ Association
The Sydney University Agricultural Graduates’ Association (SUAGA) is a graduate society. All graduates of the Faculty of Agriculture 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 of Agriculture.
POSTGRADUATE DEGREE AND DIPLOMA REQUIREMENTS

Degrees
The higher degrees in the Faculty of Agriculture are:

- DAgrEc Doctor of Agricultural Economics
- DScAgr Doctor of Science in Agriculture
- PhD Doctor of Philosophy
- MAgEc Master of Agricultural Economics
- MScAgr Master of Science in Agriculture
- MAg Master of Agriculture.

The regulations governing the award of these degrees are printed in the Statutes and Regulations section (Appendix 1). Prospective candidates should consult with the head of the department most closely concerned before submitting an application for admission to candidature.

All candidates would normally begin in First Semester (near the end of February). In some cases candidates may be able to commence in Second Semester (about the end of July).

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 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 five 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 seven years.

Degrees of Master of Agricultural Economics (MAgrEc), Master of Science in Agriculture (MScAgr) and Master of Agriculture (MAgr)
Graduates of the University of Sydney who have completed courses acceptable to the Faculty of Agriculture 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.

Master of Agricultural Economics and Master of Science in Agriculture
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
Candidates engage in courses of advanced study in some branch of agriculture for one year full-time or pro rata part-time. Candidates proceed by coursework including a research project comprising between 15% and 40% of the year's work. The areas of study are agricultural chemistry, agricultural economics, agricultural entomology, agricultural genetics, agronomy, animal science, biometry, cereal chemistry, horticultural science, microbiology, plant breeding, plant pathology, plant protection, soil conservation, soil contamination, soil science and turf management. The first semester of candidature is normally on probation.

Diplomas
The following postgraduate diplomas are awarded by the Faculty of Agriculture:

- GradDipAgrEc – Graduate Diploma in Agricultural Economics
- GradDipAgrSc – Graduate Diploma in Agricultural Science.

The Graduate Diploma in Agricultural Science shall be awarded in the following subject areas and the testamur for the diploma shall specify the subject area: agricultural chemistry; agricultural entomology;
agricultural genetics; agronomy; animal science; biometry; horticultural science; microbiology; plant pathology; plant protection, soil science and turf management.

Graduates of the University of Sydney who have completed courses acceptable to the Faculty of Agriculture 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 a diploma.

Candidates engage in courses of advanced study in some branch of agriculture, for one year full-time or pro rata part-time. Candidates proceed by coursework including a research project comprising between 15% and 50% of the year's work. The first semester of candidature is normally on probation.

ENROLMENT REGULATIONS
Discontinuation of enrolment and readmission after discontinuation — postgraduate
All Faculties, Colleges, Boards of Studies and Graduate Schools — all candidates
1. A candidate will be presumed to have discontinued enrolment in a course, degree or diploma from the date of application to the Faculty, College, Board of Studies or Graduate School concerned, 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.
2. A candidate who at any time discontinues enrolment from a degree or diploma shall not be entitled to re-enrol in that degree or diploma unless the candidate is readmitted to candidature for that degree or diploma.
3. Subject to subsections (i) and (ii) of section 1, candidates may not discontinue enrolment in a course after the end of classes in that course, unless the degree or diploma regulations permit otherwise.
4. The Dean, Pro-Dean or an Associate Dean of a Faculty, Director or Deputy Director of a College, Chairperson of a Board of Studies or a Chairperson of a Graduate School may act on behalf of that Faculty, College, Board of Studies or Graduate School in the administration of these resolutions.

 Candidates proceeding mainly by coursework
Withdrawal from full-year and First Semester courses
5. A candidate for a degree or diploma who discontinues enrolment in a full-year or First Semester course on or before 30 March in that year, shall be recorded as withdrawn from that course.
Withdrawal from Second Semester courses
6. A candidate for a degree or diploma who discontinues enrolment in a Second Semester course on or before 30 August in that year, shall be recorded as withdrawn from that course.

Discontinuation
7. A candidate for a degree or diploma who discontinues enrolment in a course after the withdrawal period but before the end of classes in that course, shall be recorded as 'Discontinued with Permission' in that course, unless the degree or diploma resolutions permit otherwise.

Candidates proceeding mainly by thesis
Withdrawal
8. A candidate who discontinues enrolment in a course or degree before the end of the fifth week of enrolment, shall be recorded as having withdrawn from that course or degree.

Discontinuation
9. A candidate who discontinues enrolment in a course or degree after the end of the fifth week of enrolment shall be recorded as 'Discontinued with Permission'.

BOARD OF EXAMINERS
Pursuant to the resolutions of Senate the Faculty of Agriculture has resolved to appoint the following Board of Examiners:
all full-time and fractional permanent and full-time and fractional temporary members of the teaching staff of the Faculty together with the Professors of all or any subjects taught in the University for which a student of the Faculty of Agriculture is a candidate, or their nominees who are full-time or fractional members of the teaching staff.

BOARD OF POSTGRADUATE STUDIES
Pursuant to the resolutions of Senate the Faculty appoints the following Board of Postgraduate Studies:
Dean
Associate Dean (Postgraduate Studies)
Professors
Heads of Departments (or nominees)

Table of courses of advanced study MAgr (Agricultural Science subject areas) and GradDipAgrSc

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses with the same name but different unit values are mutually exclusive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Chemistry</td>
<td></td>
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</tr>
<tr>
<td>Research Methods in Agricultural and Biological Chemistry</td>
<td>8</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Research Project</td>
<td>24</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Research Project A</td>
<td>16</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Chemistry and Biochemistry of Biological Macromolecules</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Chemistry and Biochemistry of Biological Macromolecules A</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Units</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Cereal Chemistry</td>
<td>16</td>
<td>MAg only</td>
</tr>
<tr>
<td>Cereal Chemistry A</td>
<td>8</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Methods of Analysis of Agricultural and Food Products and the Environment</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Methods of Analysis of Agricultural and Food Products and the Environment A</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Other courses approved by the Head of Department up to 8 units</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cereal Chemistry**

As for Agricultural Chemistry except Cereal Chemistry 16 Compulsory

**Animal Science**

Research Project 24 Compulsory

Animal Health (Advanced) 8
Animal Reproduction (Advanced) 8
Non-Ruminant Nutrition (Advanced) 8
Animal Genetics (Advanced) 8
Pig Production (Advanced) 8
Poultry Production (Advanced) 8
Ruminant Nutrition (Advanced) 8
Ruminant Production (Advanced) 8
Other courses approved by the Head of Department up to 8 units

**Agricultural Genetics**

Research Project 16 Compulsory
Research Project A 8 Compulsory
Research Project B 24 Compulsory
Biotechnology 4
Advanced Biotechnology 4
Cytology and Cytogenetics 4
Advanced Cytogenetics 4
Data Management (Advanced) 4
Introductory Plant Breeding 4
Advanced Plant Breeding 4
Livestock Genetics 4
Population Genetics 8
Prokaryote and Eukaryote Molecular Genetics 12
Other courses approved by the Head of Department up to 24 units

**Agronomy**

Research Project 24 Compulsory
Research Project A 8 or 16 Compulsory
Advanced Crop Agronomy 8
Advanced Pasture Agronomy 8
Crop Physiology (Advanced) 6 Compulsory
Plant Nutrition 4
Weed Ecology 4
Other courses approved by the Head of Department up to 24 units

**Biometry**

Research Project 24 Compulsory
Advanced Biometry 8
Applied Multivariate Analysis 8
Computing Skills in Biometry 8
Designing Experiments in Agriculture 8
Statistical Modelling in Agriculture 8
Other courses approved by the Head of Department up to 24 units

**Horticultural Science**

Research Project 26 Compulsory (MAgr only)
Research Project A 18 Compulsory
Ornamental Horticulture (Advanced) 6 Compulsory
Methods in Horticultural Research (Advanced) 6 Compulsory
Other courses approved by the Head of Department up to 18 units
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plant Breeding</strong></td>
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<tr>
<td>Research Project</td>
<td>24</td>
</tr>
<tr>
<td>Plant Breeding A</td>
<td>8</td>
</tr>
<tr>
<td>Plant Breeding B</td>
<td>4</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>4</td>
</tr>
<tr>
<td>Breeding for the Environment</td>
<td>4</td>
</tr>
<tr>
<td>Cytogenetics and Genetic Manipulation</td>
<td>4</td>
</tr>
<tr>
<td>Germplasm Management</td>
<td>4</td>
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<tr>
<td>Quantitative Genetics</td>
<td>4</td>
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<tr>
<td>Other courses approved by the Head of Department up to 20 units</td>
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</tr>
<tr>
<td><strong>Soil Conservation</strong></td>
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</tr>
<tr>
<td>Research Project</td>
<td>8</td>
</tr>
<tr>
<td>Formation, Evaluation and Management of the Soil Resource</td>
<td>8</td>
</tr>
<tr>
<td>Natural Resource Economics (Advanced)</td>
<td>8</td>
</tr>
<tr>
<td>Soil Properties and Processes</td>
<td>8</td>
</tr>
<tr>
<td>Strategies for Soil Conservation</td>
<td>10</td>
</tr>
<tr>
<td>Advanced Methods of Studying and Analysing Soil</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry of the Soil Environment</td>
<td>6</td>
</tr>
<tr>
<td>Data Management (Advanced)</td>
<td>4</td>
</tr>
<tr>
<td>Physical Modelling of the Soil Environment</td>
<td>6</td>
</tr>
<tr>
<td>Soil Mineralogy, Pedogenesis and Taxonomy</td>
<td>6</td>
</tr>
<tr>
<td>Other courses approved by the Head of Department up to 16 units</td>
<td></td>
</tr>
<tr>
<td><strong>Soil Contamination</strong></td>
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<td>Biology and Control of Viral and Bacterial Diseases</td>
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<td>Crop Protection</td>
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<td>Other courses approved by the Head of Department up to 20 units</td>
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<td>Compulsory for students without previous training in soil science</td>
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<td>Compulsory for MAgr</td>
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Ecology and Control of Soilborne Fungal Pathogens 6
Mycology (Taxonomy and Physiology) 6
Defence Mechanisms of Plants 8
Special Topics in Plant Pathology 8
Other courses approved by the Head of Department up to 16 units

**Plant Protection**
- Insect Taxonomy and Collection 8
  - Compulsory
- Principles of Crop Protection 8
- Plant Protection Research Methods 16
- Plant Protection Research Methods A 8

- Biology and Control of Viral and Bacterial Diseases 6
- Ecology and Control of Soilborne Fungal Pathogens 6
- Insect Anatomy 8
- Insect Ecology (Advanced) 8
- Mycology (Taxonomy and Physiology) 6
- Defence Mechanisms of Plants 6
- Special Topics in Entomology 8
- Topics in Plant Pathology 6
- Other courses approved by the Head of Department up to 16 units

**Turf Management**
- Research Project 16  Compulsory
- Diagnostic Methods in Turf Management 2  Compulsory
- Advanced Turf Management 8  Compulsory
- Plant Nutrition 4  Compulsory
- Turf Management 8  Compulsory
- Turf Species and Varieties 4  Compulsory
- Special Topics in Business Management 4  Compulsory

- Applied Plant Ecology 6*
- Computing Applications in Management 6*
- Ecology and Control of Soilborne Fungal Pathogens 6*
- Irrigation Science 4*
- Soil Properties and Processes 8*
- Mycology (Taxonomy and Physiology) 6*
- Other courses approved by the Head of Department up to 8 units

*Available subject to background knowledge and availability of facilities.

**Note:** MAg 56 units total
Grad Dip AgrEc 48 units total

**Table of courses of advanced study MAg (Agricultural Economics) and Grad Dip AgrEc**

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
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<tr>
<td>Research Project</td>
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<td>Applied Commodity Modelling (Advanced)</td>
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<td>Applied Commodity Trade (Advanced)</td>
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<td>Commodity Price Analysis (Advanced)</td>
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<td>Contemporary Issues in Agricultural Economics</td>
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<td>Natural Resource Economics (Advanced)</td>
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<td>Production Economics (Advanced)</td>
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<tr>
<td>Applied Econometrics</td>
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<td>Decision Theory</td>
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<td>Forecasting for Economics and Business</td>
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<td>Other courses approved by the Head of Department up to 16 units</td>
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*Note:* MAg 56 units total
Grad Dip AgrEc 52 units total
COURSE DESCRIPTIONS FOR AGRICULTURAL SCIENCE SUBJECT AREAS

Agricultural Chemistry and Cereal Chemistry

Chemistry and Biochemistry of Biological Macromolecules 16 units

Chemistry and Biochemistry of Biological Macromolecules A 8 units

Classes Yr

A course of lectures and laboratory classes on physical behaviour of natural macromolecules and the structure and function of polysaccharides, proteins and nucleic acids. The 8-unit course will include additional material on the mechanism of enzyme action, the chemistry and biochemistry of nucleic acids and gene expression, and the regulation of metabolism.

Cereal Chemistry 16 units

Cereal Chemistry A 8 units

Classes Yr

A course of lectures and practical classes on the uses of various cereal, legume and oil-containing seeds. It includes descriptions of the chemical structures, location, properties, isolation and analysis of commercially significant components such as proteins, polysaccharides and lipids as well as harmful substances, such as enzyme inhibitors, alkaloids, mycotoxins.

Methods of Analysis of Agricultural and Food Products and the Environment 16 units

Methods of Analysis of Agricultural and Food Products and the Environment A 8 units

Classes Yr

This course teaches the theory and practice of advanced analytical techniques for measuring the quality of agricultural products and the environment. It consists of laboratory analyses of the compounds in food that are important in nutrition, as well as procedures for assessing the quality of food, soil and water with respect to residues of agricultural chemicals. Exercises using computer simulation will be included to model processes of environmental chemistry and the factors affecting the persistence of some compounds.

Research Methods in Agricultural and Biological Chemistry 8 units

Classes Sem 1

This course deals with recent developments in experimental techniques and analytical methods in agricultural and biological chemistry. Candidates prepare discussion papers and short essays (of approximately 1000 words) on topics of their choice, selected from a reading list which covers a wide range of basic and applied areas of biological chemistry.

Research Project 24 units

Research Project A 16 units

Classes Yr

Candidates either undertake a program of extended laboratory experiments in biological chemistry and analyses of food and agricultural products or they elect to carry out a short research project in close association with a member of the academic staff. Projects are usually available in one of the following areas of research interest within the Department of Agricultural Chemistry and Soil Science: carbohydrate and nitrogen metabolism in a variety of crop plants; symbiotic nitrogen fixation; biochemistry of herbicides and pesticides; nutritional aspects of seed proteins; organic and inorganic residues in agricultural products.

Animal Science

Coordinator Dr Lean

Research Project 24 units

Candidates will conduct and report on a well-defined investigation into an aspect of animal production.

Animal Health 8 units

Lecturer Dr Miller

Classes Sem 1: (3 lec & 1 tut)/wk

Assessment one 3hr exam

Biology and immunology of host responses to infectious and parasitic diseases; definition of general disease states; examination of several livestock diseases of major economic significance; the development of livestock management programs which minimise the occurrence of or eradicate the above diseases; the use of commercial biological and chemical products to control animal health.

Animal Reproduction (Advanced) 8 units

Lecturer Dr Miller

Classes Yr: (3 lec & 1 tut)/wk

Assessment one 3hr exam

Reproductive biology, with a strong emphasis on reproductive processes in domestic animals; assessment of reproductive performance and the identification of causes of reproductive failure; the principles and practice of controlled breeding programs, the production, manipulation and storage of gametes and embryos; artificial insemination and multiple ovulation and embryo transfer.
Non-ruminant Nutrition (Advanced) 8 units  
**Lecturer**: Assoc. Prof. Bryden  
**Classes Yr**: (3 lec & 1 tut)/wk  
**Assessment**: one 3hr exam

Nutritional requirements of pigs and poultry, with emphasis on commercial production, and the special needs of breeding stock. Least cost formulation of rations. The use of computer-based models to predict production responses to nutrients, and to maximise profitability. Nutrition: genotype interactions and the application of biotechnology to the feed industry.

Animal Genetics (Advanced) 8 units  
**Lecturers**: Assoc. Prof. Nicholas, Assoc. Prof. Moran  
**Classes Yr**: (2 lec & 2 prac)/wk  
**Assessment**: one 3hr exam, assignments

A course of lectures and practical classes providing a firm basis in population and quantitative genetics, leading to more advanced applications in animal breeding. Single locus population genetics theory, including the theory of selection and random drift, precedes the exposition of quantitative theory, including partitioning of phenotypic and genetic variances and parameter estimation. Selection indexes (both single trait and multi-trait) are dealt with extensively and BLUP (Best Linear Unbiased Prediction) is discussed. Practical classes are based on computer simulation or analysis of illustrative data. Excursions illustrate the applications of genetics in commercial and research settings.

Pig Production (Advanced) 8 units  
**Coordinator**: Assoc. Prof. Bryden  
**Classes Yr**: (2 lec & 1 tut)/wk  
**Assessment**: one 3hr exam, assignments

A course of lectures and practical classes with emphasis on the efficiency of pig meat production. All aspects of the production cycle are covered including management of the breeding sow and growing pig. Environmental requirements, housing, feeding practices and disease control are considered. Application of computer-based models to commercial pigeries.

Poultry Production (Advanced) 8 units  
**Lecturer**: Assoc. Prof. Balnave  
**Classes Yr**: (3 lec & 1 tut)/wk  
**Assessment**: one 3hr exam

Avian biology, with emphasis on the unique features of the digestion, absorption and utilisation of nutrients, and on the physiology of egg formation. Commercial production of broilers and table eggs, with consideration of environmental requirements, housing and disease control.

Ruminant Nutrition (Advanced) 8 units  
**Lecturer**: Assoc. Prof. Kellaway  
**Classes Yr**: (3 lec & 1 tut)/wk  
**Assessment**: one 3hr exam


Ruminant Production (Advanced) 8 units  
**Lecturer**: Assoc. Prof. Gooden  
**Classes Yr**: 4 lec/wk  
**Assessment**: one 3hr exam

Sheep production, including wool production, meat production, pasture and sheep management systems, reproduction and property management. Intensive and extensive systems of beef production, including pasture and cattle management systems and reproduction. Milk production, including milking systems, pasture and dairy cow management and reproduction. Use of computer-based models in animal production.

**Agricultural Genetics**

Research Project 16 units

Research Project A 8 units

Research Project B 24 units

Candidates will conduct and report on a well-defined investigation into an area of interest in agricultural genetics.

Biotechnology 4 units  
**Lecturer**: Dr Sharp  
**Classes Sem 1 or Sem 2**

A course of lectures and practical periods covering: techniques and potential uses of plant transformation in manipulating plant quality and agronomic characteristics; the use of molecular techniques in the diagnosis of plant diseases in plant breeding; the construction and use of genetic maps for selection in plant breeding programs.

Advanced Biotechnology 4 units

An advanced course.

Cytology and Cytogenetics 4 units  
**Lecturer**: Dr Darvey  
**Classes Sem 1 or Sem 2**  
**Assessment**: one 2hr exam

Lectures in cytology and cytogenetics, with special emphasis on cereals and the application of chromosome engineering to plant breeding. The laboratory course includes routine cytological procedures and tissue culture technology.
Advanced Cytogenetics 4 units
An advanced course in cytogenetics with a strong practical component.

Data Management (Advanced) 4 units
Lecturer Assoc. Prof. O'Neill
Classes Sem 2
Assessment one 2hr exam, assignments

This course explores experimental design and analysis, using balanced and unbalanced data sets. Examples are taken from current experiments conducted in the Department or the Faculty. This course is half of Advanced Biometry.

Introductory Plant Breeding 4 units
Approximately 30 lectures and 30 hours of laboratory work devoted to the theory of plant breeding, conservation of genetic variability, breeding for resistance to disease and measurements and analysis of data.

Advanced Plant Breeding 4 units
An advanced course in plant breeding, with emphasis on design and implementation of a breeding program.

Livestock Genetics 4 units
Lecturer Assoc. Prof. Nicholas
Classes Sem 2

A course of lectures in livestock genetics with special emphasis on the genetic basis of animal disease.

Population Genetics 8 units
Lecturers Assoc. Prof. Nicholas, Assoc. Prof. Moran
Classes Yr (2 lec & 2 prac)/wk
Assessment one 3hr exam, assignments

A course of lectures and practical periods, dealing with population genetics, quantitative inheritance and animal breeding given by the Department of Animal Science.

Prokaryote and Eukaryote Molecular Genetics 12 units
This course is offered by staff in the School of Biological Sciences, Faculty of Science.

A field-based course on crop management with particular reference to grain legume and fibre crops. Analyses will be in the context of (i) their ecology, underlying physiology and nutrition; (ii) their farming system, including technical and economic analysis of their management and their roles and restrictions within existing and imaginable farming systems; and (iii) their end uses, and how to better meet the technical needs of markets. Remote sensing and geographic information systems technology are used to monitor crop area and production, computer-based decision support systems to assist crop management, and professional diagnosis of hypothetical problems in crop production to develop analytical skills.

The course involves two field trips. The first, of five days, begins in the first week of Semester 1. This allows study of two crops. A second field trip is organised to research broader issues of management of traditional and alternative field-crop ecosystems identified by students during the course.

Advanced Grassland Agronomy 8 units
Classes Yr (2 lec & 2 prac)/wk
Assessment one 2hr exam, assignments

Identification of management problems relating to pastures within farming systems; grassland measurement; improvement of farm performance; plant adaptation and management of plant competition. Principles of grassland ecology; taxonomy and identification of important grasses and legumes.

Weed Ecology 4 units
Classes Sem 1
Assessment one 2hr exam, assignments


Plant Nutrition 4 units
See under Turf Management.

**Biometry**

Research Project 24 units
Candidates will conduct and report on a well-defined investigation into an area of interest in biometry.

Advanced Biometry 8 units
Lecturer Assoc. Prof. O'Neill
Classes Yr
Assessment one 3hr exam, assignments

This course explores experimental design and analysis, using balanced and unbalanced data sets. Examples are taken from current experiments conducted in the Department or the Faculty. It also extends statistical theory to more difficult design problems. Topics here include bivariate distributions, maximum likelihood estimation, likelihood ratio tests.
Applied Multivariate Analysis 8 units
Lecturer Dr Thomson
Classes Sem 2

This course develops methods for analysing several agronomic variables simultaneously, in designed experiments.

Computing Skills in Biometry 8 units
Lecturers Assoc. Prof. O'Neill, Dr Thomson
Classes Sem 1
Assessment assignments

This course takes many of the latest computing packages such as Word, Excel, Genstat, SAS and S, and applies them to problems in design and analysis of experiments. A programming language such as Basic, Fortran or Pascal is also studied, as it relates to biometrical problems.

Designing Experiments in Agriculture 8 units
Lecturers Assoc. Prof. O'Neill, Dr Thomson
Classes Sem 1
Assessment one 2hr exam, assignments

This course looks at the principles and techniques underlying the modern statistical approach to designing experiments in agricultural research. Emphasis is placed on students learning how to advise experimenters on design problems, in consultation with Faculty members.

Statistical Modelling in Agriculture 8 units
Lecturers Assoc. Prof. O'Neill, Dr Thomson
Classes Sem 2
Assessment one 2hr exam, assignments

This course looks in depth at how statistical models can be of use in agricultural research. Topics covered include linear and non-linear models, time series methods, and spatial analyses of field experiments.

Statistical Modelling in Agriculture (Advanced) 6 units
Coordinator: Dr Goodwin
Classes: Sem 1: 14 lec & seven 6hr prac, 4-day residential short course (mid-sem break)
Assessment: two 1hr exams (50%), assignments

Lectures and practicals on methods used in research on ornamental and fruit crops. The course covers the use of controlled environment rooms, DNA manipulation and advanced tissue culture methods, including Agrobacterium-mediated genetic transformation. The fruit crop segment of the course (2 units) will be given as a one-week residential at Yanco in the MIA.

Research Project 24 units

An attempt is made to tailor the project to the student's requirements, thus discussion of project requirements is welcome prior to course enrolment. Projects may be carried out at any of the Plant Breeding Institute locations (Campus, Cobbytt, Narrabri); however Australian students with access to approved research facilities (other universities, public or private breeding centres or laboratories, CSIRO, etc.) will be exempted from this requirement, subject to adequate supervision.

Research Project A 8 units
Classes mid-year break (end of Sem 1)
Assessment open book exam, seminar assignments

Lectures and laboratory work on the theory and philosophy of plant breeding. Special emphasis is placed on present and future technologies with respect to anther culture, mutation breeding, breeding for disease resistance, somaclonal variation, apomixis, interspecific hybridisation, the wheat x maize system for haploid production, hybrid producing systems and microspore culture for the production of transgenic plants. The course aims to develop perspective in relation to research priorities and realistic research objectives. It also considers various aspects of program design and efficiency, including the cost of establishing and maintaining programs, returns to growers, and sources of income (PVR, patents, hybrid seed, etc.).

Research Project B 4 units
Classes Sem 2
Assessment literature review, assignments

A review of various plant breeding programs, obtained from field trips to public and private breeding centres in eastern Australia, including the Phytotron in Canberra. The course includes practical hands-on field experience. It also includes various aspects of
plot design and automated data analysis, which are mainly presented during the visit to the Plant Breeding Institute at Narrabri.

**Biotechnology 4 units**
A course of lectures and practical periods covering: techniques and potential uses of plant transformation in manipulating plant quality and agronomic characteristics; the use of molecular techniques in the diagnosis of plant diseases in plant breeding; the construction and use of genetic maps for selection in plant breeding programs.

**Breeding for the Environment 4 units**
Lectures and practical periods dealing with management of pests, diseases (fungi, bacteria and viruses) and environmental pollutants. Deals briefly with soil degradation and weed control. The plant breeding options will be discussed, including the selection, identification and transfer of genes for resistance to diseases, mineral toxicities, etc. The details of the National Rust Program and its philosophy for the genetic control of the rusts will be elaborated at both a theoretical and practical level. The greenhouse effect and the management options for rapidly altering breeding strategies in response to a changing environment will also be discussed.

**Cytogenetics and Genetic Manipulation 4 units**
Lectures and lab work in cytogenetics emphasising cereals and genetic means for manipulation and alien incorporation. Cytogenetics component includes chromosome identification; aneuploidy; polyploidy; genome origins; genetic control of chromosome pairing; gene mapping; and cytogenetics of crop species. Genetic manipulation component includes: alien genetic transfer; induced mutation; alternative methods for the production of haploids; genetic and cytoplasmic male sterility; alternative systems for hybrid production; wide-species crosses; and identification of useful genes (apomixis, meiotic, restitution, endosperm and embryo quality from wide species crosses, parthenogenesis, semigamy, etc.). Practical component includes: techniques for chromosome identification (Feulgen staining, C-banding, N-banding, autoradiography); various tissue culture techniques including somaclone production and anther culture; and various other laboratory and greenhouse techniques including mutation breeding, chromosome doubling, etc.

Visits are made to key research centres including the CSIRO Division of Plant Industry in Canberra in conjunction with the biotechnology course.

**Germplasm Management 4 units**
*Classes Sem 2*
*Assessment* literature review, assignments

Lectures on strategies and methods for germplasm collection, storage, evaluation, and utilisation; and on germplasm databases. A review of major international germplasm centres is also included.

**Quantitative Genetics 4 units**
(for part-time students)
A course of lectures and practical periods, dealing with population genetics and quantitative inheritance.

*Note*
In an attempt to assist Australian students wishing to complete this degree while simultaneously working in industry, it is intended to run each of the above four-unit courses as an intensive two-week program at least once every two years, so that part-time students can complete the course on a pro rata basis. These intensive courses would be conducted during the University vacation periods, when college facilities should be readily available.

The eight- and four-unit courses in plant breeding will also be presented on a similar basis; however fieldtrips will need to be adjusted to seasonal limitations, with part-time students having a choice as to the year of participation in each field trip.

**Soil Conservation**

**Research Project 8 units**
Candidates will conduct and report on a well-defined investigation into an area of interest in soil conservation.

**Formation, Evaluation and Management of the Soil Resource 8 units**
See Soil Science.

**Natural Resource Economics (Advanced) 8 units**
See Agricultural Economics.

**Soil Properties and Processes 8 units**
See Soil Science.

**Strategies for Soil Conservation 10 units**
*Classes Yr: 10 days in the field (semester breaks)*
*Assessment* assignment, seminar

In this course candidates will investigate and integrate biological, chemical, physical, economic and sociopolitical constraints on soil conservation in the context of a particular enterprise, farming system or geographic region. This will involve the design and execution of a field-sample survey. The concepts of land care and sustainable development will be investigated thoroughly in the course of this study.

**Advanced Methods of Studying and Analysing Soil 6 units**

**Chemistry of the Soil Environment 6 units**

**Data Management (Advanced) 4 units**
This course explores experimental design and analysis, using balanced and unbalanced data sets. Examples are taken from current experiments conducted in the Department or the Faculty. It also extends statistical theory to more difficult design problems. Topics here include bivariate distributions, maximum likelihood estimation, likelihood ratio tests.

Data Management (Advanced) 4 units

Formation, Evaluation and Management of the Soil Resource 8 units
See Soil Science.

Soil Science

Research Project A 8 units
Candidates will conduct and report on a well-defined investigation into an area of interest in soil science.

Advanced Methods of Studying and Analysing Soil 6 units

Physical Modelling of the Soil Environment 6 units

Lecturer
Assoc. Prof. O'Neill
Classes Yr
Assessment one 2hr exam, prac report, problem sets, essay

Approaches to scientific investigation and methods of literature survey followed by tutorial on computer search techniques.

Physical. Particle Size Analysis (PSA) of clay fraction and fractionation by centrifugation techniques, specific surface area measurements by BET Thermocouple methods for field measurements of moisture. Thermal conductivity methods for soil moisture content. Gamma and neutron probe methods for field measurements of moisture content and bulk density and time-domain reflectometry.

Physico-chemical. Measurement of oxidation-reduction status, O₂ diffusion rate and O₂, CO₂ concentrations in soil, selective ion-electrodes for measurements of ion activities in soil solution.

Geotechnical. Mechanical measurements of soil properties including Atterberg limits, unconfined compression, penetrometer, Proctor and compaction, torsion shear box, dynamometer, rupture-test and drop shatter test, sampling and testing procedures for determining physical properties of swelling soils.


Chemistry of the Soil Environment 6 units

Classes Sem 1: (3 lec, 1 tut & 8hr prac)/7wks (first half)
Assessment one 2hr exam, prac report, problem sets, essay

Topics include cation exchange capacity and pH...
dependent charge, soil charge characteristics, soil chemical analyses and their interpretation, formation of acid soil – Al and Mn toxicities, chemistry and adsorption/desorption of K, P and S in soil, soil solution and speciation of ionic components, soil salinity and sodicity, oxidation/reduction reactions in soil and chemistry of soil organic matter and nitrogen.

Physical Modelling of the Soil Environment  6 units

Lecturer Prof. McBratney
Classes Sem 1: (2 lec, 4 tut & 5hr prac)/7wks, 5 days in the field (first half)
Assessment one 2hr exam, field and prac reports, problem sets, essay

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 laboratory 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 fundamentals of numerical computer modelling of soil physical processes.

Field work involves field measurement of soil physical properties such as hydraulic conductivity and infiltration rates and moisture content.

Data Management (Advanced)  4 units

Lecturer Assoc. Prof. O’Neill
Classes Sem 2
Assessment one 2hr exam, assignments

This course explores experimental design and analysis, using balanced and unbalanced data sets. Examples are taken from current experiments conducted in the Department or Faculty. This course is half of Advanced Biometry.

Formation, Evaluation and Management of the Soil Resource  8 units

Lecturers Assoc. Prof. Koppi, Mr Geering, Prof. McBratney
Classes Sem 2: (4 lec & 3hr prac)/wk, 5 days in the field
Assessment one 3hr exam, report, field and lab work

Lectures on classification of soil, soil survey, pedological processes, geomorphology and soil stratigraphy, aerial photography, geostatistics and their application to land evaluation for rural purposes, the forms of land degradation occurring in Australia, and management conducive to sustainable soil husbandry.

Field work involves landscape description and the description, mapping and sampling of soil profiles for the purpose of assessing land use capability and field variability of soil properties.

Laboratory work involves routine physical and chemical tests of samples taken in the field relevant to assessment of the land-use potential and the quantification of the soil variability at the survey site.

Soil Mineralogy, Pedogenesis and Taxonomy 6 units

Lecturer Assoc. Prof. Koppi
Classes Sem 2: (3 lec, 1 tut & 8hr prac)/7wks
Assessment one 2hr exam, prac reports

This course centres on a weathering study which traces the changes from a rock parent material up through the soil profile. The methods of study include particle-size analysis and extraction of a fine-sand fraction for optical identification and quantification of the mineral species present. Thin sections of the rock and profile are prepared, examined and the main features identified and quantified. The data from the sand analysis, micromorphological investigations and clay mineral assessments are used to provide an understanding of the pedogenesis of the particular soil.

A detailed study, including exercises, is made of the USDA soil classification system, Soil Taxonomy.

Soil Properties and Processes  8 units

Lecturers Assoc. Prof. Koppi, Prof. McBratney, Mr Geering, Dr New
Classes Sem 1: (4 lec & 4hr prac)/wk, 1 day in the field
Assessment one 3hr exam, class work, prac book

This course includes the fundamental properties of soil, the factors of soil formation, and the processes that operate in the soil system. Components comprising pedology, soil physics, soil chemistry and soil biology are synthesised by reference to common soil horizons and profiles from N.S.W. Field studies start with description and assessment of essential characteristics. The physics of water and gas movement, temperature, density, swelling and strength are considered. The chemistry of soil solids, surfaces and solutions are discussed as well as macronutrients and micronutrients and problems such as salinity, acidity and waterlogging. There is also some discussion of soil microorganisms and microbiological transformations in the soil.

Microbiology  

Microbiology (Advanced)  24 units

Classes 81 lec, 189hr of prac work and 59hr of other course-related activities organised into three themes

Medical Microbiology medical bacteriology, virology, serology

Molecular Microbiology bacterial structure and function, prokaryote evolution, molecular pathogenesis, genetic regulation and bacterial physiology, bacterial and phage genetics

Applied and Environmental Microbiology microbial ecology, plant-microbe interactions, food microbiology, pollution microbiology

Wherever possible, the practical course is intended to complement the lecture course and includes excursions to industrial and medical institutions.
Candidates are required to undertake a project and submit a report in some advanced aspect of agricultural microbiology related to the area of interest.

Special Aspects of Microbiology 8 units
These may include tutorials, seminars, essays and directed reading on selected topics.

Agricultural Entomology

Insect Anatomy 8 units
Lecturer Assoc. Prof. McDonald
Classes Sem 1: (2 lec & 6 prac)/wk
Assessment one 3hr theory exam & one 3hr prac exam

The internal and external anatomy of all orders of insects will be studied in detail. Practical classes will enable students to dissect a number of insect types and examine examples of the major order of insects.

Insect Ecology (Advanced) 8 units
Lecturer Dr Meats
Classes Sem 2: (2 lec & 6 prac)/wk
Assessment one 3hr exam, assignment

Ecological principles will be dealt with as they apply to conservation, sustained-yield harvesting and pest management (classical and managed biological control, sterile male techniques, behavioural and integrated systems). The remainder of the course will emphasise behavioural mechanisms of importance to ecological systems. Further topics to be covered range from foraging theory and predator-prey interactions to interference mechanisms and opportunistic responses.

Insect Taxonomy and Collection 8 units
Lecturer Assoc. Prof. McDonald
Classes Yr: (2 lec & 6 prac)/wk
Assessment one 3hr exam & two 3hr prac exams, assignment

The classification, life cycle and general biology of all orders of insects will be considered. Candidates will be given an introduction into the philosophy of taxonomy. Lectures will deal with insect zoogeography and phylogeny. Practical classes will give students good working knowledge of all insect orders. The collection will supplement the practical classes.

Research Methods in Entomology 16 units

Research Methods in Entomology A 8 units
Classes Yr

This will involve analytical laboratory work, management of experimental data and writing up of data for critical review.

Special Topics in Entomology 8 units
Classes Yr
Assessment assignment

The course deals with specialised areas of particular interest to each candidate. Candidates will be given a selected reading list and will prepare discussion papers and essays on these topics.

Biology and Control of Viral and Bacterial Diseases 6 units
Coordinator Prof. Deverall
Lecturer Dr Bowyer
Classes Sem 1: (3 lec & 12 prac for 7wks)/wk
Assessment one 3hr exam

A course of lectures and laboratory classes on the characteristics of viruses and bacteria and their interactions with plants, and the principles of disease control.

Crop Protection 4 units
Coordinator Dr Rose
Lecturers Dr Rose, Prof. Burgess, Prof. Deverall, Dr Bowyer
Classes Sem 2: 4 lec/wk
Assessment one 3hr exam, essay

The course covers weeds, diseases and insect pests of crops. The topics covered in this introductory course on the principles of crop protection are population dynamics; loss assessment; strategies, including thresholds; biocontrol; legislation, including quarantine; pesticide use; resistance to pesticides; future directions. There will be contributions from invited speakers.

Ecology and Control of Soilborne Fungal Pathogens 6 units

Lecturer Prof. Burgess
Classes Sem 1: (3 lec & 12 prac for 7wks)/wk
Assessment one 3hr exam

A course of lectures and practical classes on the nature of diseases caused by soilborne fungi and the ecology and control of these pathogens.

Mycology (Taxonomy and Physiology) 6 units

Lecturers Prof. Deverall, Prof. Burgess
Classes Sem 1: (3 lec & 12 prac for 7wks)/wk
Assessment one 3hr exam

A course of lectures and laboratory classes on the principles of fungal taxonomy and fungal physiology. The taxonomy of the Fungi Imperfecti is considered in detail.

Defence Mechanisms of Plants 6 units

Lecturer Prof. Deverall
Classes Sem 1: (3 lec & 12 prac for 7wks)/wk
Assessment one 3hr exam
A course of lectures and laboratory classes on the genetic and physiological aspects of the interactions between plants and pathogens underlying disease resistance.

**Research Methods in Plant Pathology**

20 units

**Research Methods in Plant Pathology A**

16 units

**Classes Sem 2**

This course involves analytical laboratory work and the management of experimental data, together with essay assignments on a range of topics in experimental plant pathology. A written report is required on the experimental work.

**Special Topics in Plant Pathology**

8 units

This course deals with specialised areas of particular interest to each candidate. Candidates will be given a reading list on which essays and/or seminars will be presented.

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**Plant Protection**

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**Biology and Control of Viral and Bacterial Diseases**

6 units

**Lecturer** Dr Bowyer

**Classes Sem 1:** (3 lec & 12 prac for 7wks)/wk

**Assessment** one 3hr exam

A course of lectures and laboratory classes on the characteristics of viruses and bacteria and their interactions with plants, and the principles of disease control.

**Ecology and Control of Soilborne Fungal Pathogens**

6 units

**Lecturer** Prof. Burgess

**Classes Sem 1:** (3 lec & 12 prac for 7wks)/wk

**Assessment** one 3hr exam

A course of lectures and practical classes on the nature of diseases caused by soilborne fungi and the ecology and control of these pathogens.

**Insect Anatomy**

8 units

**Lecturer** Assoc. Prof. McDonald

**Classes Sem 1:** (2 lec & 6 prac)/wk

**Assessment** one 3hr exam & one 3hr prac exam

The internal and external anatomy of all orders of insects will be studied in detail. Practical classes will enable students to dissect a number of insect types and examine examples of the major order of insects.

**Insect Ecology (Advanced)**

8 units

**Lecturer** Dr Meats

**Classes Sem 2:** (2 lec & 6 prac)/wk

**Assessment** one 3hr exam, assignment

Ecological principles will be dealt with as they apply to conservation, sustained-yield harvesting and pest management (classical and managed biological control, sterile male techniques, behavioural and integrated systems). The remainder of the course will emphasise behavioural mechanisms of importance to ecological systems. Further topics to be covered range from foraging theory and predator-prey interactions to interference mechanisms and opportunistic responses.

**Insect Taxonomy and Collection**

8 units

**Lecturer** Assoc. Prof. McDonald

**Classes Yr:** (2 lec & 6 prac)/wk

**Assessment** one 3hr exam & two 3hr prac exams, assignment

The classification, life cycle and general biology of all orders of insects will be considered. Candidates will be given an introduction into the philosophy of taxonomy. Lectures will deal with insect zoogeography and phylogeny. Practical classes will give students good working knowledge of all insect orders. The collection will supplement the practical classes.

**Mycology (Taxonomy and Physiology)**

6 units

**Lecturers** Prof. Deverall, Prof. Burgess

**Classes Sem 1:** (3 lec & 12 prac for 7wks)/wk

**Assessment** one 3hr exam

A course of lectures and laboratory classes on the principles of fungal taxonomy and fungal physiology. The taxonomy of the Fungi Imperfecti is considered in detail.

**Defence Mechanisms of Plants**

6 units

**Lecturer** Prof. Deverall

**Classes Sem 1:** (3 lec & 12 prac for 7wks)/wk

**Assessment** one 3hr exam

A course of lectures and laboratory classes on the genetic and physiological aspects of the interactions between plants and pathogens underlying disease resistance.

**Plant Protection Research Methods**

16 units

**Plant Protection Research Methods A**

8 units

**Classes Sem 2**

**Assessment** assignment

This will involve analytical laboratory work, and management of experimental data on a topic in plant protection.

**Principles of Crop Protection**

8 units

**Coordinator** Dr Rose

**Lecturers** Dr Rose, Prof. Burgess, Prof. Deverall, Dr Bowyer

**Classes Sem 2:** 4 lec/wk

**Assessment** one 3hr exam, assignment

The course covers weeds, diseases and insect pests of crops. The topics covered in this introductory course
on the principles of crop protection are population dynamics; loss assessment; strategies, including thresholds; biocontrol; legislation, including quarantine; pesticide use; resistance to pesticides; future directions. There will be contributions from invited speakers. An assignment on a topical aspect of crop protection is required.

Special Topics in Entomology 8 units

Classes Yr
Assessment assignment

The course deals with specialised areas of particular interest to each candidate. Candidates will be given a selected reading list and will prepare discussion papers and essays on these topics.

Topics in Plant Pathology 6 units

Classes Yr
Assessment assignment

This course deals with areas of particular interest to each candidate. Candidates will be given a reading list on which essays and/or seminars will be presented.

Turf Management

Research Project 16 units

Candidates will conduct and report on a well-defined investigation into an area of interest in turf management.

Applied Plant Ecology 6 units

Lecturers Dr Smith, Prof. Martin
Classes Sem 2
Assessment one 3hr exam, assignments and an individual seminar

Aspects of plant protection and its effects on the environment. Interaction between weeds, pests and diseases; contamination of groundwater; herbicide and pesticide safety and other topical issues. In addition to written assignments, each student will be required to choose a topic in consultation with the lecturer and subsequently present a seminar for the class on that topic. For example, a golf course manager might address the ecological management of pest susceptible, regularly cut turf grasses growing on soils of low cation exchange capacity outside the usual thermal limits of the grasses.

Diagnostic Methods in Turf Management 2 units

Coordinator Prof. Martin
AAn extensive knowledge of turf management, basic knowledge of inorganic chemistry
Prereq Turf Management, Plant Nutrition
Classes Sem 1: 7 lec & seven 3hr prac
Assessment quizzes, an assignment and a prac exam

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 provide an introduction to the theoretical basis and practical application (including interpretation guidelines) of selected chemical methods used for diagnostic purposes in the turf industry for soils, irrigation waters and plant tissues.

Reference book

Irrigation Science 4 units

Coordinator Dr Sutton
Classes Sem 1: (1 lec & 3 prac/workshop)/wk
Assessment one 2000w report, one 1500w essay

The course covers the scientific basis of irrigation practice. Modification of productivity potential through irrigation. Objectives of irrigation. Biological, physical and technical aspects of irrigation science, including furrow, flood, sprinkler and drip systems. Efficiency of water use and the proper use of instrumentation for irrigation management.

Reference book
M. E. Jensen Design and Operation of Farm Irrigation Systems (American Society of Agricultural Engineers, 1980)

Plant Nutrition 4 units

Lecturer Dr Campbell
Classes Sem 2
Assessment one 3hr exam, assignments

This course examines how plants acquire nutrients and distribute nutrients between organs during growth. Temperature, water and cutting (defoliation) effects on nutrient uptake. Nutrient function, nutrient genotype interactions and diagnosis of nutrient deficiencies/toxicities are interrelated concepts. Other topics include: prediction of macronutrients and micronutrient requirements; legume nutrition; heavy metals; can nutrients affect plant resistance to pathogens?; environmental considerations, e.g. leaching of nitrate. A substantial reading list and written assignment are directed to an industry of the graduate student's choice.

Turf Management 8 units

Lecturer Prof. Martin
Classes Sem 1
Assessment one 3 hr exam, assignments and prac exercises
Lectures, workshops and field visits centred on the theme of 'turf: a self-contained system'. Students will address the scientific issues underlying the design, construction, grassing and maintenance of turf facilities: construction of desired soil profiles; structure, nutrition and drainage of soils under turf management; the micro- and macroenvironment of turf; water management; physiology of growth under turf conditions; environmental legislation and emerging issues for turf management.
Advanced Turf Management 8 units
Coordinator Prof. Martin
Prereq Turf Management
Classes Sem 2
Assessment one 3hr exam, reports

Lectures, discussions and practical experiments to gain advanced expertise in laboratory and field aspects of the plant sciences underlying turf management. Topics include germination, stress physiology, irrigation and water use, root growth, growth analysis, canopy photosynthesis and fertilizer management.

Turf Species and Varieties 4 units
Lecturers Mr King, Prof. Martin
Classes Sem 2
Assessment one 2hr theory exam, prac exam, plant collection

This course, which is given as intensive workshops, has three aims: to provide an overview of plant taxonomy (how plants are named and how the families of plants are arranged); to teach skills in plant identification (use of botanical terminology and use of conventional and vegetative taxonomic keys); and to recognise commercially-important turf species and varieties and weeds. Information is also provided on biochemical methods of identifying grasses; development of new cultivars by breeding and/or selection; comparative trialing of grasses; plant variety rights and cultivar registration.

Soil Properties and Processes 8 units
Lecturers Assoc. Prof. Koppi, Prof. McBratney, Mr Geering, Dr New
Classes Sem 1: (4 lec & 4hr prac)/wk, 1 day in the field
Assessment one 3hr exam, class work, prac book

This course includes the fundamental properties of soil, the factors of soil formation, and the processes that operate in the soil system. Components comprising pedology, soil physics, soil chemistry, and soil biology are synthesised by reference to common soil horizons and profiles from N.S.W. Field studies start with description and assessment of essential characteristics. The physics of water and gas movement, temperature, density, swelling and strength are considered. The chemistry of soil solids, surfaces and solutions are discussed as well as macronutrients and micronutrients and problems such as salinity, acidity and waterlogging. There is also some discussion of soil microorganisms and microbiological transformations in the soil.

Mycology (Taxonomy and Physiology) 6 units
Lecturers Prof. Deverall, Prof. Burgess
Classes Sem 1: (3 lec & 12 prac)/wk for 7wks
Assessment one 3hr exam

A course of lectures and laboratory classes on the principles of fungal taxonomy and fungal physiology. The taxonomy of the Fungi Imperfecti is considered in detail.

COURSE DESCRIPTIONS FOR AGRICULTURAL ECONOMICS

Agricultural and Resource Policy (Advanced) 8 units
Classes Sem 1: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments

The topics discussed include: basic theoretical 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; microeconomic 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 for this course.

Applied Commodity Modelling (Advanced) 8 units
Classes Sem 1: (3 lec & 1 tut/lab session)/wk
Assessment one 1.5hr exam, one 1.5hr prac exam, assignments

The application of methods of data analysis to the agricultural and resource sectors is the focus of this course. Topics covered will include: formulation and econometric estimation of production relationships; demand; supply; expectations models and simple simultaneous representations of commodity sectors; time series forecasting applied to commodity and futures markets; and a suitable selection from an introduction to dynamic multipliers, dynamic
elasticities, and econometric simulation. Use will be made of a variety of data analysis and econometric computer packages. Emphasis will also be placed on electronic and graphical approaches to data analysis along with consideration of the limitations and problems of the particular techniques.

Applied Commodity Trade (Advanced) 8 units

Classes Sem 2: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments

In this course 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; trade policies of importing and exporting nations, including issues such as food aid and surplus disposal programs; economic integration and impacts on international commodity trade; international trade policy making, including GATT; trade policies of the centrally planned economies and developing countries; the impact of exchange rates and other macroeconomic variables on international trade in commodities.

Applied Marketing (Advanced) 8 units

Classes Sem 1: (3 lec & 1 tut/excursion)/wk
Assessment one 3hr exam, assignments

This course will provide an understanding of the operation and principles of marketing, with practical applications focussed on the food and fibre markets.

The main topics covered will include: firm-level marketing mix and marketing strategy decision making; marketing management and planning; market research and information; futures markets and other risk sharing devices. The course will also address the organisation and trends of food and fibre marketing in Australia; food and fibre industrial marketing, including value-adding and power in the supply chain; market efficiency; and international marketing by agribusiness firms.

Commodity Price Analysis (Advanced) 8 units

Classes Sem 1: (3 lec & 1 tut/excursion)/wk
Assessment one 3hr exam, assignments

The topics covered will include: the nature of agricultural and resource commodity markets, market supply relationships, market demand relationships, price determination, marketing margin relationships, spatially related markets, market dynamics, derived demand for inputs, price expectations, non-competitive market forms and contestable markets. Applied examples from agriculture and the resource industries will be used throughout the course as illustrations of the principles involved.

Contemporary Issues in Agricultural Economics 4 units

Classes Yr: 54hr seminars

Assessment one 3hr exam, assignments

Topics include: recent developments in agricultural economic theory; current economic issues in the Australian and world agricultural and resource industries; appraisal of current Australian agricultural and resource policy.

Natural Resource Economics (Advanced) 8 units

Classes Sem 2: (3 lec & 1 tut)/wk
Assessment one 3hr exam, assignments

A course in natural resource economics of relevance to agriculture and the resource industries. Issues discussed are: the environment as a source of environmental services; socially efficient resource allocation and Pareto welfare economics; market failure and characteristics of environmental services; benefit cost analysis of public projects, including the modification of environmental services; non-depletable resources and pollution; depletable resources; irreversibility; sustainability. Applications include land degradation, fisheries, forestry, land-use planning and greenhouse effect.

Production Economics (Advanced) 8 units

Classes Sem 2: (3 lec and 1 tut/lab session)/wk
Assessment one 1.5hr exam, one 1.5hr prac exam, assignments

Production economics is concerned with production decisions on resource allocation at the firm, industry and economy levels. The topics include: the nature of agricultural and resource industry production; production functions; factor substitution; principles of enterprise combination and multi-product production; firm objectives; constrained and unconstrained optimisation; factor demands; cost functions and other duality relationships; economies of scale and size in farming; production over time; productivity and technical change; production under risk and the illustration of the principles involved through the use of practical applications and exercises involving both the agricultural and resource industries.

Quantitative Business Management and Finance (Advanced) 8 units

Classes Sem 2: (3 lec & 1 tut/lab session)/wk
Assessment one 3hr exam, assignments

The application of applied optimising methods to decision-making in the agricultural and resource sectors is the focus of this course. Topics covered include: an overview of the applications of optimising models; the mathematical basis for constrained optimisation; basic linear, quadratic and nonlinear programming; farm modelling; agricultural sector models; transport and location models; spatial equilibrium systems; introduction to general equilibrium models; and model validation and verification. In addition, basic decision analysis will
be introduced including basic concepts of probability; concepts of utility; utility functions and elicitation of preferences. Issues of financial analysis and control, financial relationships, investment, capital budgeting, risk management and risk in investment decision making will also be covered.

Research Methods (Advanced)  4 units
Classes Sem 2: (2 lec & 1 tut/workshop)/wk
Assessment one 2hr exam, assignments

Topics covered will include: report preparation; techniques and methods of report writing; seminar and workshop presentation methods; visual methods including overhead slides, projected slides and video; time management techniques; research as an orderly process of enquiry; hypothesis formulation and testing; preparation of research proposals; the role of the economist; sources and collection of agricultural data; primary versus secondary data; agricultural surveys; questionnaire construction and interviewing techniques; and methods of analysis of survey data.

### 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 governed by a council composed of the Vice-Chancellor, members of the N.S.W. Wheat Research Foundation, members of the Faculty of Agriculture, and a representative of the N.S.W. Minister for Agriculture and Rural Affairs. The Professor of Plant Breeding in the Department of Crop Sciences is the Director of the Institute. (See Statutes and Regulations section, Appendix 1)

#### Institute of Advanced Studies
The Institute of Advanced Studies was established within the Faculty of Agriculture 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. It is intended that the Institute shall promote the attraction of additional income.

The directors of the Institute are elected from and by members of the Faculty of Agriculture who are full-time permanent members of the departments. The Dean and Associate Dean (Postgraduate Studies) are ex officio directors. (See Statutes and Regulations section, Appendix 1)

### SCHOLARSHIPS AND PRIZES: POSTGRADUATE
The following is a summary only; for full details concerning the conditions governing the awards of these prizes and scholarships contact the Scholarships Office.

<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Value $</th>
<th>Closing date for applications</th>
<th>Other information</th>
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<tr>
<td><strong>Tenable at the University of Sydney</strong></td>
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<tr>
<td>Australian Postgraduate Awards</td>
<td>15 364</td>
<td>31 October</td>
<td>Graduates with Hons I. For research in any field</td>
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<tr>
<td>Henry Bertie and Florence Mabel</td>
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<td>Griton Postgrad. Research Scholarships —</td>
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<tr>
<td>Junior</td>
<td>15 364</td>
<td>as advertised</td>
<td>For research in chemistry in relation to industry and agriculture</td>
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<td>Richard Claude Mankin</td>
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<td>Postdoctoral</td>
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<td>Postgraduate</td>
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<tr>
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<td>up to 1000</td>
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<td>McCaughey Memorial Institute</td>
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<tr>
<td>Norman Scott Noble Scholarship</td>
<td>up to 1000</td>
<td>31 May</td>
<td>Travel grant or grant-in-aid to candidates in the discipline of agricultural entomology</td>
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<tr>
<td>Irvine Armstrong Watson Scholarship</td>
<td>up to 300</td>
<td>31 May</td>
<td>Travel grant or grant-in-aid to candidates in the disciplines of agricultural genetics, biometry, plant breeding or plant pathology</td>
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<td><strong>Faculty scholarships</strong></td>
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<td>The following five are identical (except that the F.H. Loxton is restricted to males) and are awarded annually depending on the availability of funds.</td>
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<tr>
<td>Thomas Lawrence Pawlett Postgraduate Scholarship</td>
<td>as for APA</td>
<td>31 October</td>
<td>Graduates for full-time research within the faculty (Preference to Hons I or Hons II Div. 1 or equivalent)</td>
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<tr>
<td>Christian Rowe Thornett Scholarship</td>
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<td>Alexander Hugh Thurburn Scholarship</td>
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Note: Scholarship conditions may change without notice.

**Awards not restricted to graduates in Agriculture**

- *Travelling scholarships*
  - Baillieu Research Scholarship
  - H.S. Carslaw Memorial Scholarship
  - William and Catherine McIlraith Scholarship
  - The Rhodes Scholarship
  - The Nuffield Foundation Dominion Travelling Fellowships
  - Science Research Scholarships of the Royal Commission for the Exhibition of 1851
  - The Gowrie Postgraduate Research Scholarships
  - The J.B. Watt Travelling Scholarship
  - The James King of Irrawang Travelling Scholarship
  - The G.H.S. and I.R. Lightoller Scholarship
  - The University of Sydney Postgraduate Research Travelling Scholarships
  - The Charles Gilbert Heydon Travelling Fellowship in the Biological Sciences
  - The Eleanor Sophia Wood Travelling Fellowships
  - The Herbert Johnson Travel Grants
  - The Rotary Foundation Fellowships
  - The Commonwealth Scholarships tenable in other British Commonwealth countries under the Commonwealth Scholarship and Fellowship Plan
  - CSIRO postdoctoral studentships.
  - Other scholarships are available. Enquiries about scholarships should be made at the Scholarships section of the Administrative Support Services Division. Enquiries about scholarships offered by other universities should be addressed to the registrar of the university concerned. Scholarship conditions may change without notice.
Resolutions of the Senate

CONSTITUTION OF THE FACULTY OF AGRICULTURE

1. The Faculty of Agriculture 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 Departments of Agricultural Chemistry and Soil Science, Agricultural Economics, Animal Science, Crop Sciences and Microbiology;
   (b) two members of the teaching staff in the categories specified in paragraph (a) in each of the Schools of Biological Sciences, Chemistry and Physics and the Departments of Accounting, Econometrics, Economics, Government and Public Administration, and Veterinary Anatomy, nominated annually by the Head of the Department or School concerned;
   (c) the Deans of the Faculties of Science, Veterinary Science and Economics, and the Principal of the Orange Agricultural College;
   (d) the Director of the I.A. Watson Wheat Research Centre;
   (e) not more than three persons distinguished in the field of agriculture appointed by the Senate on the nomination of the Dean of the Faculty of Agriculture with the approval of the Faculty;
   (f) not more than four students elected in the manner prescribed by resolution of the Senate; and
   (g) such other persons, if any, being full-time members of the senior research staff in the Faculty as may be appointed from time to time by the Senate on the nomination of the Faculty.

2. (a) A person appointed pursuant to section 1(e) 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(g) 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

1. The degrees in the Faculty of Agriculture shall be:
   (a) Bachelor of Science in Agriculture (BScAgr)
   (b) Bachelor of Agricultural Economics (BAgEc)
   (c) Bachelor of Horticultural Science (BHortSc)
   (d) Master of Agriculture (MAgr)
   (e) Master of Science in Agriculture (MScAgr)
   (f) Master of Agricultural Economics (MAgEc)
   (g) Doctor of Philosophy (PhD)
   (h) Doctor of Science in Agriculture (DScAgr)
   (i) Doctor of Agricultural Economics (DAgEc).

2. The diplomas in the Faculty of Agriculture shall be:
   (a) Graduate Diploma in Agricultural Economics (GradDipAgEc)
   (b) Graduate Diploma in Agricultural Science (GradDipAgSc).

BACHELOR OF SCIENCE IN AGRICULTURE

(Sections 1 and 2 commenced in 1995 and 1996 respectively)

1. A candidate for the degree shall, during the First Year, complete the following courses:
   Agricultural Science

2. A candidate for the degree shall, during the Second Year, complete the following courses:
   Agricultural Chemistry 2
   Agricultural Genetics 2
   Agricultural Microbiology 2
   Animal Science 2
   Biometry 2
   Crop Protection
   Crop Science 2
   Soil Science 2

(Sections 3 and 4 are current for 1996 and will be amended for 1997 and 1998 respectively)

3. A candidate for the degree shall, during the Third Year, complete the following courses:
   Agricultural Entomology and Mycology 3
   Agricultural Genetics 3
   Agricultural Microbiology 3
   Agronomy 3
   Animal Anatomy
   Animal Physiology
   Animal Science 3
   Applied Marketing
   Horticultural Science 3
   Plant Pathology 3
   Production Economics
   Crop Protection
   Soil Science 3

4. A candidate for the degree shall, during the Fourth Year, complete the prescribed courses as set out in Faculty resolutions in one of the following subject areas:
   Agricultural Chemistry 4
   Agricultural Economics
   Agricultural Entomology 4
   Agricultural Genetics 4
   Agricultural Microbiology 4
   Agronomy 4
   Animal Production
   Biometry 4
   Farming Systems
   Horticultural Science 4
   Plant Pathology 4
   Soil Science 4
   Special Program

5. (1) First Class or Second Class Honours may be awarded at graduation.
   (2) First Class Honours candidates whose work is, in the opinion of the Board of Examiners, of sufficient merit shall receive a bronze medal.

6. Before admission to the degree, a candidate shall complete professional experience as prescribed from time to time by the Faculty.

7. The unit values of the courses listed in sections 1, 2 and 3 are set out in the following table which combines courses from the new resolutions, sections 1 and 2, and the old resolutions, section 3:
8. (1) Graduates in other faculties of the University of Sydney or of other institutions who are admitted to candidature for the degree of Bachelor of Science in Agriculture, may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 100 units.

(2) Students who have completed a course or courses in another faculty of the University of Sydney and who are admitted to candidature for the degree of Bachelor of Science in Agriculture may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 100 units, provided they have abandoned credit for such courses in the other faculty.

(3) Students who have completed a course or courses in another institution and who are admitted to candidature for the degree of Bachelor of Science in Agriculture may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 100 units, provided they have abandoned credit for such courses in the other faculty.

(4) In each of the circumstances of the foregoing subsections, where an applicant for admission to candidature has completed courses which are not comparable with any of the courses set out in these resolutions, the Dean on behalf of the Faculty may determine the number of units which may be credited for such courses accordingly towards the satisfaction of the requirements of the degree, provided that a candidate may be credited with a maximum of 100 units.

9. (1) A candidate shall not be admitted to the degree unless the candidate shall produce a certificate from the Dean of the Faculty that the candidate has completed all the courses required by the resolutions and has satisfactorily complied with all the other conditions required since the candidate's admission to the degree.

(2) The degree of Bachelor of Science in Agriculture shall not be conferred upon a person holding the degree of Bachelor of Agriculture.

10. (1) A candidate who re-enrols in a course which the candidate has previously failed to complete shall, unless exempted by the Faculty, attend all lectures and other classes and complete all written and other work prescribed for the course.

(2) A candidate in the Third Year may choose any of the elective courses for which there is no prerequisite course or for which the prerequisite has been completed, provided that the exigencies of the timetable permit the taking of the courses chosen by the candidate.

Transitional provisions

11. (1) A candidate who was enrolled for the degree prior to 1 January 1995 and who has not completed the academic requirements by 31 March 1998, or such later date as the Dean in any case may determine, shall complete the requirements for the degree in accordance with these resolutions.

(2) In the case of any candidates who might be prejudiced by any change in the curriculum the Dean of the Faculty may, subject to any resolutions of the Faculty, give such directions as to courses to be completed and give such credit for courses already completed as the circumstances may require.

BACHELOR OF HORTICULTURAL SCIENCE

1. A candidate for the degree shall, during the First Year, complete the following courses:

- Biology
- Biometry 1
- Chemistry (Agriculture) or Chemistry 1A
- Economic Environment of Australian Agriculture
- Horticultural Science

2. A candidate for the degree shall, during the Second Year, complete the following courses:

- Agricultural Chemistry 2
- Agricultural Genetics 2
- Agricultural Microbiology 2
- Biometry 2
- Crop Protection
- Crop Science 2
- Horticultural Science 2
- Soil Science 2

3. A candidate for the degree shall, during the Third and Fourth Years, complete the following courses:

- Agricultural Chemistry 3
- Agricultural Genetics 3
- Agricultural Microbiology 3
- Biometry 3
- Crop Protection
- Crop Science 3
- Horticultural Science 3
- Soil Science 3

4. (1) First Class or Second Class Honours may be awarded at graduation.

(2) First Class Honours candidates whose work is, in the opinion of the Board of Examiners, of sufficient merit, shall receive a bronze medal.

5. Before admission to the degree, a candidate shall complete professional experience as prescribed from time to time by the Faculty.

6. The unit values of the courses listed in sections 1, 2 and 3 are set out in the following table:

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
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<tbody>
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</tr>
<tr>
<td>Agricultural Chemistry 2</td>
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</tr>
<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
</tr>
<tr>
<td>(Agricultural and Food Products)</td>
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</tr>
<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
</tr>
<tr>
<td>(Chemistry and Biochemistry of Ecosystems)</td>
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</tr>
<tr>
<td>Agricultural Genetics 2</td>
<td>6</td>
</tr>
<tr>
<td>Agricultural Microbiology 2</td>
<td>6</td>
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<tr>
<td>Agricultural Microbiology 2</td>
<td>6</td>
</tr>
<tr>
<td>Applied Marketing</td>
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</tr>
<tr>
<td>Biology</td>
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</tr>
<tr>
<td>Biometry 1</td>
<td>6</td>
</tr>
<tr>
<td>Biometry 2</td>
<td>6</td>
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<td>Biometry 3</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry (Agriculture or 1A)</td>
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<tr>
<td>Crop Protection</td>
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</tr>
<tr>
<td>Crop Science 2</td>
<td>6</td>
</tr>
<tr>
<td>Economic Environment of Australian Agriculture</td>
<td>6</td>
</tr>
<tr>
<td>Horticultural Science 3</td>
<td>6</td>
</tr>
<tr>
<td>Plant Pathology 3</td>
<td>4</td>
</tr>
<tr>
<td>Production Economics</td>
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<td>Soil Science 2</td>
<td>6</td>
</tr>
<tr>
<td>Soil Science 3</td>
<td>8</td>
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</tbody>
</table>
Table 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agribusiness Management</td>
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<td>Economic Env</td>
<td></td>
</tr>
<tr>
<td>Agricultural Chemistry 3</td>
<td>8</td>
<td>of Aust Agriculture</td>
<td></td>
</tr>
<tr>
<td>Agricultural Science</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied Marketing</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Science 3</td>
<td>8</td>
<td>Agricultural Genetics 2</td>
<td>Crop Science 2</td>
</tr>
<tr>
<td>Turf Species and Varieties</td>
<td>4</td>
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<td></td>
</tr>
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</table>

Courses from the BScAgr degree*

*Subject to the approval of the Dean and the Head of the Department concerned.

BACHELOR OF AGRICULTURAL ECONOMICS

1. A candidate for the degree shall, during the First Year, complete the following courses:
   - Agricultural Economics I
   - Economics I
   - Economics II
   - Accounting I
   - Agricultural Science
   - Biology
   - Commercial Law I
   - Geography I
   - Government I
   - Mathematics I (Life Sciences)
   - The Australian Economy

2. A candidate for the degree shall, during the Second Year, complete the following courses:

3. A candidate for the degree shall, during the Third Year, complete the following courses:
   - Agricultural and Resource Policy
   - Economics III
   - Production Economics
   - Research Methods

4. A candidate for the degree shall, during the Fourth Year, complete the following courses:
   - Applied Commodity Modelling
   - Commodities IIB
   - Commodity Price Analysis
   - Economics II
   - and a minimum of 12 units from Table 1 attached to these resolutions.

7. (1) Graduates in other faculties of the University of Sydney or of other institutions who are admitted to candidature for the degree of Bachelor of Horticultural Science, may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 100 units.

8. (1) A candidate shall not be admitted to the degree unless the candidate shall produce a certificate from the Dean of the Faculty that the candidate has completed all the courses required by the resolutions and has satisfactorily complied with all the other conditions required since the candidate’s admission to the degree.

9. (1) A candidate who re-enrolls in a course which the candidate has previously failed to complete shall, unless exempted by the Faculty, attend all lectures and other classes and complete all written and other work prescribed for the course.

(2) A candidate in the Third Year may choose any of the elective courses for which there is no prerequisite course or for which the prerequisite has been completed, provided that the exigencies of the timetable permit the taking of the courses chosen by the candidate.
complete the prescribed topics in the course Agricultural Economics IV.

5. A candidate may count no more than 2 of the following courses towards the degree: Accounting I, Biology, Commercial Law I (i.e. Commercial Transactions I and Trade Practices and Consumer Law), Geography I, Government I, Mathematics I (Life Sciences) and The Australian Economy.

6. (i) First Class or Second Class Honours may be awarded at graduation.

(ii) First Class Honours candidates whose work is, in the opinion of the Board of Examiners, of sufficient merit shall receive a bronze medal.

7. Before admission to the degree, a candidate shall complete professional experience as prescribed from time to time by the Faculty.

8. The unit values of the courses listed in sections 1, 2, 3, 4 and 5 are set out in the following table:

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
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</thead>
<tbody>
<tr>
<td>Accounting I</td>
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<td>Agribusiness Management</td>
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<tr>
<td>Agricultural Economics I</td>
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<td>Agricultural Economics IV</td>
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<td>Agricultural and Resource Policy</td>
<td>8</td>
</tr>
<tr>
<td>Agricultural Science</td>
<td>12</td>
</tr>
<tr>
<td>Agronomy</td>
<td>8</td>
</tr>
<tr>
<td>Animal Science</td>
<td>6</td>
</tr>
<tr>
<td>Any Semester Course in Commercial Law</td>
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</tr>
<tr>
<td>Any other Semester Course in Econometrics</td>
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</tr>
<tr>
<td>Any Semester Course in Economic History</td>
<td>8</td>
</tr>
<tr>
<td>Any Semester Course in Finance</td>
<td>8</td>
</tr>
<tr>
<td>Any Semester Course in Government</td>
<td>8</td>
</tr>
<tr>
<td>Any Semester Course in Marketing</td>
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</tr>
<tr>
<td>Applied Commodity Modelling</td>
<td>8</td>
</tr>
<tr>
<td>Applied Commodity Trade</td>
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</tr>
<tr>
<td>Applied Econometrics</td>
<td>8</td>
</tr>
<tr>
<td>Applied Marketing</td>
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</tr>
<tr>
<td>Asian Studies I</td>
<td>8</td>
</tr>
<tr>
<td>Asian Studies 2</td>
<td>8</td>
</tr>
<tr>
<td>Asian Studies 3</td>
<td>8</td>
</tr>
<tr>
<td>Biology</td>
<td>12</td>
</tr>
<tr>
<td>Commercial Law I</td>
<td>12</td>
</tr>
<tr>
<td>Commercial Transactions I</td>
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</tr>
<tr>
<td>Commodity Price Analysis</td>
<td>8</td>
</tr>
<tr>
<td>Corporations Law I</td>
<td>6</td>
</tr>
<tr>
<td>Crop and Pasture Agronomy</td>
<td>6</td>
</tr>
<tr>
<td>Crop Science I</td>
<td>6</td>
</tr>
<tr>
<td>Econometrics I</td>
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</tr>
<tr>
<td>Econometrics IIA</td>
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</tr>
<tr>
<td>Econometrics IIB</td>
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</tr>
<tr>
<td>Econometrics IIIIB</td>
<td>8</td>
</tr>
<tr>
<td>Financial Accounting</td>
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</tr>
<tr>
<td>Financial Accounting Concepts</td>
<td>6</td>
</tr>
</tbody>
</table>

9. (1) Graduates in other faculties of the University of Sydney or of other institutions who are admitted to candidature for the degree of Bachelor of Agricultural Economics may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 units.

(2) Students who have completed a course or courses in another faculty of the University of Sydney and who are admitted to candidature for the degree of Bachelor of Agricultural Economics may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 units, provided they have abandoned credit for such courses in the other faculty.

(3) Students who have completed a course or courses in another institution and who have been admitted to candidature for the degree of Bachelor of Agricultural Economics may be granted credit for such courses as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 units, provided they have abandoned credit for such courses in the other faculty.

(4) In each of the circumstances of the foregoing subsections, where an applicant for admission to candidature has completed courses which are not comparable with any of the courses set out in these resolutions, the Dean on behalf of the Faculty may, either instead of or in addition to giving credit for any course that is so set out, give credit for such number of unspecified units, up to a maximum value of 36 units, as the Dean on behalf of the Faculty may determine, up to a maximum value of 96 units.

Table 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting I</td>
<td>12</td>
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</tr>
<tr>
<td>Animal Science</td>
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<tr>
<td>Asian Studies I</td>
<td>8</td>
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<td>Asian Studies 2</td>
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<td>Asian Studies 1</td>
<td></td>
</tr>
<tr>
<td>Commercial Transactions I</td>
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<td></td>
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<td>Corporations Law I</td>
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<td>Commercial Transactions I</td>
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<td>Crop and Pasture Agronomy</td>
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<td>Crop Science I</td>
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<td>Econometrics I</td>
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<td>Prerequisites</td>
<td>Corequisites</td>
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<td>Trade Practices and</td>
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<td>Consumer Law*</td>
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* Not available to students who took Commercial Law in 1995

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**Table 2**

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit value</th>
<th>Prerequisites</th>
<th>Corequisites</th>
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<tr>
<td>Accounting I</td>
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<td>Agribusiness Management</td>
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<td>Production Economics</td>
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<td>Agronomy</td>
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</tr>
<tr>
<td>Financial Accounting Concepts</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Forecasting for Economics and Business</td>
<td>8</td>
<td>—</td>
<td>Econometrics IIA</td>
</tr>
<tr>
<td>Geography II</td>
<td>16</td>
<td>Geography I</td>
<td>—</td>
</tr>
<tr>
<td>Geography III</td>
<td>16</td>
<td>Geography II</td>
<td>—</td>
</tr>
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<td>Government II</td>
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<td>Government I</td>
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<tr>
<td>Government III</td>
<td>16</td>
<td>Government II</td>
<td>—</td>
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<tr>
<td>Horticultural Science</td>
<td>6</td>
<td>Crop and Pasture Agronomy</td>
<td>—</td>
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<tr>
<td>Management Accounting A</td>
<td>8</td>
<td>Accounting I</td>
<td>Econometrics I</td>
</tr>
<tr>
<td>Management Accounting Concepts</td>
<td>6</td>
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<tr>
<td>Operations Research A</td>
<td>8</td>
<td>Commodity Price Analysis</td>
<td>—</td>
</tr>
<tr>
<td>Operations Research B</td>
<td>8</td>
<td>Econometrics IIB</td>
<td>—</td>
</tr>
<tr>
<td>Sample Design and Analysis</td>
<td>8</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Courses from the BScAgr degree*</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

* Subject to the approval of the Head of Department of Agricultural Economics.

° Subject to the approval of the Head of Department of Agricultural Economics and the Head of the Department concerned.

° These courses may be offered in alternate years. Contact Department for specific information.
7. A candidate proceeding by coursework shall complete courses prescribed by the Faculty to a total value of 56 units from courses approved from time to time by the Faculty.

8. (1) Each candidate shall report regularly to the Faculty on his or her progress towards completing the requirements for the degree.
(2) The Faculty shall 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.
(3) The Faculty may accept a candidate's results in coursework examinations in place of reports from the candidate.

Lodge the thesis
9. (1) Not earlier than the end of the minimum period of candidature, each candidate proceeding by research and thesis shall lodge with the Registrar three copies of a thesis embodying the results of an original investigation carried out by the candidate.
(2) The candidate shall 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 works of others, and the portion of the thesis the candidate claims to be original.
(3) The thesis shall 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.
Examination
10. The Faculty shall appoint at least two examiners for a thesis.

Result of candidature
11. The Faculty shall determine the result of the candidature after it has considered—
   (a) the reports of the examiners of the thesis or the results of the examinations completed by a candidate proceeding by coursework, and
   (b) a recommendation on the result of the candidature from the Head of the Department in which the candidate is proceeding.

Award of the degree
12. The degree of Master of Agriculture may be awarded in the following subject areas and the testamur for the degree shall specify the subject area:

   (a) Agricultural Chemistry
   (b) Agricultural Economics
   (c) Agricultural Entomology
   (d) Agricultural Genetics
   (e) Agronomy
   (f) Animal Science
   (g) Biometry
   (h) Cereal Chemistry
   (i) Horticultural Science
   (j) Microbiology
   (k) Plant Breeding
   (l) Plant Pathology
   (m) Plant Protection
   (n) Soil Conservation
   (o) Soil Contamination
   (p) Soil Science
   (q) Turf Management.

GRADUATE DIPLOMAS
1. Candidates for the graduate diplomas shall proceed by coursework.
2. (1) A candidate for the Graduate Diploma in Agricultural Science shall proceed in one of the following departments:
   Department of Agricultural Chemistry and Soil Science
   Department of Animal Science
   Department of Crop Sciences
   Department of Microbiology.
   (2) A candidate for the Graduate Diploma in Agricultural Economics shall proceed in the Department of Agricultural Economics.

Admission to candidature
3. (1) The Faculty of Agriculture may admit to candidature for a graduate diploma in the Faculty a graduate of the University of Sydney who has completed courses acceptable to the Faculty.
   (2) On the recommendation of the Faculty, the Academic Board may admit to candidature in accordance with Chapter 10 of the by-laws a person who has, in the opinion of the Faculty, qualifications equivalent to those required of a graduate of the University of Sydney.
4. The Faculty may require a person admitted to candidature 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 shall review the candidature and the work completed, and may confirm or terminate the candidature. If the Faculty confirms the candidature, it shall be deemed to have commenced at the beginning of the period of probation.

Periods of candidature
5. (1) The period of candidature for a full-time candidate for a graduate diploma shall be one year.

6. (1) Each candidate shall report regularly to the Faculty on his or her progress towards completing the requirements for the graduate diploma.
   (2) The Faculty shall 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 graduate diploma, terminate the candidature.
   (3) The Faculty may accept a candidate's results in coursework examinations in place of reports from the candidate.

Result of candidature
7. The Faculty shall determine the result of the candidature after it has considered—
   (a) the results of the examinations completed by a candidate, and
   (b) a recommendation on the result of the candidature from the Head of the Department in which the candidate is proceeding.

Award of the graduate diploma
8. The Graduate Diploma in Agricultural Science shall be awarded in the following subject areas and the testamur for the diploma shall specify the subject area:

   (a) Agricultural Chemistry
   (b) Agricultural Entomology
   (c) Agricultural Genetics
   (d) Agronomy
   (e) Animal Science
   (f) Biometry
   (g) Horticultural Science
   (h) Microbiology
   (i) Plant Pathology
   (j) Plant Protection
   (k) Soil Science
   (l) Turf Management.

PLANT BREEDING INSTITUTE WITHIN THE FACULTY OF AGRICULTURE
1. (1) There shall be an institute to be known as the Plant Breeding Institute within the Faculty of Agriculture.
   (2) The Institute shall advise the University on the promotion of the science of plant breeding and improvement in the genotypes of crop plants available for commercial cultivation.
2. (1) The governing body of the Institute shall be a Council comprising—
   (a) the Vice-Chancellor and Principal, the Dean of the Faculty of Agriculture and the Professor of Plant Breeding or their nominees;
   (b) the New South Wales Minister for Agriculture or the Minister's representative;
   (c) not more than six trustees of the New South Wales Wheat Research Foundation appointed by the Senate on the recommendation of the Foundation;
   (d) not more than four members of the full-time staff of the University appointed by the Dean on the recommendation of the Faculty of Agriculture.
   (2) Each member shall hold office for a period of three years and shall be eligible for reappointment.
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) The Chairperson at any such meeting shall have one vote.
(4) At any such meeting eight members shall form a quorum.

4. (1) The Professor of Plant Breeding shall be honorary Director of the Institute, provided that during any vacancy in the Chair of Plant Breeding, the Vice-Chancellor, after consulting the Dean and principal research leaders at Narrabri and Cobbitty, may appoint an honorary Acting Director for a period not exceeding 6 months.
(2) The Director or Acting Director shall be responsible for administering the following—
(a) the buildings, equipment, land and staff located at the I.A. Watson Wheat Research Centre, Narrabri;
(b) the buildings, equipment, land and staff involved in plant breeding research at the Plant Breeding Institute, Cobbitty.
(3) The staff of the Institute shall carry out their duties under the direction of the Director or Acting Director.

5. The Director or Acting Director shall report to the Council annually and shall include an annual budget for the ensuing year.

6. (1) The Council and its officers shall have such other powers, duties and functions as may be prescribed by resolution of the Senate provided that all acts of the Council and its officers shall be subject to the by-laws and to any direction which may be given by the Senate.
(2) The Senate shall provide such administrative, technical and secretarial assistance as it considers proper for the Institute.

THE INSTITUTE OF ADVANCED STUDIES WITHIN THE FACULTY OF AGRICULTURE
1. The name of the Institute shall be the Institute of Advanced Studies within the Faculty of Agriculture.

2. (i) The Institute shall advise the Senate regarding the funds of the Joanne Josephine Harris Bequest, the Thomas Lawrence Pawlett Bequest, the Mrs Christian Rowe Thorpett Bequest, the Alexander Hugh Thurbum Fund, the Turland Endowment and the portion of the funds of the F.H. Loxton Bequest which has been allocated to the Faculty of Agriculture.
(ii) The Institute shall promote the attraction of additional income.

3. (i) The Institute shall further the development of postgraduate studies and research in the Faculty of Agriculture.
(ii) The Institute shall be responsible for the administration of the scholarship program in the Faculty of Agriculture.

4. The names of the donors shall be perpetuated by their association with the various projects that the Institute initiates.

5. (i) One director of the Institute from each department shall be appointed by the Faculty from the full-time permanent members of the Departments of Agricultural Chemistry and Soil Science, Agricultural Economics, Animal Science, Crop Sciences, and Microbiology.
(ii) The Dean and the Associate Dean (Postgraduate Studies) of the Faculty shall be ex officio directors.
(iii) Directors shall be appointed biennially at the November meeting of the Faculty in the year in which a term ends.
(iv) Directors shall be eligible for re-appointment.

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, including both the supervision of research candidatures and where appropriate the coordination of coursework programs.

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 sections 1-4 above.

Control of candidature
8. (i) Each candidate for the MAgEc or MScAgr degree shall pursue his or her course of advanced study and research wholly under the control of the Faculty.
(ii) 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.

Part-time candidature by research
9. (i) 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 departmental and faculty activities as are required by the Head of the Department.
(ii) The Faculty may permit part-time candidates for the MAgEc or the MScAgr degree 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.
(iii) Candidates admitted to part-time candidature are expected to devote a minimum of 20 hours per week (or equivalent) to their candidature.
(iv) Research assistants or associate lecturers in the University shall enrol part-time unless they can demonstrate to the satisfaction of the Faculty that they have sufficient time to pursue full-time candidature.

Coursework to be completed
10. A candidate proceeding by coursework shall satisfactorily complete such coursework as the Faculty on the advice of the Head of the Department may prescribe. Coursework, including a research project, will be chosen from the tables of courses attached to these resolutions.

(a) For the MAg degree, 56 units of coursework must be completed including 8 to 24 units of a research project.
(b) For the GradDipAgEc, 52 units of coursework must be completed including 8 or 16 units of a research project.
(c) For the GradDipAgEc, 48 units of coursework must be completed including 8 to 24 units of a research project.

Credit for previous studies
11. The Board of Postgraduate Studies (Board) may grant credit:
(a) towards MAg candidate for coursework completed in graduate diploma candidature in this Faculty;
(b) for up to 12 units of unspecified coursework towards MAg candidate for courses completed in another faculty of this University or of other tertiary institutions;
(c) for up to 8 units of unspecified coursework towards graduate diploma candidature for courses completed in another faculty of this University or of other tertiary institutions; provided that
(a) no course for which credit is granted has been a basis for the award of any other degree or diploma;
(b) the course or courses 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;
(c) the course or courses were completed within six years immediately preceding the commencement of candidature for the MAg degree or the graduate diploma.

Form of a thesis
12. (1) A thesis may be bound for submission in either a temporary or a permanent form.
(2) Temporary binding must be strong enough to withstand ordinary handling and postage. The preferred form of binding is the 'Perfect Binding' system; ring-back or spiral binding is not permitted.
(3) The cover of a temporarily bound thesis must have a label with the candidate's name, name of the degree, the title of the thesis and the year of submission.
(4) The requirements for permanent binding are set out in the Statutes and Regulations in the Academic Board's resolutions for binding of PhD theses.
(5) Following examination, and emendation if necessary, at least one copy of a thesis (the Rare Book Library copy) must be bound in permanent form on acid-free paper.
(6) If emendations are required, all copies of a thesis which are to remain available within the University must be emended.

Result of candidature
13. (1) The Board of Postgraduate Studies awards, or for the PhD degree recommends the award of, the degree or graduate diploma whenever—
(a) the examiners have recommended without reservation that the degree be awarded and the Head of the Department concurs; or
(b) 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 Head of the Department concurs; or
(c) the Board of Postgraduate Studies unanimously accepts a recommendation from the Head of the Department to award or award subject to emendations despite reservations expressed by one or more of the examiners; or
(d) the coursework results are satisfactory and the Head of the Department recommends the award of the degree or graduate diploma.
(2) The Board of Postgraduate Studies may permit an unsuccessful candidate to prepare for re-examination if, in its opinion, the candidate's work is of sufficient merit to warrant this concession and the Head of the Department has so recommended.

Satisfactory progress
14. (1) A candidate proceeding by research and thesis shall lodge a progress report annually with the Registrar.
(2) 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 course which has been twice failed or discontinued to count as failure.

Preliminary requirements
15. When an applicant is not qualified for admission to a Master's degree by research, the Faculty may require satisfactory
completion of a preliminary examination before admission to candidature can be granted. In such a case a candidate may be enrolled in a Master's Preliminary program which shall consist of such coursework or other requirements as the Faculty may determine.

Delegation
16. In these resolutions—
   (1) Faculty delegates its responsibility to the Board of Postgraduate Studies.
   (2) The Board of Postgraduate Studies delegates the following responsibilities to the Dean who in turn delegates them to the Associate Dean (Postgraduate Studies):
       approval of—
       (a) award of the Master of Agriculture degree and the Graduate Diplomas in Agricultural Science and Agricultural Economics
       (b) award of the Master of Science in Agriculture and Master of Agricultural Economics degrees when there is no apparent reason for debate at the Board
       (c) appointment of examiners
       (d) admission to candidature
       (e) supervisory arrangements
       (f) variation of candidature
       (g) extension of candidature
       (h) completion of candidature away from the University
       (i) suspension of candidature
       (j) approval of continuance following receipt of annual progress reports,
### Appendix 2: Explanation of symbols for courses of study

Symbols may have been used in the courses of study chapter in the handbook as a succinct way of presenting teaching and assessment information. Because of the varied nature of the work described and occasional difficulties in interpretation and typesetting, such details are not construed as a firm undertaking. Students are advised to check details with the departments concerned. The significance of symbols used is as follows:

**Hypothetical examples of symbols used**

<table>
<thead>
<tr>
<th>Title of course</th>
<th>Actual lecturers</th>
<th>Allied studies</th>
<th>Class contact &amp; course duration</th>
<th>Exams, essays, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Dutch 1</td>
<td>Assoc. Prof. Holland, Dr Nederlands</td>
<td>AKn HSC German</td>
<td>Classes Yr: (3 lec &amp; 1 tut)/wk</td>
<td>Assessment one 3hr exam, two 2000w essays/sem, 4 tut papers/sem</td>
</tr>
<tr>
<td>8766 Star Wars 5</td>
<td>Dr Lazer, Ms Gunn</td>
<td>Prereq 7653 Coreq Intro. Media Manipulation</td>
<td>Classes Sem 1: (2 lec &amp; 3 tut/prac)/wk; Sem 2: (2 lec &amp; 2 tut/prac)/wk</td>
<td>Assessment one 3hr exam, sem, classwork</td>
</tr>
</tbody>
</table>

### Examples

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sem 1: 1 class/wk</td>
</tr>
<tr>
<td>Yr: (2 lec &amp; 3 tut/prac)/wk</td>
</tr>
<tr>
<td>Sem 2: 3 lec/wk &amp; 1 tut/fn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>one 3hr exam, two 3hr exams/sem</td>
</tr>
<tr>
<td>one 2000w essay, one 3000w essay, two 2000w essays/sem, 4 tut papers the course (one 3000w &amp; two 2000w essays)/sem</td>
</tr>
</tbody>
</table>

### Allied studies

**AKn**

- **Prereq** assumed knowledge
- **Coreq** prerequisite (you must have passed the indicated prerequisite before you start the course)

- **Coreq** corequisite (you must enrol in this course at the same time unless you have already passed it)

### Type of class contact/assessment

- **class** class contact of any form
- **lab** laboratory
- **lec** lecture
- **prac** practical
- **tut** tutorial
- **exam** examination
- **tut paper** tutorial paper

### Duration

- **hr** hour
- **Sem 1** Semester 1
- **Sem 2** Semester 2
- **Yr** throughout the year
Buildings, departments and operations (main campus)

15A  Accommodation Service A35
16S  Accounting H25
16D  Applied Policy & Strategic Planning Division A14
17D  Admin. Support Services Division A14
17D  Admissions A18
13E  Agricultural Engineering H07
15C  Agricultural Annex A07
15C  Agricultural Chemistry & Soil Science A03
15C  Agricultural Economics A04
15C  Agricultural Pathology A06
15C  Agriculture Office A05
25N  Alma Street Glasshouse B07
17U  Alumni Relations F18
17H  Anderson Stuart Building P13
17H  Anatomy & Histology P13
7E  Animal Science B09
15F  Anthropology A14
15Q  Anatomy & Histology P13
15R  Archaeology, Classics & Ancient History A14
22M  Architectural & Design Science G04
22M  Architecture, Dept & Faculty Office G04
22M  Archives G04
20N  Art Workshop G03
16A  Arts Faculty Office A14
17S  Asian Studies A18
17O  Attendee’s Lodge P18
14D  Badham Building & Library A16
13C  Commonwealth A09
16N  National Australia A15
16N  National Australia G01
22D  Badger’s Lodge B02
8L  Biological Science J05
11C  Biotechnology J05
16C  Biological Science, Botany A12
8L  Blackburn Building D06
8L  Biological Chemistry C06
19N  Bookshop, SRC Secondhand G01
19K  Bookshop, Medical C06
8B  Bookshop G05
9M  Booth Lecture Theatres D04
16C  Botany A12
16C  Botany A12
17D  Brennan, C., Building A18
17C  Berry Library F13
17E  Business Liaison Office A14
13A  Career Centre B21
6C  Carterett’s Cottage (Vet. area) B03
19L  Cartwright Building P07
16A  Chemistry A09
15E  Celtic Studies A17
21S  Centennial Science G06
19L  Centre for Teach & Learning R07
17D  Chancellor’s Shop Committee A14
15K  Chemistry A07
23Q  Chemical Engineering J01
21S  Chemical Science G17
17K  Chemistry F11
13K  Child Care
35B  Boundary Lane
4R  Carillon Avenue
4A  Law (University of Sydney) H05
21S  Union (Darlington) G10
17B  Computer Science, Basser Dept F09
12A  Continuing Education K01
9K  Coppleston Postgrad. Med. Inst D02
12G  Corporate Services, University A35
14C  Credit Union A09
13E  Crop Sciences A02
13E  Crop Entomological A04
11C  Agricultural Genetics & Plant Breeding A06
15C  Agronomy A02
12E  Bicentenary A08
12E  Biological Facility A05
7C  CSIRO McMaster Laboratory B02
17E  Bouchier-Fellows F18
17B  Dental H. Educ. & Res. Fndn K03
14K  Dental Services A35
12A  Disability Services A35
17Q  Economics B04
16F  Economics Library A07
13C  Economics Faculty Office H04
12F  Engineering Building A27
16F  Engineering Center N01
17L  Engineering Science, Casual A09
12Q  Engineering Faculty Office J02
17G  English A08
16G  Equal Employment Opportunity H47
6L  Evelyn Williams Building B10
17D  Experimental Medicine D06
17L  Experimental Relations Division A14
17D  Financial Services Division A14
16F  Fine Arts A26
20F  Fisher Library F03
14C  Footbridge Theatre A09
16F  Forestry Building A12
21T  Garage, University G13
17G  Geology & Geophysics B03
17G  Geology & Geophysics F05
15G  Geographic Studies A18
17Q  Geography F12
17Q  Geography & Geophysics F05
15Q  Geomatics A16
17Q  Geomatics A16
8D  Grandstand No. 1 Oval D01
16D  Greek—Ancient A14
17E  Greek—Ancient A14
17E  Greek—Ancient A14
13F  Griffith Taylor Building A19
7E  Gunn, R.M.C., Building F10
13F  Gunn, R.M.C., Building F10
15G  History A12
15L  History & Philosophy of Science F11
5D  Hospitality A09
5D  Horse Stables B09
20F  Human Nutrition Unit G08
11Q  Industrial Relations Division H03
8L  Infectious Diseases D06
19L  Information Technology Services H08
17Q  Institute Building H08
17Q  Institute for Advanced Studies A19
12A  International Student Centre K07
23L  International House G06
17T  Joinery—large animal bull pen B05
4D  Italian Studies A26
17Y  Jonny G12
12F  Koori Centre A22
12F  Language Centre A19
17E  Latin A14
17E  Language Assistance Centre A35
15K  Linguistics F12
12T  Link, R.C. Building J13
12E  Lost Property A19
12A  Mackee Library A14
14C  Mackay Building A12
12A  Mackay Medical Library A12
17C  McMaster Laboratory CSIRO B02
17C  McCrindle, J.R. Building A05
17D  Medlab Building P09
17T  Medlab Building P09
17E  Main Building A14
17E  Manning House A23
12U  Mandurah House
15A  Margaret Ceter Building K07
16L  Mathematics Learning Centre F12
16L  Mathematics & Statistics F07
24N  Mechanics & Aero. Eng B09
24O  Mechanical Engineering F07
15K  Medicine Faculty Office A27
15K  Medicine, Preclinical F13
17H  Medicine, Preclinical F13
17K  Medical Library H04
12P  Medical Library G02
14Q  Mills, R.C., Building A26
14Q  Mooroo College A26
17Q  Moore Theological College 1
16F  Murdoch Macarthur Building A17
17S  Museum Studies J16
17M  Mungo Macarthur Building A17
25D  Music Faculty Office D02
16F  Nicholson Museum A16
16F  Obstetrics & Gynaecology D02
17C  Oceania Science Institute H34
17C  Old Building A12
22F  Old School Building G12
12F  Old Teachers’ College Building A22
24L  Pathology & Path Museum D06
12A  Performance A08
12A  Personnel Services K07
35D  Pharmacy A15
12A  Philosophy A17
12A  Philosophy A17
12A  Physics A21
12A  Physics A21
12A  Physics F13
12A  Photography in Two in Medicine D02
13D  Photofluent A15
16F  Press Building H03
21T  Printing Services G12
21T  Professors Board Room A14
12A  Prophylactic B07
41F  Psychiatry D09
41F  Psychology A17
41D  Publication A20
15K  Public Health A27
13Q  Quaestio A14
16K  Queen Elizabeth II Res. Inst. D02
17P  Records D12
13F  Religion, School of Studies in A19
13F  Research Institute for Asia & the Pacific H40
18A  Risk Management H31
14G  Rose Street Building J04
8C  Ross Street Building A05
7D  Round House B11
23P  Russell, Peter Nicol, Building J02
16K  SALU F12
5P  St Andrew’s College 2
34M  St John’s College 2
21M  St Michael’s College
12N  St Paul’s College 4
14A  School of Arts and Science 5
4C  Sand roller B04
19L  Science Faculty Office H07
14E  Security A19
12A  Self House K02
14E  Senate Studies A14
18E  Senate Room A14
21T  Services Building G12
25M  Seymour Theatre Centre J09
5D  Sheep Building & Parc B07
17H  Shadforth Museum F13
17H  Shadforth Museum F13
16H  Social Work A26
20R  Noel Martin Recreation Centre, Darlington G09
12H  Sports Centre Western Ave A30
7F  Sports Union D08
7F  Ward, E.K., Gymnasium D08
26P  Stephen Roberts Theatre F06
8D  Stewart, J.D., Building R01
17L  Student Centre F09
15C  SRC, C01
21T  Supply Department G12
18S  SUPRA H01
8L  Surgery D06
38R  Swimming Pool C09
32U  Sydney Cove D17
28D  Tennis pav. & women’s courts F01
29N  The Shells College G03
14B  Traffic Office A19
14K  Transient Building F13
19U  University of Sydney G01
15F  University of Sydney Club A17
22M  Urban & Regional Planning D04
8D  Vet. Anatomy B01
8D  Vet. Clinic, hospital, surgery B10
8D  Vet. Clinical Sciences B10
7D  Vet. operating theatre & animal house B13
7D  Vet. Pathology B01
7E  Vet. Physiology B19
16E  Vet. Services, Security Office B01
14E  Vets-Challenge A14
11D  Wallace Theatre A21
17W  War Memorial Gallery A14
11F  Watt, R.D., Building A04
19W  Wentworth Building G01
11L  Wesley College 6
26W  Western Avenue Underground Parking Station D07
16E  Western Tower A14
22M  Wilkinson Quay D04
17H  Wilson (Anatomy) Museum F13
190  Women’s College 10
12H  Women’s Sports Association
16S  Women’s Studies Centre C15
12S  Woolley Building MO
12M  Women’s Studies Centre H53
17U  Women’s Sports Association
8D  Women’s College 7
18M  Women’s College 6
17U  Women’s Sports Association
8D  Women’s College 7
18M  Women’s College 6
17U  Women’s Sports Association