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THE UNIVERSITY OF
NEW SOUTH WALES



Science

HANDBOOK

1998

THE UNIVERSITY OF
NEW SOUTH WALES



Science
HANDBOOK
1998

Subjects, courses and any arrangements for courses including staff allocated as stated in this Handbook are an expression of intent only. The University reserves the right to discontinue or vary arrangements at any time without notice. Information has been brought up to date as at 1 November 1997, but may be amended without notice by the University Council.

CREDIT POINTS – IMPORTANT NOTE

From 1996, UNSW introduced a university wide credit point system for all subjects offered to both undergraduate and postgraduate students. The system means that a subject will have the same credit point value irrespective of which faculty's course it is counting towards. Students are able to determine the value of subjects taken from other faculties when planning their programs of study. The student load for a subject is calculated by dividing the credit point value of a subject by the total credit points required for the program for that year of the course. Student load is used to determine both HECS and overseas student fees. Students who take more than the standard load for that year of a course will pay more HECS.

Old subject measures have been replaced by new university credit points. Every effort has been made to ensure the accuracy of the credit point values shown for all subjects. However, if any inconsistencies between old and new credit point measures cause concern, students are advised to check with their faculty office for clarification before making 1998 subject selections based on the credit points shown in this handbook.

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Message to New Students

Welcome to the University of New South Wales

This Handbook sets out information about Undergraduate and Postgraduate Science Courses, which are among the most varied and flexible available in our University.

In such a large institution as the University of New South Wales, Science based subjects are taught by Schools in a number of different Faculties. At the undergraduate level they are brought together through a cross-faculty organisation known as the Board of Studies in Science and Mathematics (BSSM), which embraces topics from chemistry to psychology, from biology to mathematics. The Science and Advanced Science courses are organised so as to lead directly to a career in experimental science or to provide a broad program which enables a number of options to be kept open.

All of you will have the opportunity to be taught by active scientists who are engaged in research of international significance, and all of you will acquire skills of great importance for the future of the community. While this handbook sets out the possibilities, we hope that you will feel free to take personal advice over your subject and career choices.

General course advice is always available from the Board of Studies in Science and Mathematics office and every science-based school will be happy to discuss options with interested students. Naturally, not all new students are new to universities, and many of the new students this year will have chosen to pursue higher degree work in science at the University of New South Wales.

For graduate students the link with an individual school and discipline is even closer, but each of you should feel that the general resources of the Board and faculties associated with it, are very much at your disposal. Remember that science is always an adventure and that science is fun. We wish you every success and sincerely hope that your student years as valued members of our community will be stimulating, happy and rewarding.

C E Sutherland
Dean
Faculty of Science and Technology

Calendar of Dates

The academic year is divided into two sessions, each containing 14 weeks for teaching. Between the two sessions there is a break of approximately six weeks, which includes a one-week study period, two weeks for examinations, and three weeks recess. There is also a short recess of one week within each session.

Session 1 commences on the Monday nearest 1 March.

Faculties other than Medicine, AGSM and University College, ADFA

	1998	1999
Session 1		
(14 weeks)	2 March to 9 April 20 April to 12 June	1 March to 1 April 12 April to 11 June
Mid-session recess	10 April to 19 April	2 April to 11 April
Study period	13 June to 18 June	12 June to 17 June
Examinations	19 June to 7 July	18 June to 6 July
Mid-year recess	8 July to 26 July	7 July to 25 July
Session 2		
(14 weeks)	27 July to 25 September 6 October to 6 November	26 July to 24 September 5 October to 5 November
Mid-session recess	26 September to 5 October	25 September to 4 October
Study period	7 November to 12 November	6 November to 11 November
Examinations	13 November to 1 December	12 November to 30 November

Important dates for 1998

January 1998

Th 1 New Year's Day – Public Holiday
M 12 Medicine IV – Term 1 begins
Th 15 Medicine V – Term 1 begins
M 26 Australia Day – Public Holiday

February 1998

M 9 AGSM EMBA GMQ and GDM programs –
Session 1 begins
M 23 Medicine VI – Term 2 begins
AGSM MBA Program – Year 1 classes –
Term 1 begins

March 1998

M 2 Session 1 begins – for Faculties other than
Medicine and AGSM
ADFA – Session 1 begins
AGSM MBA program – Year 2 classes –
Term 1 begins
F 13 Last day applications are accepted from students
to enrol in Session 1 or whole year subjects
Su 15 Medicine IV – Term 1 ends
M 16 Medicine IV – Term 2 begins
Su 22 Medicine V – Term 1 ends
M 30 Medicine V – Term 2 begins
T 31 Last day for students to discontinue without failure
subjects which extend over Session 1 only
HECS Census Date for Session 1

April 1998

Th 9	Medicine VI – Term 2 ends
F 10	Medicine VI – Recess begins Mid session recess begins – for Faculties other than Medicine, AGSM and ADFA Good Friday – Public Holiday
S 11	Easter Saturday
Su 12	Easter Sunday
M 13	Easter Monday
Su 19	Medicine VI – Recess ends Mid-session recess ends – for Faculties other than Medicine, AGSM and ADFA
M 20	Medicine VI – Term 3 begins
S 25	Anzac Day – Public Holiday
Su 26	Medicine IV – Term 2 ends
M 27	Medicine IV – Recess begins

May 1998

S 2	ADFA – Mid-session recess begins
Su 3	Medicine IV – Recess ends
M 4	Medicine IV – Term 3 begins
F 8	AGSM MBA program – all classes – Term 1 ends
M 11	AGSM MBA program – all classes – Examinations begin
T 12	Publication of provisional timetable for June examinations
F 15	AGSM MBA program – all classes – Examinations end
Su 17	ADFA – Mid-session recess ends
M 18	AGSM EMBA GDM programs – Session 1 ends
S 23	AGSM EMBA GDM program – Examination
M 25	AGSM EMBA GMQ program – Session 1 ends
S 30	AGSM EMBA GMQ – Examination
Su 31	Medicine V – Term 2 ends Medicine VI – Term 3 ends

June 1998

M 1	Medicine VI – Term 4 begins AGSM MBA program – all classes – Term 2 begins
T 2	Publication of timetable for June examinations
M 8	Queen's Birthday – Public Holiday
T 9	Medicine V – Term 3 begins
F 12	Session 1 ends – for Faculties other than Medicine, AGSM and ADFA
S 13	Study period begins – for Faculties other than Medicine, AGSM and ADFA
Su 14	Medicine IV – Term 3 ends
M 15	Medicine IV – Term 4 begins
Th 18	Study period ends – for Faculties other than Medicine, AGSM and ADFA
F 19	Examinations begin – for Faculties other than Medicine, AGSM and ADFA ADFA – Session 1 ends
M 22	ADFA – Examinations begin

July 1998

S 4	ADFA – Examinations end
Su 5	ADFA – Mid year recess begins
T 7	Examinations end – for Faculties other than Medicine, AGSM and ADFA
W 8	Mid-year recess begins – for Faculties other than Medicine, AGSM and ADFA
M 13	AGSM EMBA GMQ and GDM programs – Session 2 begins
Su 19	ADFA – Mid-year recess ends
M 20	ADFA – Session 2 begins
F 24	Medicine VI – Term 4 ends
S 25	Medicine VI – Recess begins
Su 26	Mid-year recess ends – for Faculties other than Medicine, AGSM and ADFA
M 27	Session 2 begins – for Faculties other than Medicine, AGSM and ADFA

August 1998

Su 2	Medicine VI – Recess ends
M 3	Medicine VI – Term 5 begins
F 7	Last day applications are accepted from students to enrol in Session 2 subjects. Last day for students to discontinue without failure subjects which extend over the whole academic year. AGSM MBA program – all classes – Term 2 ends
Su 9	Medicine IV – Term 4 ends Medicine V – Term 3 ends
M 10	Medicine IV – Recess begins AGSM MBA program – all classes – Examinations begin
F 14	AGSM MBA program – all classes – Examinations end
Su 16	Medicine IV – Recess ends
M 17	Medicine IV – Term 5 begins Medicine V – Term 4 begins
M 31	Last day for students to discontinue without failure subjects which extend over Session 2 only HECS Census Date for Session 2 AGSM MBA program – all classes – Term 3 begins

September 1998

S 5	Courses and Careers Day
Su 13	Medicine VI – Term 5 ends
M 14	Medicine VI – Term 6 begins
F 25	Closing date for applications to the Universities Admission Centre
S 26	Mid-session recess begins – for Faculties other than Medicine, AGSM and ADFA ADFA – Mid-session recess begins
Su 27	Medicine IV – Term 5 ends
M 28	Medicine IV – Term 6 begins

October 1998

M 5	Labour Day – Public Holiday Mid-session recess ends – for Faculties other than Medicine, AGSM and ADFA ADFA – Mid-session recess ends
T 6	Publication of provisional timetable for the November examinations
W 14	Last day for students to advise of examination clashes
Su 18	Medicine V – Term 4 ends
M 19	AGSM EMBA GDM program – Session 2 ends
F 23	ADFA – Session 2 ends
S 24	AGSM EMBA GDM program – Examination
Su 25	Medicine VI – Term 6 ends
M 26	AGSM EMBA GMQ program – Session 2 ends ADFA – Examinations begin
T 27	Publication of timetable for November examinations
S 31	AGSM EMBA GMQ program – Examination

November 1998

F 6	Session 2 ends – for Faculties other than Medicine, AGSM and ADFA AGSM MBA program – all classes – Term 3 ends
S 7	Study period begins – for Faculties other than Medicine, AGSM and ADFA
Su 8	Medicine IV – Term 6 ends
M 9	AGSM MBA program – all classes – Examinations begin
Th 12	Study period ends – for Faculties other than Medicine, AGSM and ADFA
F 13	Examinations begin – for Faculties other than Medicine, AGSM and ADFA ADFA – Examinations end AGSM MBA program – all classes – Examinations end

December 1998

T 1	Examinations end – for Faculties other than Medicine, AGSM and ADFA
F 25	Christmas Day – Public Holiday
S 26	Boxing Day – Public Holiday

Board of Studies in Science and Mathematics

The Board of Studies in Science and Mathematics is a coordinating body for science courses, and its staff includes all members of the Faculty of Life Sciences and the Faculty of Science and Technology, and some members of specific schools in other faculties contributing to the Science and Mathematics Courses: Philosophy, Science and Technology Studies (Arts and Social Sciences); Accounting, Economics, Information Systems (Commerce and Economics); Electrical Engineering, Computer Science and Engineering, Chemical Engineering and Industrial Chemistry, Mechanical and Manufacturing Engineering, Geomatic Engineering (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine).

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Associate Dean

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Faculty of Life Sciences

Comprises Schools of Applied Bioscience (encompassing the Departments of Biotechnology and Food Science and Technology), Biochemistry and Molecular Genetics, Biological Science, Microbiology and Immunology, and Psychology.

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Richard Taylor, PhD *Nott.*

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Patrick Thomas McMillan, BSc DipEd *Syd.*

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John Tann, BAppSc *Melb.*

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Technical Officers

Gary Keenan, BSc *Macq.*

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Dave Ryan

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Doris Bock

Sahar Behman
Ranji Balalla
Barbara Ellis

Workshop Foreman

Eddie Lyon

Laboratory Craftsmen

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Ken Jackson
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John Kelvin Webb, BSc *Sur.*, PhD *Camb.*

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JR Smith, BSc *Syd.*, PhD *UNSW*, MAIP

Lecturer

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John Roberts, BSc *N.E.*, PhD *W.A.*

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Derecke Palmer, MSc *Syd.*

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Research Associate

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Department of Safety Science

Professor of Safety Engineering and Head of Department

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 Ronald Rosen, MSc *N.Z.*, PhD *UNSW*, CPhys, FInstP, FAIP, FIPSM, FARPS, MACPSEM

**Conjoint appointment with the Faculty of Medicine.*

Centre for Advanced Numerical Computation in Engineering and Science

(in association with the Faculty of Engineering)

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Yaping Shao, DiplMet *Bonn*, PhD *Flin.*

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Shenglin Di, MEngSc PhD *Nanjing*

Administrative Officers

Karen Hahn
 Jennifer Hartley

UNESCO Centre for Membrane Science and Technology

(in association with the Faculty of Engineering)

Professor and Director (Biophysics)

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 John Robert Smith, BSc *Syd.*, PhD *UNSW*, MAIP

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Alan Walker, BSc Qld., PhD Tas., FAA

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 Galina Kaseko, MD *Mos.*
 Tohsak Lee Mahaworasilpa, BSc *Mah*, MSc PhD *UNSW*

Director (Chemical Engineering)

Professor A G Fane

Centre for Remote Sensing and Geographic Information Systems

(in association with the Faculty of Engineering)

Director and Professor

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UNSW Groundwater Centre

(in association with the Faculty of Engineering)

Director

Dr J Jankowski

Senior Lecturer

Richard Ian Acworth, BSc *Leeds*, MSc PhD *Birm.*, FGS

Handbook Guide

The information in this handbook is set out as follows:

1. Faculty Information

2. Undergraduate Study

This contains:

- Courses: Science and Advanced Science
- Information on how to structure your course
- Program outlines
- Specific, Professional and Combined courses: *followed by program outlines of these courses*
- Subject descriptions: *this section includes HSC requirements, prerequisites, corequisites, exclusions and other notes*

3. Postgraduate Study

This contains:

- Courses and Programs: *followed by course outlines*
- Subject descriptions: *this section includes prerequisites, corequisites, exclusions and other notes*
- Conditions for the Award of Degrees

4. Scholarships and Prizes

Information Key

The following key provides a guide to abbreviations used in this book:

CP	credit points
F	full year (Session 1 plus Session 2)
HPW	hours per week
L	lecture
P/T	part-time
S1	Session 1
S2	Session 2
SS	single Session, but which Session taught is not known at time of publication
T	tutorial/laboratory
WKS	weeks of duration
X	external

Prefixes

The identifying alphabetical prefixes for each organisational unit offering subjects to students in the Board of Studies in Science and Mathematics follow.

Prefix	Organisational Unit	Faculty/Board
ACCT	School of Accounting	Commerce and Economics
ANAT	School of Anatomy	Medicine
BIOC	School of Biochemistry and Molecular Genetics	Life Sciences
BIOS	School of Biological Science	Life Sciences
BIOM	Centre for Biomedical Engineering	Engineering
BIOT	Department of Biotechnology	Life Sciences
BSSM	Board of Studies in Science and Mathematics	
CEIC	School of Chemical Engineering and Industrial Chemistry	Engineering
CHEM	School of Chemistry	Science and Technology
CIVL	School of Civil Engineering	Engineering
CMED	School of Community Medicine	Medicine
COMP	School of Computer Science and Engineering	Engineering
ECOH	Department of Economic History	Commerce and Economics
ECON	School of Economics, Departments of Economics and Econometrics	Commerce and Economics
ELEC	School of Electrical Engineering	Engineering
ENVS	Environmental Studies	Life Sciences
FINS	School of Banking and Finance	Commerce and Economics
GENS	Centre for Liberal and General Studies	
GEOG	School of Geography	Science and Technology
GEOL	Department of Applied Geology	Science and Technology
INFS	School of Information Systems	Commerce and Economics
JAPN	Asian Studies Unit	Commerce and Economics
LAWS	School of Law	Law
LEGT	Department of Legal Studies and Taxation	Commerce and Economics
MANF	School of Mechanical and Manufacturing Engineering	Engineering
MATH	School of Mathematics	Science and Technology
MATS	School of Materials Science and Engineering	Science and Technology
MDCN	School of Medicine	Medicine
MECH	School of Mechanical and Manufacturing Engineering	Engineering
MICR	School of Microbiology and Immunology	Life Sciences
MSCI	Centre for Marine and Coastal Studies	Science and Technology
OCEA	Oceanography (Mathematics)	Science and Technology
OPTM	School of Optometry	Science and Technology
PATH	School of Pathology	Medicine
PHIL	School of Philosophy	Arts and Social Sciences
PHPH	School of Physiology and Pharmacology	Medicine
PHYS	School of Physics	Science and Technology
POLY	Department of Polymer Science	Science and Technology
PSCY	School of Psychiatry	Medicine
PSYC	School of Psychology	Life Sciences
REMO	Centre for Remote Sensing	Engineering
SAFE	Department of Safety Science	Science and Technology
SCTS\	School of Science and Technology Studies	
HPST		Arts and Social Sciences
WOOL	Department of Wool and Animal Science	Science and Technology

Faculty Information

Science courses take advantage of a wide range of science and technology based subjects available across the University.

The Board of Studies in Science and Mathematics administers these courses and is therefore responsible for the undergraduate studies of students specialising in disciplines associated with the faculties of Life Sciences and of Science along with several schools from other faculties.

Board of Studies in Science and Mathematics

The Science Courses are administered by the Board of Studies in Science and Mathematics which includes all members of the Faculty of Life Sciences and the Faculty of Science and Technology and some members of specific Schools in other faculties contributing to the Science and Mathematics Course, Education, Science and Technology Studies, Philosophy (Arts); Accounting, Economics, Information Systems (Commerce); : Chemical Engineering and Industrial Chemistry, Electrical Engineering, Computer Science and Engineering, Mechanical and Manufacturing Engineering, Geomatic Engineering (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine)

The Dean is Professor C Sutherland who is also the Dean of the Faculty of Science and Technology.

The Presiding Member is Associate Professor G Russell.

The Associate Dean is Dr K Moon.

The Administrative Officer is Mr P Buist.

Some People Who Can Help You

If after reading this handbook you still have problems which concern the administration of the science course, consult the staff of the Board of Studies in Science and Mathematics Office (The Undercroft, Electrical Engineering Building, map reference G18).

If you require academic advice regarding particular programs or subjects consult the appropriate staff member for each program of study or subject, as listed later in this handbook.

Enrolment Procedures

New students will receive enrolment information with their offer of a place in a Science or Advanced Science course. All students re-enrolling in 1998 should obtain a copy of the leaflet *Re-Enrolling 1998: Procedures and Fees for Science Courses*. This is available from the Course Administration Office and the Admissions Office. *All quotas are assessed on the basis of applications made at the time of preliminary enrolment. Students enrolling in graduate courses should contact the Postgraduate Section.

The subject timetable for the Science and Mathematics Course and the Advanced Science Courses is available in late October/early November from the Science and Mathematics Course Office, The Undercroft, Electrical Engineering Building. All re-enrolling students should collect one of these timetables along with a preliminary enrolment form (SM98). The preliminary enrolment form is to be completed and returned to the Science and Mathematics Office by late December.

Students not lodging a completed enrolment form before the first day of Session 1 have no guarantee that a place is available in the subjects offered in that year. This is particularly important for subjects where laboratory space is limited. Students should be aware that some subjects may require a field trip which may involve personal costs to the student. Consult individual subject authorities for details.

** It should be noted that quotas apply to certain subjects and programs, as indicated in the relevant programs or subject descriptions.*

General Education Program

UNSW requires that all undergraduate students undertake a structured program in General Education as an integral part of studies for their degree. The University believes that a general education complements the more specialised learning undertaken in a student's chosen field of study and contributes to the flexibility which graduates are increasingly required to demonstrate. Employers repeatedly point to the complex nature of the modern work environment and advise that they highly value graduates with the skills provided by a broad general education, as well as the specialised knowledge provided in more narrowly defined degree programs. As well, over many years graduates of this University have reported that they greatly valued their General Education studies, which are found to be relevant to both career and personal development.

The General Education Program at UNSW intends to broaden students' understanding of the environment in which they live and work and to enhance their skills of critical analysis.

Objectives of the General Education Program

The following objectives were approved by the Council of the University in December 1994.

1. To provide a learning environment in which students acquire, develop, and deploy skills of rational thought and critical analysis.
2. To enable students to evaluate arguments and information.
3. To empower students to systematically challenge received traditions of knowledge, beliefs and values.
4. To enable students to acquire skills and competencies, including written and spoken communication skills.
5. To ensure that students examine the purposes and consequences of their education and experience at University, and to foster acceptance of professional and ethical action and the social responsibility of graduates.

6. To foster among students the competence and the confidence to contribute creatively and responsibly to the development of their society.
7. To provide structured opportunities for students from disparate disciplines to co-operatively interact within a learning situation.
8. To provide opportunities for students to explore discipline and paradigm bases other than those of their professional or major disciplinary specialisation through non-specialist subjects offered in those other areas.
9. To provide an environment in which students are able to experience the benefits of moving beyond the knowledge boundaries of a single discipline and explore cross- and interdisciplinary connections.
10. To provide a learning environment and teaching methodology in which students can bring the approaches of a number of disciplines to bear on a complex problem or issue.

General Education requirements

The basic General Education requirements are the same for students in all courses:

- Four (4) session length subjects carrying 7.5 credit points each or their equivalent in combinations of session length and year long subjects
- An additional fifty-six (56) hours of study which fosters acceptance of professional and ethical action and social responsibility. This fifty-six hours of study may be distributed throughout the course, or exist as a separate subject, depending on the course.

Because the objectives of General Education require students to explore discipline and paradigm bases other than those of their professional or major disciplinary specialisation, all students are *excluded from counting subjects toward the fulfilment of the General Education requirement, which are similar in content or approach to subjects required in their course.*

Each Faculty has responsibility for deciding what subjects are *not* able to be counted towards the General Education requirement for their students. In most cases, this means that subjects offered by the Faculty in which a student is enrolled, or subjects which are a required part of a course even though offered by another Faculty, are *not* able to be counted toward the General Education requirement. Students may also only count a maximum of 15 Credit Points (56 hours) of General Education Subjects from a single Faculty

Students should consult the General Education Handbook for detailed information about what subjects may and may not be taken to fulfil the General Education requirements for each course offered by the Faculty. The General Education Handbook is freely available from all Faculty Offices.

Additional information for undergraduate students who first enrolled before 1996

Transitional arrangements

It is intended that no student will be disadvantaged by the change to the new General Education Program. The old Program had specific requirements to complete four session length subjects (or their equivalent) in designated categories A and B. The new General Education Program does not categorise subjects in the same way.

As a result, students who enrolled prior to 1996 will be given full credit for any General Education subjects completed up to the end of Session two 1995.

From the summer session of 1995-96, students will be required to satisfy the unfilled portion of their General Education requirement under the terms of the new Program.

The exemption of General Education requirements for some double or combined degree programs will continue to apply for students who enrolled in these exempt courses prior to 1996.

General Information

While this Handbook has been specially designed as a detailed source of reference in all matters related to both the Faculty of Life Sciences, and the Faculty of Science and Technology, the University's *Student Guide* is intended to provide general information on some important rules and procedures, and introduces students to many of the services available to them. The *Guide*, which puts the Faculties into perspective within the University as a whole, is issued free of charge to all enrolled students. For other details about some aspects of the University and its activities students might need to consult the *University Calendar*.

Computing at UNSW

The Division of Information Services (DIS) encompasses information technology and the University Library at UNSW.

Specific University information which is frequently updated is available on the World Wide Web (WWW) in the UNSW home page at <http://www.unsw.edu.au> which has an index to its contents which includes URLs <http://www.ascu.unsw.edu.au> and <http://www.misu.unsw.edu.au>. You can access this information from your workstation and in any computing laboratory with access to WWW through Mosaic or Netscape.

The information provided on the WWW includes more details about DIS information technology units such as points of contact for particular areas of responsibility and services provided.

The Faculty of Science and Technology manages a number of computer laboratories, equipped with X-terminals, Macintoshes and PCs. They are used for teaching purposes, and are linked via the campus-wide optical fibre network which supports TCP/IP, IPX and Appletalk protocols, and also provides access to AARNET. The Faculty also supports some specialised computing facilities for research purposes, together with the Faculty of Engineering. These include a cluster of seven HP735 workstations, managed by CANCES (the Centre for Advanced Numerical Computation in Engineering and Science), and a 32-node Thinking Machines CM5 parallel supercomputer, operated by the Sydney Regional Centre for Parallel Computing. The latter machine is shortly to be replaced by a 16-processor Silicon Graphics Power Challenge system.

The School of Chemistry has Macintosh computers and laser printers used by staff and students. A colour inkjet printer has been purchased for the production of posters and conference presentations. Postgraduate students in the School also have email addresses and access to Internet software such as World Wide Web browsers.

The School of Mathematics maintains a Computer Centre for staff and student use. The School makes extensive use of computing in its teaching, research and administration. Information about the School and its computing facilities is available on the World Wide Web at <http://solution.maths.unsw.edu.au>.

The School of Optometry has a mixed platform network of personal computers, predominantly Macintosh, with communal laser printers. The production of high quality 35 mm slides for presentations is available through a Lasergraphics slide printer. There is also access to a range of colour printers. Experimental research is supported through dedicated low-end workstations (both Mac and PC). The School Clinic is serviced by an on-line scheduling and job-tracking database system (PC) with accounting and patient information capability – with provision for modem ordering of appliances.

The School of Physics has its own general purpose DEC station 5000 computer which is heavily used by staff and students. This has recently been supplemented by a dual-processor

DEC Alphaserver 2000 4/233 workstation for intensive numerical computations. A VisLab facility is also located within the School, with several Silicon Graphics machines intended for visualisation and graphics applications. These systems can be accessed either via 36 X-terminals attached to the Ethernet, or from individual PCs. Individual research groups also possess their own dedicated workstations for specialised use. Finally, there are about 80 Macintosh and IBM-compatible PCs distributed around the School.

Library Information

Faculty of Life Sciences Library Facilities

Although any of the university libraries may meet specific needs, the staff and students of the Faculty of Life Sciences is served mainly by the Biomedical Library.

The Biomedical Library

The Biomedical Library provides library services for staff and students from the Faculties of Medicine and Life Sciences, the Schools of Applied Bioscience, Health Services Management, Fibre Science and Technology, Food Science and Technology and the Department of Safety Science.

The Biomedical Library is located on Levels 2, 3 and 4 of the Mathews Building Annexe and is connected to the other Special Libraries via a link through Level 3 of the Library Building. Professional staff are available at the Information Desk on Level 2 to provide reference services and to assist in the use of the catalogues. Instructional classes in the use of the library and specific subject material can be arranged through the Information Desk. Serials in the Biomedical Library are shelved in alphabetical order by title and carry the prefix MB or MBQ. Details about Biomedical Library books, serials and audiovisual material can be found in the Library Catalogue.

In addition, the Biomedical Library offers the following services: literature searches; on-site and remote access to a wide range of bibliographic databases; and a document supply service for external and remote students.

Biomedical Librarian: Jill Denholm

Faculty of Science and Technology Library Facilities

Although any of the university libraries may meet specific needs, the staff and students of the Faculty of Science and Technology are served mainly by the Physical Sciences Library.

The Physical Sciences Library

The Physical Sciences Library, located on levels 5, 6 and 7 of the Library Building, provides information for students and staff from the Faculties of Science, Engineering, the Built Environment and Applied Science.

During the academic year, the Library is open from 8.00 to 10.00 Monday to Thursday, 8.00 to 6.00 on Friday and 12.00 to 5.00 Saturday and Sunday. During vacations, Library hours of opening will vary.

Staff assisted service is available after 10.00am including help with catalogue, CD-Roms, interlibrary loans, maps and online searching. An information skills program is in place with emphasis on developing basic information access and management skills for first years and advanced skills for final year and postgraduate students.

The Library's catalogue and selected CD-Rom databases are available over the Campus Wide Network.

Physical Sciences Librarian: Rhonda Langford

Undergraduate Study

Science and Mathematics Courses

– course codes 3970; 3978; 3979

Advanced Science Courses

– course codes 3973; 3976; 3985; 3986; 3990

Overview of Courses

The main aims of the Science and Mathematics courses may be summarised as providing opportunities for students to prepare themselves for careers in research, technology, science, mathematics and education, or areas of management or public policy which involve the use of science or mathematics.

The Science and Mathematics Courses (**3970; 3978; 3979**) lead to the award of the degree of Bachelor of Science (BSc) at pass level on the completion of a three stage program, taking three years of full-time study.

The Advanced Science Courses (**3973; 3976; 3985; 3990**) lead to the award of Bachelor of Science (BSc) on the completion of a four stage program, at honours or pass level (level of award and honours is based on academic performance), taking four years of full-time study. Depending on their program of study, students in their fourth year undertake either a research honours program or a program of coursework and research.

The time specified (three or four years) is the **minimum** time required for completion of each course. Students may complete course requirements over a longer period of time or as part-time candidates. Students contemplating part-time study should note that with few exceptions classes are offered in the day only. This applies even at first year level and means that it is not possible to complete studies by evening classes alone.

Both the Science and Mathematics and the Advanced Science courses are controlled by the Board of Studies in Science and Mathematics (BSSM).

Admission

For admission requirements for Science and Mathematics courses see the appropriate entry in the current UAC Handbook.

Applicants for admission to Science and Mathematics courses should note that a number of new UAC entry codes have been introduced which correspond to specific courses and programs of study. UAC entry codes for Science courses are:

429000 Science and Mathematics

This is applicable to study in a wide range of science and mathematics areas in course 3970 as indicated in the programs outlined on pages 40-42.

429019 Computer Science

This is applicable specifically to a major in Computer Science in course 3978 as outlined on pages 48-49.

429024 Information Systems

This is applicable specifically to a major in Information Systems in course 3979 as outlined on page 56.

429010 Advanced Science (Chemical, Mathematical, and Physical Sciences)

This is applicable to study in areas of mathematics, chemistry and physics in course 3985 as outlined in the program descriptions commencing on page 43, and in course 3973 as outlined in the Medical Physics program on page 63.

429009 Advanced Science (Life Sciences)

This is applicable to study in areas of biological, biomedical and behavioural sciences in course 3990 as outlined in the program descriptions commencing on page 43.

429008 Advanced Science (Environmental Science)

This is applicable to study in environmental science in course 3976 as outlined in programs 6861 – 6869 commencing on page 50.

See Table 2 below for details of programs available within these courses for each UAC admission code.

The number of places available each year in the Advanced Science courses is limited, and this is reflected in a higher TER cut-off for these courses.

Course Design

Programs

A feature of the design of both the Science and Mathematics and Advanced Science courses is the requirement that all students enrol in and complete requirements for a specified **program**. Programs are designed to link subjects in such a way that a coherent pattern of study is achieved in a specific discipline or specialisation. Each program is identified by its own code (eg 1200 Psychology). A wide choice of programs, designed to meet specific aims and objectives, is available. Most programs are identified with a particular School or discipline (eg Anatomy, Chemistry) but some are multidisciplinary (eg Mathematics of Management). Some programs are only available in the Advanced Science courses. See Table 2 below for details.

Students are required to fulfil all of the requirements of their particular program as specified in the handbook in the year in which they first enrolled.

Each program has a four-digit identifying number. Programs are set out in stages – Stage 1, 2, 3 and 4 (Stage 4 is for Advanced Science programs only). While a number of programs are available in both the Science and Mathematics and Advanced Science courses, some are only available as 3 stage programs in the Science and Mathematics course and lead to the award of degree of Bachelor of Science at pass level only. See Table 2 and the program outlines (commencing on page below) for details.

Subjects

Typically, each program requires study of a number of prescribed subjects and elective subjects at specified stages or levels to ensure a sound basis in the discipline. Each subject available within courses offered by the BSSM is assigned a level, which corresponds to the defined stages for each program. There are limits on the number of Level I subjects that can be studied in a program (see **Course Requirements and Rules** below). Students are not normally allowed to enrol in subjects at a given level before reaching the corresponding stage of the course. Levels are:

Level I	Stage 1
Level II	Stage 2
Level II/III	Stage 2 or 3
Level III	Stage 3 (also Stage 4 in some Advanced Science programs)
Level IV	Stage 4 (or Honours year) – Advanced Science only

Course Objectives

Programs in the Science and Mathematics Course and the Advanced Science Courses have been designed for students to:

1. develop and sustain an interest in and knowledge of Science and Mathematics.
2. develop a working knowledge of scientific methods of investigation and a favourable attitude towards them.
3. encourage curiosity and creative imagination and an appreciation of the role of speculation in the selection and solution of problems, the construction of hypotheses, and the design of experiments.
4. develop an appreciation of scientific criteria and a concern for objectivity and precision.
5. develop confidence and skill in formulating problems and in treating both qualitative and quantitative data.
6. develop the ability and disposition to think logically, to communicate clearly by written and oral means, and to read critically and with understanding.
7. develop the habit of seeking and recognizing relationships between phenomena, principles, theories, conceptual frameworks and problems.
8. promote understanding of the significance of science, technology, economics and social factors in modern society, and of the contributions they can make in improving material conditions and in widening their imaginative horizons and their understanding of the universe.
9. provide opportunities for the development of students' motivations and social maturity, and an awareness of their capabilities in relation to a choice of career which will be fruitful to themselves and to society.

Course Assessment

Students' assessment results are submitted by subject authorities for final review by the Board of Studies in Science and Mathematics Assessment Committee at the end of each assessment period. The Committee has the authority to exercise some latitude in determining final grades for the science subjects or their equivalent in the light of the overall performance of a student in those subjects for single session and whole year subjects.

If a student's overall performance in the science subjects or their equivalent is rated as:
 good, i.e. if the average in those subjects is 55.0 or higher;
 reasonable, i.e. if the average in those subjects is 50.0 or higher and less than 55.0;
 poor, i.e. if the average in those subjects is less than 50.0,

then

- for a mark of 49 a PC (pass conceded) can be awarded for a reasonable or good performance;
- for a mark of 48 a PC can be awarded for a good performance and a PT (pass terminating) can be awarded for a reasonable performance;
- for a mark of 47 a PT can be awarded for a good performance.

Students with a poor performance may be awarded concessional passes only on the basis of one subject for each subject passed with the equivalent or greater Credit Point value. These can only be 49PC or 48PT.

Where results are available for one subject only in a particular session a PC may be awarded if the mark in that subject is 49, or a PT may be awarded for a mark of 48.

Course Requirements and Rules

Science and Mathematics Courses (3970; 3978; 3979)

– pass course (3 years)

Program Requirement

1. Students must select and be enrolled in one of the approved programs of study – see Table 2 below for details of programs available. All programs consist of a total of 345 Credit Points specified as combinations or sequences of Level I, II, II/III or III subjects, and include prescribed and elective subjects.

Students must complete not less than 120 nor more than 150 Credit Points of Level I subjects and a minimum of 60 Credit Points of Level III subjects. All students must complete 30 Level I Credit Points of Mathematics as specified for individual programs.

Subject Requirement

2. Students must complete subjects with a total value of 345 Credit Points plus General Education. Each subject available in Science programs has a Credit Point value (usually 15 but ranging from 7.5 to 60) based on the number of hours taught and the mode of study.

Students wishing to take subjects additional to those required for the award should be aware that the relevant subjects will attract an additional fee, payable up-front, as voluntary subjects.

General Education Requirement

3. The University requires all students to complete a coherent sequence of General Education subjects. The General Education Program is an integral part of the Science and Mathematics course and gives students the opportunity to address some of the key questions they will face as individuals, citizens and professionals.

Students in the Science and Mathematics course must complete General Education subjects totalling 112 hours. See Table 1 – for a description of General Education subject categories.

Prerequisites, Corequisites and Excluded Subjects

4. Where a choice of subjects is available in a program students must take care to satisfy prerequisites and corequisites. A prerequisite is a subject which must be completed prior to enrolment in the subject for which it is prescribed. A corequisite subject is one which must either be completed successfully before, or studied concurrently with, the subject for which it is prescribed. An excluded subject is one which cannot be counted towards the degree qualification together with the subject which excludes it.

Credit Transfer

5. In addition to University rules governing admission with credit for previous studies or attainments, the following provisions apply for the BSSM.

Students admitted to the Science and Mathematics course may be granted credit by the BSSM for previous studies and attainments provided that:

5.1. where students transfer from another tertiary institution, they shall not in general be granted credit in the Science and Mathematics course superior to that attained at the other institution.

5.2. Students admitted to the Science and Mathematics course who hold a completed or partly completed degree or another award, may be given credit for previous studies and attainments, but in order to qualify for the award of the BSc will be required as a minimum to complete subjects equivalent to the requirements for Stage 3 of the course.

Study Load

6. Students may not undertake a study load of more than 60 Credit Points in any session. This can be exceeded only in exceptional circumstances by students with an excellent academic record and requires the permission of the Associate Dean. Students with external commitments – such as part-time employment – in excess of ten hours per week, should take fewer subjects each session. External commitments will not be taken into consideration in relation to such matters as extensions of time for submission of written work or failure to attend examinations (which may, for some subjects, be scheduled on Saturday mornings). Students who do not make satisfactory progress may be required to show cause why they should be allowed to continue in the course or may be given a restricted program (see **7. Progression and Exclusion** below).

Progression and Exclusion

7. Students whose performance is unsatisfactory in the course will be asked to show cause at the end of the academic year why they should remain in their course of study. Any student who fails a subject twice, or is deemed to be making unsatisfactory progress, will be required to show cause.

Unsatisfactory progress may include:

- failure in 50% or more of subjects attempted in an academic year;
- failing to pass subjects totalling at 60 Credit Points in one year;
- failing to complete 120 Credit Points of level I subjects in the first two years of study.

Students required to show cause will be informed by the Registrar in writing. Students who apply to show cause will be assessed in accordance with the University's procedures. Failure to show cause can result in exclusion from a subject or the course. Also see the section on progression and exclusion ('Restrictions on Students Re-enrolling') in the **Student Guide**.

Program and Subject Quotas

8. Quotas are imposed on some programs and subjects (usually because of class size constraints related to space). Where quotas are imposed, students' eligibility to enrol will be assessed on academic merit or on the basis of the requirements of the program of study in which the student is enrolled.

Graduation and majors

9. In order to graduate, students must satisfy requirements for the award by passing all the subjects specified for their program. Students who complete requirements will be awarded the degree of Bachelor of Science at pass level with a major in the area of specialisation (usually indicated by the program name). The award will appear on the testamur as:

Bachelor of Science in (name of program)

Transferring Programs

10. Students must apply in writing to transfer between programs within the Science and Mathematics courses. Applications are assessed on academic performance and approval is subject to places being available in the nominated program. Applications must be lodged with submission of the pre-enrolment form to the BSSM office by the end of December in the preceding academic year.

Transfers to Advanced Science Courses

11. Students who wish to proceed to Stage 4 in a given program must apply to the Admission and Re-enrolment Committee of the BSSM to transfer to Advanced Science courses. Applications are only accepted for transfer at the end of each year of study. Applicants must lodge the **Internal Course Transfer form** with the Student Centre **by 30 November** in the preceding academic year.

Transfer should not be considered automatic. Applications are assessed on academic performance and approval is subject to places being available in the nominated program of the relevant Course. Students must satisfy all prerequisites for the subjects specified in the Advanced Science program, and have completed the relevant sequence of subjects for the proposed program.

Students seeking to enrol in a Stage 4 honours program should seek the guidance of the appropriate Head of School at an early stage of study to ensure that the program being followed is best suited for the pursuit of an honours program.

Advanced Science Courses (3973 – 3979; 3985; 3986; 3990) – Honours/advanced Course (4 years)

Program Requirement

1. Students must select and be enrolled in one of the approved programs of study – see Table 2 for details of programs available. All Advanced Science programs are four stage programs consisting of a total of 360 Credit Points to be completed in Stages 1-3, specified as combinations or sequences of Level I, II, II/III or III subjects, and including prescribed and elective subjects. Most programs indicate a total of 345 Credit Points for Stages 1-3, since this is the requirement for course 3970. Students in Advanced Science courses must take a total of 360 Credit Points in stages 1-3. Except where otherwise indicated, the additional subject/s would normally be an elective subject/s. Students also undertake a Stage 4 sequence consisting of either:

- in designated programs, an advanced structured coursework sequence of Level IV subjects, or level IV subjects in combination with other subjects (where specified), totalling at least 120 Credit Points, and which may include a short research program;

or

- an approved honours program offered by one or more schools, consisting of a significant research program in combination with other requirements specified for individual programs.

See Table 2 below for available Advanced Science programs. Study sequences for Stage 4 are given in the details of programs commencing on page .

All Advanced Science students also complete General Education subjects see Table 1 below.

Students must not complete more than 120 Credit Points of Level I subjects except where specified in particular programs, students must also complete a minimum of 60 Credit Points of Level III subjects. All students must complete 30 Level I Credit Points Mathematics as specified for individual programs.

Subject Requirement

2. Students must complete subjects specified for their program.

Each subject available in Science programs has a Credit Point value (usually 15 but ranging from 7.5 to 60) based on the number of hours taught and the mode of study.

Students wishing to take subjects additional to those required for the award should be aware that the relevant subjects will attract an additional fee, payable up-front, as voluntary subjects.

General Education Requirement

3. The University requires all students to complete a coherent sequence of General Education subjects. The General Education Program is an integral part of the Advanced Science course and gives students the opportunity to address some of the key questions they will face as individuals, citizens and professionals.

Prerequisites, Corequisites and Excluded Subjects

4. Where a choice of subjects is available in a program students must take care to satisfy prerequisites and corequisites. A prerequisite is a subject which must be completed prior to enrolment in the subject for which it is prescribed. A corequisite subject is one which must either be completed successfully before, or studied concurrently with, the subject for which it is prescribed. An excluded subject is one which cannot be counted towards the degree qualification together with the subject which excludes it.

Credit Transfer

5. In addition to University rules governing admission with credit for previous studies or attainments, the following provisions apply for the Advanced Science courses.

Students admitted to an Advanced Science course may be granted credit by the BSSM for previous studies and attainments provided that:

5.1. where students transfer from another tertiary institution, they shall not in general be granted credit in the Advanced Science course superior to that attained at the other institution.

5.2 Students admitted to the Advanced Science course who hold a completed or part completed degree or another award (including the BSc at pass level at UNSW), may be given credit for previous studies and attainments, but in order to qualify for the award of the BSc in an Advanced Science course, will be required as a minimum to complete a sequence of subjects or other requirements equivalent to the requirements for Stage 4 of the course.

Study Load

6. Students may not undertake a study load of more than 60 Credit Points per session in Stages 1 – 3. This can be exceeded only in exceptional circumstances by students with an excellent academic record and requires the permission of the Associate Dean. Students with external commitments – such as part-time employment – in excess of ten hours per week, should take fewer subjects per session. External commitments will not be taken into consideration in relation to such matters as extensions of time for submission of written work or failure to attend examinations (which may, for some subjects, be scheduled on Saturday mornings). Students who do not make satisfactory progress may be required to show cause why they should be allowed to continue in the course or may be given a restricted program (see 7. **Progression and Exclusion** below).

Progression and Exclusion

7. Students whose performance is unsatisfactory will be asked to show cause at the end of the academic year why they should remain in their course of study. Any student who fails a subject twice, or is deemed to be making unsatisfactory progress, will be required to show cause.

Unsatisfactory progress may include:

- failure to achieve an average of 65 or higher in subjects attempted in an academic year;
- failing to pass Subjects totalling at least 60 Credit Points in one year;
- failing to complete the requirements for stage one of the course in the first two years of study.

Students required to show cause will be informed by the Registrar in writing. Students who apply to show cause will be assessed in accordance with the University's procedures. Failure to show cause can result in exclusion from a subject, the course, or transfer to the Science and Mathematics course (3970), provided that the progression requirements in that course have been met. Also see the section on progression and exclusion ('Restrictions on Students Re-enrolling') in the **Student Guide**.

Accelerated Progression

8. There is provision for exceptionally talented students to take higher level subjects in Stage 1. Contact the BSSM Course office for details.

Program and Subject Quotas

9. Quotas are imposed on some programs and subjects (usually because of class size constraints related to space). Where quotas are imposed, students' eligibility to enrol will be assessed on academic merit or on the basis of the requirements of the program of study in which the student is enrolled.

Graduation and Majors

10. In order to graduate, students must satisfy requirements for the award by passing all subjects and the requirements specified for their program. Students who complete requirements will be awarded the degree of Bachelor of Science at honours or pass level with a major in the area of specialisation (usually indicated by the program name, except that for some honours candidates the name of the honours specialisation will appear).

Students who successfully complete Stage 4 of their program will be considered for the award of Honours. The following scale generally applies to Honours gradings and, depending on the structure of the program, is based either on performance in the Stage 4 program or on performance over the whole 4 stages of the course:

Honours Class 1	mark or weighted average of 85 or greater
Honours Class 2 Division 1	mark or weighted average from 75 to 84
Honours Class 2 Division 2	mark or weighted average from 65 to 74
Honours Class 3 or Pass	mark or weighted average below 65

The award will appear on the testamur as:

Bachelor of Science
(with Honours)
 in (name of program or specialisation)

Transferring Programs

12. Students must apply in writing to transfer between programs within each of the Advanced Science courses. Applications are assessed on academic performance and approval is subject to places being available in the nominated program. Applications must be lodged with submission of the pre-enrolment form to the BSSM office by the end of December in the preceding academic year.

Transferring within the Advanced Science Courses

13. Applications for transfer from one Advanced Science Course to another are only accepted at the end of each year of study. Applicants must lodge the **Internal Course Transfer form** with the Student Centre **by 30 November** in the preceding academic year.

Transfer should not be considered automatic. Applications are assessed on academic performance and approval is subject to places being available in the nominated program of the Course. Students must satisfy all prerequisites for the subjects specified in the program of the particular Advanced Science course, and have completed the relevant sequence of subjects for the proposed program.

Progression to Stage 4 Honours Program

14. Progression to Stage 4 is subject to academic performance. Students seeking to enrol in a Stage 4 honours program are required to have the approval of the Head of School and normally will be required:

- to have completed the requirements for Stages 1, 2 and 3 of the specific program and to have satisfied prerequisite requirements as specified in that program. All General Education also must be completed;
- to have attained an average of 65 or higher in each stage of the program.

Students should also seek the guidance of the appropriate Head of School at an early stage of study to ensure that the program being followed is best suited to lead to the Year 4 honours program;

In addition, admission to a particular Stage 4 program is subject to appropriate research and supervision resources being available. Quotas may be imposed for entry in any year, in which case admission will be determined on academic merit.

Students who do not attain an average of 65 or higher in Stage 3 of their program are normally required to transfer to the Science and Mathematics course (3970) and take out the BSc award at pass level.

Transfers to the Science and Mathematics Course

15. Students enrolled in the Advanced Science courses (course code 3972-3; 3976; 3985; 3990) who wish to take out the BSc award at pass level and without proceeding to Stage 4 are required to transfer to the Science and Mathematics course (3970). Applications to transfer should be lodged with the BSSM Office no later than the HECS census date in the session in which the student expects to satisfy requirements. Students applying after that date may not be able to graduate in the next round of graduation ceremonies. The application should state the course 3970 Program in which the student wishes to be enrolled. Students must satisfy all requirements for the designated Science and Mathematics course (3970) program in order to qualify for the award of the BSc. Further information regarding the transfer from Advanced Science course programs to programs that are available in the Science and Mathematics course is available through the BSSM Office.

Range of Programs

The range of programs has been designed to cover a wide variety of needs in the various areas of science and mathematics. The programs are listed below in Table 2 in alphabetical order with the program number. The appropriate course code(s) for each program is indicated. Details of the programs follow in the next section.

Table 2

Programs available for Science and Advanced Science Courses:

Subject Area	Program Number	Available in Course(s)	UAC Entry Code(s)
ANATOMY	7000	3970, 3990	429000, 429009
BIOCHEMISTRY	4100	3970, 3990	429000, 429009
BIOLOGICAL SCIENCE	1700	3970, 3990	429000, 429009
BIOLOGICAL SCIENCES Holding Program	6817	3970, 3990	429000, 429009
BIOMEDICAL SCIENCE	7370	3990	429009
BIOTECHNOLOGY	4200	3970, 3990	429000, 429009
BOTANY	1743	3970, 3990	429000, 429009
CHEMISTRY	0200	3970, 3985	429000, 429010
COMPUTER SCIENCE	0600	3978	429019
EARTH AND ENVIRONMENTAL SCIENCE	2527	3970, 3985	429000, 429010
ECOLOGY			
Geographical Ecology	6851	3970, 3990	429000, 429009
Mathematical Ecology	6852	3970, 3990	429000, 429009
Biological Ecology	6853	3970, 3990	429000, 429009
ENGINEERING PHYSICS	0176	3985	429010
ENVIRONMENTAL SCIENCES			
Biological Environments (Terrestrial)	6861	3976	429008
Biological Environments (Marine)	6862	3976	429008
Biological Environments (Microbial)	6863	3976	429008
Environmental Chemistry	6864	3976	429008
Earth Environments (Geography)	6865	3976	429008
Earth Environments (Geology)	6866	3976	429008
Environmental Mathematics (Fluid Dynamics)	6867	3976	429008
Environmental Mathematics (Statistics)	6868	3976	429008
Environmental Mathematics (Population Dynamics)	6869	3976	429008
GENETICS	6840	3970, 3990	429000, 429009
GEOGRAPHY	2700	3970, 3985	429000, 429010
GEOGRAPHY AND COMPUTER SCIENCE	2706	3978	429019

Subject Area	Program Number	Available in Course(s)	UAC Entry Code(s)
GEOLOGY	2500	3970, 3985	429000, 429010
GEOCHEMISTRY	0225	3985	429010
GEOFYSICS	2503	3985	429010
INFORMATION SYSTEMS	1400	3979	429024
MARINE SCIENCE			
Physical Oceanography	6831	3970, 3990	429000, 429009
Biological Oceanography	6832	3970, 3990	429000, 429009
Earth Science Oceanography	6833	3970, 3990	429000, 429009
Environmental Chemistry	6834	3970, 3990	429000, 429009
MATERIALS SCIENCE	0400	3985	429010
MATHEMATICS	1000	3970, 3985	429000, 429010
MATHEMATICS WITH COMPUTING	1061	3970, 3985	429000, 429010
MATHEMATICS OF MANAGEMENT	6810	3985	429010
MATHEMATICS WITH COMPUTER SCIENCE	1060	3985	429010
MEDICAL CHEMISTRY	0210	3985	429010
MEDICAL PHYSICS	0141	3973	429010
MICROBIOLOGY AND IMMUNOLOGY	4400	3970,3990	429000, 429009
MOLECULAR GENETICS	4110	3970, 3990	429000, 429009
NEUROSCIENCE A	7312	3990	429009
NEUROSCIENCE B	1273	3990	429009
PHARMACOLOGY	7301	3970, 3990	429000, 429009
PHILOSOPHY	5200	3970, 3985	429000, 429010
PHILOSOPHY OF SCIENCE	5262	3970, 3985	429000, 429010
PHILOSOPHY AND COMPUTER SCIENCE	5206	3985	429010
PHYSICS	0100	3985	429010
PHYSICS	0110	3970	429000
PHYSICS WITH COMPUTER SCIENCE	0161	3970, 3985	429000, 429010
PHYSICS AND ASTRONOMY	0121	3985	429010
PHYSIOLOGY	7300	3970, 3990	429000, 429009
PSYCHOLOGY	1200	3970	429000
PSYCHOLOGY AND COMPUTER SCIENCE	1206	3978	429019
PHILOSOPHY	5262	3970, 3985	429000, 429010
PHILOSOPHY AND COMPUTER SCIENCE	5206	3985	429019
PURE AND APPLIED CHEMISTRY	0205	3985	429010
SAFETY SCIENCE			
Safety Science	8000	3970	429000
Safety Science with Physics	8100	3985	429010
Safety Science with Chemistry	8200	3985	429010
Safety Science with Psychology	8400	3985	429010

Subject Area	Program Number	Available in Course(s)	UAC Entry Code(s)
SCIENCE AND TECHNOLOGY STUDIES	6200	3970, 3985	429000, 429010
STATISTICS	1006	3970, 3985	429000, 429010
STATISTICS WITH COMPUTER SCIENCE	1066	3985	429010
STATISTICS WITH COMPUTING	1067	3970, 3985	429000, 429010
ZOOLOGY	1745	3970, 3990	429000, 429009

Note: Entry to Anatomy and Neuroscience programs is at stage 2. Quotas apply and entry will be based solely on academic achievement. Students planning to enrol in these programs should enrol for stage 1 in the Biological Sciences Holding Program (6817).

Certain of the programs listed above are appropriate for Courses **3930** (Science/Arts), **3931** (Advanced Science/Arts), **3611** (Science/Aeronautical Engineering), **3661** (Science/Industrial Engineering), **3681** (Science/Mechanical Engineering), **3701** (Science/Naval Architecture), **3725** (Science/Electrical Engineering), **3730** (Science/Civil Engineering), **3820** (Science/Medicine), **3951** (Science/Optomety), **3996** (Science/Commerce), **4075** (Science/Education), **4770** (Science/Law). Students in these courses should consult their course advisor for details.

Details of Programs

ANATOMY

Anatomy is the study of the structure of the human body. The word 'anatomy' is derived from the Greek, and means 'cutting up' or 'dissection'. However, anatomy today is much more than the descriptive study of the dissected body although dissected specimens are still used for research and instruction. The subject anatomy now embraces separate but strongly related disciplines. Gross Anatomy deals with the description of form, arrangement and function of the bones, joints, muscles and internal organs, together with their blood and nerve supply. Histology deals with the microscopic structure of tissues and cells. Embryology is concerned with the normal development of the embryo and fetus from conception to birth and with the mechanisms of development and malformations. Neuroanatomy deals with the internal organisation and functions of the brain and spinal cord. In all courses in Anatomy, strong emphasis is given to the functional significance of the structures in health and in disease.

Entry to Anatomy programs is only possible at Level II or above, and academic merit is the sole criterion. All students are advised to enrol initially in the Biological Sciences holding program 6817 and apply to meet the quota at the time of pre-enrolment for Level II.

A major in anatomy may suitably be combined with elective subjects from Biochemistry, Physiology or Psychology.

7000

Anatomy

Stage 1

BIOS1101, BIOS1201

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

Elective subjects totalling 60 Credit Points

Stage 2

ANAT2111, ANAT2211

Elective subjects totalling 75 or 90 Credit Points

Recommended: Biological Science, Biochemistry, Physiology, Psychology

One 56 hour or two 28 hour General Education subjects

Stage 3

Level III Anatomy subjects totalling at least 60 Credit Points (may include PATH3202)

One 56 hour or two 28 hour General Education subjects

Further subjects to give a total of 345 Credit Points

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

ANAT4000, or ANAT4509 and further subjects totalling 60 Credit Points (normally including ANAT4510)

approved by the Head of School

BIOCHEMISTRY AND MOLECULAR GENETICS

Biochemistry and Molecular Genetics are closely-related disciplines which are concerned with understanding all life processes at the fundamental level of molecular structure, function and interaction. Historically, the diverse techniques of chemistry, physiology and genetics were used to study different aspects of biological systems, but now these diverse approaches have become more integrated, with Biochemistry and Molecular Genetics providing a knowledge base and a broad range of specialised techniques which are relevant to all biology. Because the major impact of these disciplines is largely at the molecular level, the School of Biochemistry and Molecular Genetics offers programs of study which are ideal for students whose interests are in understanding and appreciating biological processes at the molecular rather than the descriptive level. Integration of these molecular approaches at the cellular, tissue, organ and whole organism level is an increasingly important part of Biochemistry and Molecular Genetics. These disciplines also represent fundamental components of medical science and are playing an increasingly important role in many aspects of modern medicine, including an input into the Human Genome Project and the exciting prospects for gene therapy. The Biochemistry Program of Study (see Program 4100 below) provides opportunities to combine Biochemistry and Molecular Biology with other related discipline areas. The Molecular Genetics Program (see Program 4110) outlines a specialised course covering the latest advances in Molecular Biology and Genetics. Alternatively the Genetics Program (see Program 6840) may be used to integrate molecular studies with other aspects of genetics within a more broadly-based genetics course.

4100 Biochemistry

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points
(Recommended: Physics, Computing)

Stage 2

BIOC2101* and BIOC2201*
BIOS2011 or MICR2201
BIOS2021
CHEM2021 or CHEM2041
Elective subjects totalling 30 or 45 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3

BIOC3111 or BIOC3121 or both BIOC3111 and BIOC3121
Further subjects from Level III Biochemistry to make a total of at least 60 Credit Points from Level III Biochemistry subjects (one of these subjects may be replaced by a Level III subject offered by the Department of Biotechnology or Immunology subjects offered by the School of Microbiology and Immunology) Further elective subjects to give a total of 345 Credit Points

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete 120 Credit Points from Level III subjects

Stage 4 (Honours)

BIOC4318/ BIOC4618

**BIOC2181 and BIOC2291 (both at credit level or above) may be substituted for BIOC2101 and BIOC2201 respectively as prerequisites for level III biochemistry subjects, and in program 4100, at the discretion of the Head of School.*

BIOLOGICAL SCIENCE

Biological Science encompasses all aspects of plants and animals including their relationship to each other and to the environment. The programs leading to the award of a science degree in Biological Science include cell biology, plant and animal physiology, ecology, genetics, taxonomy, marine biology, entomology and evolutionary studies. These studies are particularly relevant in the fields of agriculture, forestry, wildlife management, conservation and related environmental sciences. Specialisations are available in both Botany and Zoology as well as Ecology (6853), Marine Science-Biological Oceanography (6832) and Environmental Science (6861).*

* Environmental Science (6861) is available only to Advanced Science students.

6817 Biological Sciences Holding Programs

Level I is identical in most programs in the Biological Sciences. Students who wish to study the biological sciences, but at Level I are unsure of the field in which they wish to specialise, are advised to enrol in this program and then transfer to the appropriate program in Level II.

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

1700 Biological Science

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101 and BIOC2201 or
BIOC2181 and BIOC2291
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and
A further 30 Credit Points from BIOS2031, BIOS2061 or
MICR2201
One 56 hour or two 28 hour General Education subjects

Stage 3

Subjects Totalling 75 Credit Points Chosen from
BIOS3011, BIOS3021, BIOS3031, BIOS3041,
BIOS3051, BIOS3061, BIOS3071, BIOS3081,
BIOS3091, BIOS3101, BIOS3111, BIOS3121,
BIOS3131, BIOS3151, MICR3071
Elective subjects totalling 30 Credit Points (which may be also from this list)
One 56 hour or two 28 hour General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 105 Credit Points

Stage 4 (Honours)

BIOS4018 (F/T), BIOS4014 (P/T)

BIOMEDICAL SCIENCE

Entry to this program is limited to Advanced Science students at Level II and academic merit is the sole criterion. Students planning this are advised to enrol initially in the Biological Sciences Holding Program (6817) and apply to meet the Anatomy quota at the time of pre-enrolment for Level II.

7370

Biomedical Science (Advanced Science only)

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021

One of the following subjects:
PHYS1002 or PHYS1022 or COMP1001 and 1 subject totalling 15 Credit Points
or PSYC1001 AND PSYC1011

Before Stage 2 commences students should consult with Schools contributing to their proposed program about appropriate subjects and levels required for any particular honours Stage subject

Stage 2

Students must take subjects totalling 120 Credit points, with at least 75 Credit Points from:

ANAT2111, ANAT2211, BIOC2101 and BIOC2201, or BIOC2181 and BIOC2291***, BIOS2021, MICR2201 or MICR2011*, PHPH2112**

One 56 hour or two 28 hour General Education subjects
Elective subjects should be preferably in subject areas such as Mathematics, Physics, Chemistry, Computing or Psychology (see comments for Stage 4).

Stage 3

After consultation with appropriate Schools about the proposed Honours Stage subject students would ordinarily choose subjects totalling 120 Credit Points (to complete a total of 360 Credit Points) from the following subject areas: Physiology and Pharmacology**, Anatomy, Biochemistry, Microbiology and Immunology, Pathology, Biotechnology
One 56 hour or two 28 hour General Education subjects

Stage 4

Subject to satisfactory progress through the course (normally a credit average in subjects completed) students may proceed to the honours Stage. Before commencement of Level II students should consult an appropriate school (see the lists under Stage 3) about the subjects required for a particular honours program. Students should also note general guidelines for Advanced Science Stage 4.

**Students wishing to enrol in MICR2011 are required to attend a one day bridging course in the mid-Stage break.*

*** Student numbers in Physiology and Pharmacology subjects are limited. If quotas are exceeded, entry will be based on academic merit.*

**** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

BIOTECHNOLOGY

Biotechnology can be defined as the use of various biological processes to make products and perform services. The essential feature of biotechnology therefore is the use of biological processes based on living cells and biochemical macro-molecules such as proteins, DNA and RNA in a rapidly-expanding range of activities of benefit to mankind. As such, biotechnology makes practical use of the recent scientific advances in areas such as molecular genetics.

The development of recombinant-DNA (r-DNA) technology has resulted in the ability to produce large quantities of any potentially useful product. Based on this technology, a new generation of biopharmaceuticals, including hormones, vaccines, anti-hypertensive and anti-inflammatory agents, are being developed which have the potential to revolutionise medicine. Microorganisms and viruses are being modified for use in controlling plant and animal diseases and pests. Diagnostic kits are being developed for use in forensic science and in product identification and quality control. In addition, genetic improvements in agriculture, plants and animals are becoming a reality, as is the control of inborn genetic disorders in humans.

Some aspects of biotechnology are traditional, having been used for centuries. The first makers of bread, cheese and fermented beverages over six thousand years ago were applying biotechnological principles in processing these goods. Without understanding the processes they were operating, they were in fact making use of catalysis mediated by microbial cells. Such processes are still in use today and scientific advances now allow for much greater control of the processes with resultant improvements in quality and economics of production. The number of such biological processes has expanded also and enzymes and/or microorganisms are used in the production of a wide range of fermented foods (such as cheese, wine, beer, soy sauce, sauerkraut, yoghurt, tofu, kefir) and in the production of flavouring, colouring and sweetening agents.

Bioprocesses are also used in the extraction of minerals from low grade ores, and modified and novel bioprocesses are being developed for the treatment of waste and degradation of recalcitrant molecules, an area of vital importance in our increasingly polluted planet.

The future for expansion in all the above areas is immense, and an ability to cope with the problems of the 21st century will be heavily dependent on these advances.

The Department of Biotechnology offers undergraduate training through the Board of Studies in Science and Mathematics (BSc Course) and in the BE Course in Bioprocess Engineering and the BSc course in Biotechnology. The BSc Course is three Stages for a Pass degree during which the student can study aspects of biotechnology in combination with another major in a relevant discipline, preferably biochemistry, microbiology or chemistry. The fourth Honours Stage of the BSc Course includes further formal training in biotechnology as well as an extensive research project. The BE Degree Course in Bioprocess Engineering is four Stages full-time and has been designed to meet the requirements for membership of the Institution of Engineers, Australia. The BSc degree course in Biotechnology is four Stages full-time. Honours gradings can be achieved in both courses.

4200 Biotechnology

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101, BIOC2201
BIOS2011, BIOS2021
MICR2201
Elective subjects totalling 30 Credit Points
(Recommended: Chemistry, Microbiology)
All General Education subjects (112 hours)

Stage 3

BIOT3011, BIOT3021, BIOT3031, BIOT3061
Additional elective subjects to give a total of 345 Credit Points.

Students proposing to undertake Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points.

Stage 4 (Honours)

BIOT4073 (F/T) BIOT4083 (P/T)

BOTANY

Plant Science is concerned with all aspects of the structure and function of both green and non-green plants and the relationship of plants to their environments. The major aspects of the subject range from plant anatomy and morphology through physiology, ecology, taxonomy, palynology, phycology and mycology. The applications of these studies are particularly relevant in the fields of agriculture, horticulture, forestry, marine studies, conservation and related environmental sciences.

1743 Botany

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101, BIOC2201 or BIOC2181 and BIOC2291
BIOS2011, BIOS2021, BIOS2041, BIOS2051
Elective subjects totalling 30 Credit Points to make a total of 120
One 56 hour or two 28 hour General Education subjects

Stage 3

Subjects totalling 60 Credit Points from BIOS3071, BIOS3061, BIOS3091, BIOS3121, BIOS3151, MICR3071
Elective subjects totalling 45 Credit points (which may be also from this list)
Students with an interest in molecular aspects of plant science should choose at least two of BIOC3131, BIOC3271 or BIOC3281.
One 56 hour or two 28 hour General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 105 Credit Points

Stage 4 (Honours)

BIOS4028 (F/T), BIOS4024 (P/T)

CHEMISTRY

The programs in Chemistry are 0200 (Chemical Science); 0205 (Chemistry, for Advanced Science only); 0210 (Medical Chemistry, for Advanced Science only) and 0225 (Geological Chemistry, for Advanced Science only). All programs provide a basic scientific education and a professional training in the chemical sciences. Fundamental, applied, environmental and industrial aspects of chemistry are included.

0200 Chemical Science

Program 0200 combines chemistry with other disciplines such as physics, geology, biochemistry, mathematics, computer science, biotechnology, physiology and pharmacology. These programs with more than one field of specialisation result in a broadly based degree in the chemical sciences. For example: a combination of chemistry and biochemistry leads to further work in areas such as

toxicology and neurochemistry, a combination of Level III chemistry with mathematics or computing provides a valuable basis for the many applications of computers in chemistry; chemistry with physics or materials science allows entry into the rapidly developing fields of hitech materials.

Stage 1

CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PHYS1002 or PHYS1022
Elective subjects totalling 30 Credit Points

Stage 2*

CHEM2011, CHEM2021, CHEM2031, CHEM2041, CHEM2000
Elective subjects totalling 37.5 Credit Points (for students in course 3970) or 60 credit points (for students in course 3985)
General Education subjects (112 hours for students in course 3970 or 56 hours for students in course 3985)

Stage 3

Choose Level III Chemistry subjects totalling 60 credit points of which at least 45 are from:

CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose Elective subjects totalling 60 Credit Points
General Education subjects (56 hours for students in course 3985)

Students proposing to proceed to stage 4 (Honours) must complete stage 3 subjects totalling 120 Credit Points

Stage 4 (Honours)

CHEM4003**

**Students wishing to specialize in Chemistry with either Geology or Biotechnology may vary subjects with approval of the Board of Studies of Science and Mathematics*

***CHEM4003 is available in the Advanced Science course only. Students wishing to undertake an Honours Year must transfer to the appropriate course. Consult the School of Chemistry.*

0205

Chemistry (Advanced Science course 3985 only)

Program 0205 is designed for students who wish to specialise in the chemical sciences, and undertake the maximum number of chemistry subjects. It is designed to provide education and training in all contemporary fields of chemistry, and should be selected by students who wish to devote their studies at Stage III entirely to chemistry.

Stage 1

CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PHYS1002
Elective subjects totalling 30 Credit Points

Stage 2

CHEM2011, CHEM2021, CHEM2031, CHEM2041, CHEM2000
Elective subjects totalling 60 Credit points
(Recommended Biochemistry, Biotechnology, Computer Science, Geology, Mathematics, Physics, Physiology)
General Education subjects (56 hours)

Stage 3

CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose Elective Chemistry subjects totalling 60 Credit Points.
General Education subjects (56 hours)

Stage 4 (Honours)

CHEM4003

0210

Medical Chemistry (Advanced Science Course 3985 only)

This program combines a strong knowledge of synthetic and analytical chemistry and aspects of Biochemistry and Pharmacology. The program is designed to produce graduates whose background in both Chemistry and Biological areas are appropriate to the requirements of employers in Australia.

Stage 1

CHEM1101, CHEM1201
PHYS1002
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241
BIOS1101, BIOS1201

Stage 2

CHEM2011, CHEM2021, CHEM2031, CHEM2041, CHEM2000, PHPH2112*
BIOC2101 and BIOC2201
General Education subjects (56 hours)

Stage 3

CHEM3021, CHEM3041
PHPH3152*
BIOC3111 and BIOC3281
Choose additional subjects totalling 30 credit Points (15 CP's from Chemistry and 15 CP's in Biochemistry or Physiology and Pharmacology)
General Education subjects (56 hours)

Stage 4

CHEM4003 or PHPH4258/PHPH4264 or BIOC4318/4618

Joint supervision of honours projects between the School of Chemistry and the Schools of either Physiology and Pharmacology or Biochemistry are strongly encouraged.

**Student numbers in these subjects are limited. Entry to these subject will be based on academic merit.*

0225**Geological Chemistry (Advanced Science Course 3985 only)**

This program combines a knowledge of Chemistry, particularly Analytical Chemistry and Geochemical aspects of Applied Geology. The program produces graduates who have a broad background in both Chemistry and Geology.

Stage 1

CHEM1101, CHEM1201

PHYS1002

MATH1011 or MATH1131 or MATH1141

and MATH1021 or MATH1231 or MATH1241

GEOL1111, GEOL1211

Stage 2

CHEM2011, CHEM2021, CHEM2031, CHEM2041,

CHEM2000, GEOL2110, GEOL2131, GEOL2180,

GEOL2260, GEOL2200, GEOL2290, GEOL2220

General Education subjects (56 hours)

Stage 3

CHEM3021, CHEM3031, CHEM3041 and CHEM3141 or CHEM3311

GEOL3101, GEOL3280, plus 37.5 Credit Points of

Geology subjects from GEOL3110, GEOL3201,

GEOL3241, GEOL3250

General Education subjects (56 hours)

Stage 4 (Honours)

CHEM4003 (Program 0225)

Honours research projects co-supervised by members of the School of Chemistry and Department of Applied Geology are strongly encouraged.

General Comments

Chemistry is a fundamental science and strongly impinges on many areas of study. Where appropriate the School of Chemistry encourages joint areas of specialisation.

The following combinations should be considered:

- Chemistry/Biochemistry: programs 0200 and 4100 are mutually compatible;
- Chemistry/Computer Science: programs 0200 and 0600 are mutually compatible;
- Chemistry/Mathematics: programs 0200 and 1000 are mutually compatible;
- Chemistry/Physics: programs 0200 and 0100 are not mutually compatible but an appropriate program can be arranged by consultation with the Schools of Chemistry and Physics;
- Chemistry/Biotechnology: programs 0200 and 4200 are mutually compatible
- Chemistry/Physiology: programs 0200 and 7300 (strand 2: Pharmacology) are mutually compatible as a 360 credit point program.

Other combinations can be arranged by consultation initially with the School of Chemistry.

COMPUTER SCIENCE

Entry to this program is restricted to students who have been offered a place directly (UAC code 429019). Entry to later Stages is considered only in exceptional circumstances.

Computer Science involves the study of the design, construction and uses of computer systems. It is concerned with the representation of data and data structures in computer systems and the design of algorithms for automatic manipulation of this information by programming languages and machine systems. It is very much concerned with the design and development of hardware and software tools by which computer applications may be developed, but not so much with the applications themselves. It is, however, noted that noncomputing elements (such as human interface or psychological aspects) can often dictate the level of success of computing systems. At the University of New South Wales, particular emphasis is given to comprehension of the basic principles behind computing tools, operating systems, compilers and translators, and computer hardware.

Students in other programs may take some Level I and Level II Computer Science subjects. Level III studies in Computer Science are available in several combined programs. Appropriate disciplines are Physics (Program 0161); Mathematics (programs 1060 and 1066) Psychology (program 1206 (UAC entry code 429019)); Philosophy (program 5206 (UAC entry code 429019))

0600**Computer Science****Stage 1**

COMP1011**, COMP1021

MATH1131 or MATH1141

MATH1231 or MATH1241

MATH1081

Elective subjects totalling 45 Credit points*

Stage 2

COMP2011, COMP2021, COMP2031

Elective subjects totalling 75 Credit Points*

One 56 hour or two 28 hour General Education subjects

Stage 3

Level III Computer Science subjects totalling 60 Credit Points including at least 15 Credit Points from COMP3111, COMP3121, COMP3131 and at least 15 Credit Points from COMP3211, COMP3221, COMP3231, COMP3331

Further elective subjects to make a total of 105 Credit points for the year*

One 56 hour or two 28 hour General Education subjects
Students may not include Level III Computer Science subjects totalling more than 90 Credit Points

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

COMP4914

**Up to 120 Credit Points may be from subjects that are restricted to this program or subjects from the Faculty of Arts and Social Sciences subject to approval by the relevant subject authority. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104. Japanese and Korean are also available.*

*** Students who do not meet the prerequisite for COMP1011 must enrol in COMP1001 in session 1 and COMP1011 in session 2. COMP1001 is not included in the Credit Points for the course.*

2706

Geography and Computer Science (Course 3978 Only)

Stage 1

GEOG1601, GEOG1701
COMP1011**, COMP1021
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081

Elective subjects totalling 15 Credit points

Stage 2

GEOG2101, GEOG2811, GEOG3041
COMP2011, COMP2021, COMP2031
Level III Computer Science subjects totalling 15 Credit Points
Elective subjects totalling 15 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3

GEOG3122, GEOG3821
COMP3111, COMP3421
COMP3121 or COMP3511
Level III Geography subjects totalling 15 Credit Points
Level III Computer Science or Geography subjects totalling 15 Credit Points.
One 56 hour or two 28 hour General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

COMP4914 or GEOG4418

*** Students who do not meet the prerequisite for COMP1011 must enrol in COMP1001 in session 1 and COMP1011 in session 2. COMP1001 is not included in the Credit Points for the course.*

EARTH AND ENVIRONMENTAL SCIENCE

This program combines Geology and Geography giving an understanding of present geological processes and their relationships with the land surface. The effects on the natural processes of human activities, from industrial pressures to urban developments, are an integral part of the course. Community need for developments in a variety of environments and the vital role of environmental interdisciplinary safeguards have been among the main guidelines in the selection of subjects within the program.

2527

Earth and Environmental Science

Stage 1

CHEM1101, CHEM1201*
GEOG1601, GEOG1701
GEOL1111, GEOL1211
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021

**Students who have not undertaken chemistry at HSC level should take chemistry at the introductory level (CHEM1401 and CHEM1101) in year 1, and CHEM1201 in the summer session before commencing year 2.*

Stage 2

BIOS1101, BIOS1201
GEOG2811, GEOG3901, GEOG2721
GEOL2110, GEOL2120, GEOL2220, GEOL2290
One 56 hour or two 28 hour General Education subjects

Stage 3

GEOL2131, GEOL2231, GEOL3250, GEOL3280, GEOL6321
7.5 Credit Points from subjects under general education objective 5
Plus Level III subjects from Geology and/or Biology and/or Geography to give a total of 120 Credit points
One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours)

GEOL4313 or GEOG4414/GEOG4418 or GEOL4343
(GEOL4343 is offered over two years for part time students)

ECOLOGY

The Ecology programs allow students to specialise in selected areas of Ecology yet provide experience in a range of related cross disciplinary subjects, Biological Ecology (6853), Geographical Ecology (6851) and Mathematical Ecology (6852). Optional subjects allow students to match their interests and career aspirations. The selection of these subjects must be discussed with a Program adviser.

6851**Geographical Ecology****Stage 1**

BIOS1101, BIOS1201
 GEOG1601, GEOG1701
 MATH1131 or MATH1141 or MATH1011
 MATH1231 or MATH1241 or MATH1021
 Choose 1 of the strands:
 1. CHEM1101, CHEM1201
 2. GEOL1111, GEOL1211
 3. Elective subjects totalling 30 Credit Points

Stage 2

BIOS2011, BIOS2051 and BIOS2031 or BIOS2061
 BIOS2041 or GEOG2101
 GEOG2711, GEOG2811
 Subjects totalling at least 15 Credit Points from:
 BIOC2101, BIOS2021, BIOS2031, BIOS2061,
 GEOG2721, GEOG3901, GEOL3921, GEOL7223,
 GEOL6231,
 MICR2201, MICR2011
 One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3061, BIOS3071, BIOS3111
 GEOG3911, GEOG3761, GEOG3711
 subjects totalling At least 15 Credit Points from:
 BIOS3011, BIOS3031, BIOS3051,
 BIOS3081, BIOS3091, BIOS3121, BIOS3131,
 BIOS3151, GEOG2721, GEOG3721, GEOG3901,
 GEOG3032, MICR3071
 Further elective subjects (to be discussed with Program
 adviser) to give a total of 345 Credit Points
 One 56 hour or two 28 hour General Education subjects
 Students proposing to proceed to Stage 4 (Honours) must
 complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

BSSM4023 (F/T), BSSM4029 (P/T)

6852**Mathematical Ecology**

For details of this program please consult with School of
 Biological Science and the School of Mathematics.

6853**Biological Ecology****Stage 1**

BIOS1101, BIOS1201
 CHEM1101, CHEM1201

GEOG1601, GEOG1701
 MATH1131 or MATH1141 or MATH1011
 MATH1231 or MATH1241 or MATH1021

Stage 2

BIOC2181, BIOC2291
 BIOS2011, BIOS2021, BIOS2041, BIOS2051 and
 BIOS2031 or BIOS2061
 Subjects totalling 15 Credit Points from: BIOS2031,
 BIOS2061, GEOG2811, GEOG2711, GEOG2721,
 GEOG3911, MICR2011, MICR2201
 One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3061, BIOS3071, BIOS3111
 GEOG3711
 further Level III subjects totalling 30 Credit Points from:
 BIOS3011, BIOS3021, BIOS3031, BIOS3051,
 BIOS3081, BIOS3091, BIOS3121, BIOS3131,
 BIOS3151, GEOG2711, GEOG2721, GEOG3901,
 GEOG3911, GEOG3921, MICR3071
 Further elective subjects (to be discussed with Program
 adviser) to give a total of 345 Credit Points
 One 56 hour or two 28 hour General Education subjects
 Students proposing to proceed to Stage 4 (Honours)
 must complete Level III subjects totalling 90 Credit
 Points

Stage 4 (Honours)

BSSM4023 (F/T), BSSM4029 (P/T)

ENVIRONMENTAL SCIENCE

Environmental Science programs allow specialisation in a
 number of aspects: Biological Environments (Terrestrial,
 Marine, Microbial), Environmental Chemistry, Earth
 Environments (Geography, Geology), Environmental
 Mathematics (Fluid Dynamics, Statistics and Population
 Dynamics). All programs include 16 core subjects and
 electives as set out below.

Core subjects to be completed by all students in Course
 3976 are:

BIOS1101, BIOS3071
 CHEM1101, CHEM1201, CHEM3901
 ECON1107
 ENVS1011, ENVS2010, ENVS2020, ENVS2801
 GEOG1701, GEOG3911
 GEOL1111 or GEOL1211 or GEOL6231 or GEOL6321
 MATH1011 or MATH1131 or MATH1141
 MATH1021 or MATH1231 or MATH1241
 BIOS2041 or GEOG2101 or MATH2841 or MATH2301
 An ENVS honours project in Stage 4

**Students who have not undertaken chemistry at HSC level should
 take chemistry at the introductory level (CHEM1401 and CHEM1101)
 in year 1, and CHEM1201 in the summer session before commencing
 year 2.*

6861**Biological Environments (Terrestrial)
(Advanced Science only)****Stage 1**

BIOS1101, BIOS1201
 CHEM1101, CHEM1201*
 ENVS1011
 GEOG1701
 MATH1011 or MATH1131 or MATH1141
 MATH1021 or MATH1231 or MATH1241

Stage 2

BIOS2011, BIOS2041
 ECON1107
 ENVS2010, ENVS2020, ENVS2801
 GEOG2711
 GEOL1211 or GEOL6231
 subjects totalling 15 Credit Points from:
 BIOS2031, BIOS2051
 BIOS2061, GEOG2811, MSCI2001, MICR2201
 or other subjects approved by the program advisor
 One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071, BIOS3111
 CHEM3901
 GEOG3711, GEOG3911
 BIOS3061 or GEOG3761
 Further subjects for major sequence, or other subjects
 approved by the program advisor
 to complete core subjects and a total of at least 360
 Credit Points.
 One 56 hour or two 28 hour General Education subjects

Stage 4

ENVS4108/ENVS4109 (Full Stage honours thesis
 project) with permission of Program Adviser and Head of
 School or
 ENVS4118 (Combination of an honours thesis project
 and course work in Biological Science approved by
 Program Adviser) or
 BIOS4104 (Half Stage honours thesis project) and
 additional subjects approved by Program Adviser to
 make up full Stage
 General Education requirement

6862**Biological Environments (Marine)
(Advanced Science only)****Stage 1**

BIOS1101, BIOS1201
 CHEM1101, CHEM1201*
 ENVS1011

GEOG1701

MATH1011 or MATH1131 or MATH1141
 MATH1021 or MATH1231 or MATH1241

Stage 2

BIOS2011, BIOS2041
 ECON1107
 ENVS2010, ENVS2020, ENVS2801
 GEOL1111
 MSCI2001
 subjects totalling 15 Credit Points from BIOS2031,
 BIOS2051, BIOS2061, GEOG2811, MICR2011,
 MICR2201, or other subjects approved by the program
 advisor
 One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071, BIOS3081, BIOS3091, BIOS3111
 CHEM3901
 GEOG3911
 subjects totalling at least 15 Credit Points from:
 GEOG3711, GEOG3761,
 GEOL6231, GEOL6321, MSCI3001
 Further subjects for major sequence, or other subjects
 approved by the program advisor
 to complete core subjects and a total of at least 360
 Credit Points.
 One 56 hour or two 28 hour General Education subjects

Stage 4

ENVS4208/ENVS4209 (Full Stage honours thesis
 project) with permission of Program Adviser and Head of
 School or
 ENVS4218 (Combination of an honours thesis project
 and course work approved by Program Adviser) or
 ENVS4204 (Half Stage honours thesis project) and
 additional subjects approved by Program Adviser to
 make up full Stage
 General Education requirement

6863**Biological Environments (Microbial)
(Advanced Science only)****Stage 1**

BIOS1101, BIOS1201
 CHEM1101, CHEM1201*
 ENVS1011
 GEOG1701
 MATH1011 or MATH1131 or MATH1141
 MATH1021 or MATH1231 or MATH1241

Stage 2

BIOC2201
 BIOS2011
 ECON1107
 ENVS2010, ENVS2020, ENVS2801

MICR2011, MICR2201

subjects totalling 15 Credit Points from: BIOS2031, BIOS2041, BIOS2051, BIOS2061, GEOG2811, GEOL1111, GEOL1211, MSCI2001, or other subjects approved by the program advisor
One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071

CHEM3901

GEOG3911

MICR3021, MICR3071

subjects totalling 15 Credit Points from: BIOS2041, GEOG2711, GEOG3761

Further subjects for major sequence, or other subjects approved by the program advisor to complete core subjects and a total of at least 360 Credit Points.

One 56 hour or two 28 hour General Education subjects

Stage 4

ENVS4308/ENVS4309 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or

ENVS4318 (Combination of an honours thesis project and course work approved by Program Adviser) or ENVS4304 (Half Stage honours thesis project) and additional subjects approved by Program Adviser to make up full Stage

General Education requirement

6864

Environmental Chemistry (Advanced Science only)

Stage 1

BIOS1101

CHEM1101, CHEM1201*

ENVS1011

GEOG1701

GEOL1111

MATH1011 or MATH1131 or MATH1141

MATH1021 or MATH1231 or MATH1241

Stage 2

Any three of:

CHEM2011, CHEM2021, CHEM2031 CHEM2041
(Consult the School of Chemistry)

ECON1107

ENVS2010, ENVS2020, ENVS2801

PHYS1002

One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071

CHEM3901

Any three of:

CHEM3041, CHEM3221**, CHEM3231, CHEM3311
plus the remaining Stage 2 Chemistry subject
GEOG3911

statistics subjects totalling 15 Credit Points from
BIOS2041, GEOG2101, or MATH2841

Further subjects for major sequence, or other subjects approved by the program advisor to complete core subjects and a total of at least 360 Credit Points

One 56 hour or two 28 hour General Education subjects

*** The prerequisite of CHEM3021 for CHEM3221 is waived for 6864 students only.*

Stage 4

ENVS4418 (Combination of an honours thesis project and course work approved by Program Adviser) or with permission of Program Adviser and Head of School, ENVS4408/ENVS4409 (Full Stage honours thesis project), ENVS4404 (Half stage honours thesis project) and additional subjects approved by Program Adviser to make up full stage and General Education requirement.

6865

Earth Environments (Geography) (Advanced Science only)

Stage 1

CHEM1101, CHEM1201*

ENVS1011

GEOG1601, GEOG1701

GEOL1111 or GEOL1211

MATH1011 or MATH1131 or MATH1141

MATH1021 or MATH1231 or MATH1241

Stage 2

BIOS1101

ECON1107

ENVS2010, ENVS2020, ENVS2801

GEOG2101, GEOG2811, GEOG2721, GEOG3921

One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071

CHEM3901

GEOG3911, GEOG3711 or GEOG3761

Further subjects for major sequence, or other subjects approved by the program advisor to complete core subjects and a total of at least 360 Credit Points.

One 56 hour or two 28 hour General Education subjects

Stage 4

ENVS4508/ENVS4509 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or

ENVS4518 (Combination of an honours thesis project and course work approved by Program Adviser) or ENVS4504 (Half Stage honours thesis project) and additional subjects approved by Program Adviser to make up full Stage
General Education requirement

6866

Earth Environments (Geology) (Advanced Science only)

Stage 1

CHEM1101, CHEM1201*
ENVS1011
GEOG1701
GEOL1111, GEOL1211
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2

BIOS1101
ECON1107
ENVS2010, ENVS2020, ENVS2801
GEOL7223, GEOL7233
MSCI2001

Additional subjects to make a total of 120 Credit Points for the year

One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3071
CHEM3901
GEOG3911
GEOL6231, GEOL6321, GEOL7323, GEOL7333
subjects totalling 15 Credit Points from: GEOG2811, GEOG3032, GEOG3761, GEOL6221, or other subjects approved by the program advisor.
Further subjects for major sequence to complete core subjects and a total of at least 360 Credit Points.
One 56 hour or two 28 hour General Education subjects

Stage 4

ENVS4608/ENVS4609 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
ENVS4618 (Combination of an honours thesis project and course work approved by Program Adviser) or ENVS4604 (Half Stage honours thesis project) and additional subjects approved by Program Adviser to make up full Stage
General Education requirement

6867

Environmental Mathematics (fluid dynamics) (Advanced Science only)

For details of this program please consult with School of Biological Science and the School of Mathematics.

6868

Environmental Mathematics (statistics) (Advanced Science only)

For details of this program please consult with School of Biological Science and the School of Mathematics.

6869

Environmental Mathematics (population dynamics) (Advanced Science only)

For details of this program please consult with School of Biological Science and the School of Mathematics.

GENETICS

Genetics is covered in two programs: Program 6840 is broadly based and initially covers all aspects of Genetics. It allows students at Level III to maintain a broad range of interests including Molecular Genetics, Evolutionary and Population Genetics and Human Genetics or to concentrate on a particular field. Molecular Genetics (Program 4110) allows students to specialise in Molecular Biology and Genetics. In both programs students can also specialise in Biochemistry, Biological Science, Biotechnology or Microbiology/Immunology. Stage 4 (Honours) programs in Genetics are available in any of these schools.

6840

Genetics

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points
(Recommended: COMP1001)

Stage 2

BIOC2101, BIOC2201
 BIOS2011 or MICR2201
 BIOS2021

MATH2841 or BIOS2041

Elective subjects totalling 30 or 45 Credit points,
 (*Recommended:* BIOS2031, BIOS2051, BIOS2061,
 CHEM2021, COMP1001)

One 56 hour or two 28 hour General Education subjects

Stage 3

BIOC3291

Subjects totalling at least 45 Credit Points from:
 BIOC3121, BIOC3131, BIOC3141, BIOC3251,
 BIOC3281, BIOC3291, BIOT3031 or MICR3021, and
 further elective subjects to give a total of 345 Credit
 Points

(*Recommended:* BIOC3111, BIOS3071, BIOS3121,
 BIOS3141, BIOT3011, BIOT3061, MICR3011,
 MICR3041)

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must
 complete 7 Level III subjects

GEOGRAPHY

Geography is the scientific study of variations from place to place on the earth's surface. It provides an analytical framework for understanding and investigating many of society's pressing problems such as the use and management of scarce resources, the impact of environmental hazards on human activities, soil erosion and conservation, land use conflicts, and the spatial organisation of culture and economy.

The program 2700 includes physical and human Geography. Emphasis is on studies of the natural and built environment, as well as a grounding in basic analytical skills and techniques (e.g. statistical methods and computing, remote sensing and airphoto interpretation, geographical information systems, field and laboratory techniques) required for problem solving and application. Geography can be usefully combined with other sciences, especially Geology and Biological Science. The program is a generalist science degree in geography. Students who express a desire to pursue a more vocationally-oriented geography degree are able to transfer into the Bachelor of Science in Applied Geography (3010) at the end of their second year. Only those students who achieve a credit average in second year will be able to transfer.

2700**Geography****Stage 1**

Select at least two of:

GEOG1601, GEOG1701, GEOG1801
 MATH1131 or MATH1141 or MATH1011
 MATH1231 or MATH1241 or MATH1021

Elective subjects to make a total of 120 Credit Points for the year

Stage 2

GEOG2101

Geography subjects totalling 30 Credit Points

Elective subjects totalling 75 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 3

Level III Geography subjects totalling 60 Credit Points

Elective subjects totalling 60 Credit Points

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points and must have completed GEOG2101, GEOG2013 or GEOG3611

Stage 4 (Honours)

GEOG4418/GEOG4414

GEOLOGY (Including Geophysics and Geochemistry)

Geology is the study of the nature and evolution of our planet. It is concerned with the composition and modes of formation and deformation of the igneous, sedimentary and metamorphosed rocks and concentrations of minerals that comprise the earth's crust and interior. Geology enquires into the essential controls on the development and distribution of such rocks and minerals in space and geological time. Likewise it is concerned with the nature, distribution, and evolution of life forms through time. Applied geology is concerned with the use of geological knowledge in the location and extraction of mineral and energy deposits, and in engineering and environmental tasks, activities fundamental to society. Thus geology has a diverse, professional function as well as being a scientific discipline.

Geophysics employs sophisticated instrumentation in order to construct physical earth models and Geochemistry intergrates an understanding of the earth with advanced knowledge of chemistry and chemical investigation methods. Both are companion disciplines to Geology, with specialist career paths.

Program for Professional Geology

Most employers of professional geologists require completion of a four-stage program, including a major project component. This can be achieved either through the Applied Geology Course (Course 3000) or through program 2500 of the Science/Advanced Science Course. Specialist 4-stage programs are also available in Geophysics (2503) and Geochemistry (2504) through the Advanced Science Course.

Students wishing to enter the geological profession through program 2500 should follow the program for a double specialisation in Geology, and then proceed to a Stage 4 (Honours) program. This provides a balanced combination of fundamental and Applied Geology subjects, including advanced coursework as well as an independent field project in the Stage 4 component

Single Specialisations in Geology

Geology is a natural companion to other sciences, such as Chemistry (in Geochemistry program 2504), Physics (also see Geophysics Program 2503), Botany and Zoology (in Palaeontology), Biology and Geography. Program 2500, designed for a double specialisation in geology, also allows a single specialisation and students who wish to combine geology with another science subject should select the most appropriate components from the Geology Program 2500 in consultation with the Department of Applied Geology.

Geology in Marine Science

See Marine Science (Earth Science Oceanography) (6833).

2500

Geology (Double Specialisation)

Stage 1

CHEM1101, CHEM1201
 GEOL1111, GEOL1211
 MATH1131 or MATH1141 or MATH1011
 MATH1231 or MATH1241 or MATH1021
 and either
 BIOS1101 and BIOS1201* or
 GEOG1601, GEOG1701 or
 PHYS1002 or PHYS1022

** Students following a combination of Applied Geology with Botany and/or Zoology at Level I must take Biology subjects, BIOS1101, BIOS1201. At Level II they should take BIOS2031, BIOS2041, BIOS2051, BIOS2061 along with at least 45 Credit Points of level II Geology subjects. At Level III subjects totalling 45 Credit Points should be chosen from BIOS3101, BIOS3051, BIOS3071, BIOS3081, BIOS3091, BIOS3121 along with at least 60 Credit Points of level II/III or level III Geology subjects.*

Stage 2

GEOL2100, GEOL2110, GEOL2120, GEOL2131,
 GEOL2170, GEOL2180, GEOL2200, GEOL2220,
 GEOL2231, GEOL2250, GEOL2260, GEOL2290
 One 56 hour or two 28 hour General Education subjects

Stage 3

GEOL3101, GEOL3110, GEOL3120, GEOL3131,
 GEOL3170, GEOL3201, GEOL3231, GEOL3241,
 GEOL3250, GEOL3280
 7.5 Credit Points from subjects under General Education objective 5
 One 56 hour or two 28 hour General Education subjects
 Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points

Stage 4 (Honours)

GEOL4303(F/T) or GEOL4343(P/T)

2503

Geophysics (Advanced Science only)

Professional geophysicists work closely with geologists and, appropriately, studies of both disciplines are undertaken in the one Department. Fundamental and applied geophysics is taught to geology students in program 2500. Program 2503 is for students who intend to become professional geophysicists. Students should consult the Department of Applied Geology for program approval.

Stage 1

COMP1011
 GEOL1111, GEOL1211
 MATH1131 or MATH1141
 MATH1231 or MATH1241
 PHYS1002 and PHYS1601

Stage 2

COMP2811, COMP2011
 GEOL2231, GEOL2131, GEOL2120, GEOL2170
 MATH2011 or MATH2110 and MATH2610, MATH2120 or
 MATH2130, MATH2520 or MATH2620
 PHYS2601
 One 56 hour or two 28 hour General Education subjects

Stage 3

COMP3111 or COMP3421
 GEOL2260, GEOL3231
 MATH3101, MATH3150, PHYS2011, PHYS3620
 30 Credit Points chosen from: GEOL2290, GEOL3101,
 GEOL3170, GEOL3241, GEOL3250 or other subjects as
 approved by the program advisor
 7.5 Credit Points from subjects under General Education objective 5
 One 56 hour or two 28 hour General Education subjects
 Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points

Stage 4 (Honours)

GEOL4303 (F/T) or GEOL4343(P/T)

2504**Geochemistry (Advanced Science only)**

This program combines a knowledge of Chemistry particularly Analytical Chemistry and geochemical aspects of Geology. The program produces graduates who have a broad background in both Chemistry and Geology, for employment in areas such as the mineral, environmental studies or geochemical research.

For details of this program please consult with the Department of Applied Geology and the School of Chemistry.

INFORMATION SYSTEMS

Entry to this program is restricted to students who have been offered a place directly (UAC code 429024). There is a strict quota on entry to later Stages of this program.

Information Systems is concerned with information systems analysis and design, data management, computer processing, edp audit, management information systems and applied expert systems within business and government organisations. There is a growing maturity in the discipline as the underlying theory and associated principles become better understood and as advanced information processing techniques emerge. In many respects the development of the knowledge base which forms the discipline parallels developments in computing technology as new opportunities become apparent for the solution of information processing problems. Hence, information systems is concerned with the way in which computer systems are used within organisations – mainly business and government. There is a high degree of complementarity between Computer Science and Information Systems. The program is intended to develop conceptual and practical skills. After an introductory first Stage, students study systems design, database, communications and commercial programming in parallel with computer science, mathematics and management accounting subjects. In the honours Stage, well qualified students may specialise in advanced information systems and data management topics.

See also Course 3971

1400**Information Systems****Stage 1**

ACCT1501, ACCT1511

COMP1011, COMP1021

INFS1602, INFS1603

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

Stage 2

ECON1101

INFS2603, INFS2607, INFS2609

MATH2841 or MATH2801

Elective subjects totalling 45 Credit points

One 56 hour or two 28 hour General Education subjects

Stage 2 (Direct Stage 2 Entrants)*

ACCT1501, ACCT1511

COMP2811

INFS1602, INFS1603, INFS2603, INFS2607, INFS2609

One 56 hour or two 28 hour General Education subjects

** Students admitted at Level II must enrol in another science program for Stage 1. Transfer is based on academic performance at Level I. Students in this category are not required to complete ECON1101.*

Stage 3**

INFS3605, INFS3606, INFS3608

Elective subjects totalling 60 Credit Points including at least one at Level III

One 56 hour or two 28 hour General Education subjects

*** Stage 2 direct entry students must complete MATH2841 or MATH2801 in lieu of elective subjects totalling 15 Credit Points*

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

INFS4794

The General Education requirement is covered by components of compulsory subjects in the course.

MARINE SCIENCE

Marine Science programs allow specialisations in selected areas of marine science, yet also include adequate exposure to other pertinent disciplines.

All students must select one major sequence from: Physical Oceanography (6831) or Biological Oceanography (6832) or Earth Science Oceanography (6833) or Environmental Chemistry (6834). In addition, *two minor sequences* from the Physical, Biological, Earth Science, and Chemical minor sequences must be taken.

6831**Marine Science (Physical Oceanography)****Stage 1**

MATH1131 or MATH1141

MATH1231 or MATH1241

PHYS1002, PHYS1601

30 Credit Points from one of the strands:

1. BIOS1101, BIOS1201

2. CHEM1101, CHEM1201

3. GEOL1111, GEOL1211

MATH1081 or a further 15 Credit Points from the above strands

Stage 2

MATH2100, MATH2120, MATH2240, MATH2301,
MATH2520, MATH2200 or MATH2220
MSCI2001
PHYS2991

Continue the strand chosen in Stage 1:

1. BIOS2011 or BIOS2031 or BIOS2051 or BIOS2061 or
2. CHEM2011 or CHEM2021 or CHEM2031 or
- CHEM2041
3. GEOL6231

Additional elective subjects totaling 120 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 3

MATH3121, MATH3201, MATH3241, MATH3261
MSCI3001

Choose an additional 30 Credit Points from:

CHEM3021, CHEM3031, CHEM3041, BIOS3081,
BIOS3091, GEOL6321, MATH2160, MATH3101,
MATH3150, MATH3301, PHYS2810, PHYS3829

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours)

must complete 90 Credit Points of Level III subjects.

Stage 4 (Honours)

MSCI4003 F/T, MSCI4009 P/T

Subjects in waves, turbulence, ocean modelling, data
analysis and geophysical fluid mechanics are offered

6832**Marine Science (Biological Oceanography)****Stage 1**

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021 subjects totalling
30 Credit Points from 1 of the strands:
1. GEOL1111, GEOL1211
2. PHYS1002 or PHYS1022

Stage 2

BIOC2101
BIOS2031, BIOS2051
CHEM2011 or CHEM2041
MICR2201
MSCI2001
subjects totalling 15 Credit Points from the subjects
related to the strand chosen in Stage 1:

1. GEOL6231
 2. MATH2021 or MATH2801 or MATH2841
- An additional 15 Credit Points: BIOS2011, BIOS2021,
BIOS2041, BIOS2051, BIOS2061, to give a total of 120
for the Stage

One 56 hour or two 28 hour General Education subjects

Stage 3

BIOS3081, BIOS3091
MICR3071

Level III subjects totalling 30 Credit Points which may
include the subjects corresponding to the strand chosen
in Stages 1 and 2:

1. GEOL6321
2. MATH3021, MSCI3001

Elective subjects totalling 30 Credit Points

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must
complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

MSCI4003 F/T, MSCI4009 P/T

6833**Marine Science (Earth Science
Oceanography)****Stage 1**

GEOL1111, GEOL1211
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Subjects totalling 60 Credit Points of the strands:
1. BIOS1101, BIOS1201
2. CHEM1101, CHEM1201
3. PHYS1002 or PHYS1022

Stage 2

MSCI2001
GEOL6201, GEOL6221, GEOL6231
Continue both of the strands chosen in Stage 1:
1. Subjects totalling at least 15 Credit Points from:
BIOS2011, BIOS2031, BIOS2051
2. CHEM2011 or CHEM2041
3. MATH2021 or MATH2841 or MATH2801
Additional elective subjects to give a total of 120 Credit
Points
One 56 hour or two 28 hour General Education subjects

Stage 3

GEOL6311, GEOL6321, GEOL6330, GEOL6331
Level III subjects totalling 45 Credit Points which may
include the subjects corresponding to the strands
chosen in Stages 1 and 2:
1. BIOS3081, BIOS3091
2. CHEM3311
3. MSCI3001, MATH3021
further elective subjects to make a total of 105 Credit
Points
One 56 hour or two 28 hour General Education subjects
Students proposing to proceed to Stage 4 (Honours) must
complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

MSCI4003 (F/T) MSCI4009 (P/T)

6834**Marine Science (Environmental Chemistry)****Stage 1**

CHEM1101, CHEM1201
 MATH1131 or MATH1141
 MATH1231 or MATH1241

subjects totalling 60 Credit Points from 2 of the strands:

1. BIOS1101, BIOS1201
2. GEOL1111, GEOL1211
3. PHYS1002

Stage 2

CHEM2011, CHEM2041
 MSCI2001

Continue both of the strands chosen in Stage 1:

1. Subjects totalling at least 15 Credit Points from:
 BIOS2011, BIOS2051, BIOS2031
2. GEOL6231
3. MATH2021 or MATH2841

Additional elective subjects to give a total of 120

One 56 hour or two 28 hour General Education subjects

Stage 3

CHEM3041, CHEM3311

Level III units totalling 30 credit Points which may include the subjects corresponding to the strands chosen in Stages 1 and 2:

1. BIOS3081, BIOS3091
2. None
3. MSCI3001, MATH3021

Additional elective subjects to give a total of 105

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 90 Credit Points

Stage 4 (Honours)

MSCI4003 (F/T) MSCI4009 (P/T)

PHYS1002
 MECH0440
 TEXT1301

Stage 2*

CHEM2011, CHEM2828
 PHYS2030
 MATH2021

MATS1002, MATS1042, MATS1062, MATS1072,
 MATS1082, MATS1102, MATS1112

One 56 hour or two 28 hour General Education subjects

Stage 3*

PHYS3021, PHYS3310

MATS1093, MATS2213, MATS2223, MATS2233,
 MATS4513, MATS4523

Elective subjects totalling 30 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 4

MATS4444

**Stages 2 and 3 of this program are yet to be finalised further details of this program will be available in subsequent handbooks.*

***Students who enrol in this program are advised that there is no corresponding 3 year Program. Students not wishing to do the honours component must transfer to Course 3030 BSc (Tech) and complete the 3rd year component of this course. For further information contact the School of Materials Science and Engineering.*

MATHEMATICS

The School is divided into Departments of Pure Mathematics, Applied Mathematics and Statistics. Program 1000 allows specialisation in any of these areas. Students wishing to major or undertake Honours in Statistics should consult programs 1006, 1066 and 1067.

Students in the Advanced Science Course proceed to Stage 4 (Honours) and should select some higher mathematics subjects in the earlier Stages.

Students wishing to include some computing in their program should consult programs 1061 and 1067, while those in the Advanced Science Course wishing to include Level III Computer Science subjects should consult programs 1060 and 1066.

There are two specified interdisciplinary programs run with the Faculty of Commerce: Mathematics and Finance (1010) and Mathematics of Management (6810). Mathematics is also available through the Marine Science (Physical Oceanography) program 6831, Ecology (Mathematical Ecology) program 6852 and Environmental Science (Environmental Mathematics) programs 6867, 6868, 6869 and as the Science part of double degrees with Commerce, Medicine, Law, Arts and Engineering.

Pure Mathematics is the study of the essential structures of mathematics. Work by pure mathematicians underpins most of the technological advances of this century; the subject is concerned with problems and techniques which transcend specific applications. Research, focussing on

MATERIALS SCIENCE

From 1998 the School of Materials Science and Engineering are offering a program within Advanced Science. Some details of this program are not yet finalised.

0400****Materials Science (Advanced Science only)****Stage 1**

CHEM1101, CHEM1201
 MATH1131 or MATH1141
 MATH1231 or MATH1241

MATS1001, MATS 1011, MATS1021

the development of existing theories or the creation of new ones, may be driven by applications or by the internal demands of the discipline. Pure Mathematics subjects provide the insights and understanding required by those using mathematics, leading to mastery of the fundamental processes of mathematical science and the capacity for innovative applications in any area.

Applied Mathematics concerns the development of mathematics and models for understanding scientific phenomena, for the solution of technical and industrial problems, and for use in the social, economic and management sciences. Courses are designed to provide basic mathematical and computational skills needed for a wide range of applications, to develop the capability to construct, analyse and interpret mathematical models, and to encourage enthusiasm for the role of the mathematician in a variety of contexts.

Statistics is the science and art of using factual material for modelling and inference. Its mathematical foundations are in the theory of probability and it deals with how to estimate and make decisions using knowledge which is uncertain or observational material which is subject to error. There is a rich interplay of ideas between the theory of statistics and fields such as engineering, medicine and biological and behavioural sciences where statistical problems constantly arise.

Pure Mathematics majors

A Mathematics program is considered to be a degree in Pure Mathematics if it includes 60 Credit Points of Pure Mathematics Level III subjects.

Furthermore:

1. Pure Mathematics subjects relevant to the mathematical aspects of Computer Science are MATH2400 and MATH2410 in Stage 2, and MATH3400, MATH3411 and MATH3430 in Stage 3.
2. Pure Mathematics subjects relevant to mathematics teaching are MATH3511, MATH3521, MATH3531, MATH3560 and MATH3570 in Stage 3, or their higher equivalents.
3. Pure Mathematics subjects relevant to the applications of mathematics in physics or engineering are MATH3531, MATH3541 and MATH3570 in Stage 3, or their higher equivalents.

Applied Mathematics majors

A Mathematics program is considered to be a degree in Applied Mathematics if it includes 60 Credit Points of Level III Applied Mathematics subjects.

Note the following recommendation:

Level II: At least two of: MATH2160, MATH2180, MATH2200, MATH2220, MATH2240, MATH2301.
Level III: At least three of: MATH3101, MATH3110, MATH3121, MATH3130, MATH3161, MATH3170, MATH3181, MATH3201, MATH3241, MATH3261, MATH3301.

In addition, the following are recommended in Stage 1

1. For students interested in physical sciences or for theoretical oceanography, meteorology or fluid dynamics: either PHYS1002 or PHYS1022.
2. For students interested in economic or management sciences: see Mathematics for Management (6810).
3. For students interested in social or biological sciences, at least 30 Credit Points from the following: BIOS1101 and BIOS1201; PSYC1001 AND PSYC1011; PHYS1002; CHEM1101 and CHEM1201.
4. Applied mathematics for computational methods or computer science: COMP1001 and COMP1011.

Statistics majors

See programs 1006, 1066 or 1067.

A major revision of the Statistics programs involving many new and altered subjects has now been implemented. Stage 2 altered from 1996 and Stage 3 from 1997. Any student who has taken Level II Statistics subjects before 1996 or Level III Statistics subjects before 1997 and wishes to take further Statistics subjects should consult the Head of Department.

Higher Subjects

Throughout the Mathematics and Statistics programs, where a subject is mentioned at the ordinary level the higher equivalent (if any) may be substituted.

General Education

All students in Mathematics programs are required to complete 30 Credit Points of General Education in approved subjects outside of the Faculty of Science and Technology and, in addition, the subject MATH3010 Professional Issues and Ethics in Mathematics.

1000

Mathematics

Stage 1

MATH1131 or MATH1141
MATH1231 or MATH1241

Elective subjects totalling 90 Credit Points*

Advanced Science students must include MATH1081 in Stage 1. Science students must include MATH1081 in one of Stages 1 or 2. The School will advise which Stage is appropriate depending on the student's mathematical background.

Stage 2

MATH2011, MATH2120
MATH2501, MATH2520

Further Level II or Level III Mathematics subjects totalling 15 Credit Points

Elective subjects totalling 60 Credit Points*

General Education subjects totalling 15 Credit Points

Stage 3

MATH3010

Level III Mathematics subjects totalling 60 Credit Points

Elective subjects totalling 37.5 Credit Points*

General Education subjects totalling 15 Credit Points

Advanced Science students must complete 97.5 Credit Points of Level III Mathematics subjects and elective subjects totalling 22.5 Credit Points*. In special cases other subjects may be substituted for these subjects. These students should discuss their Level III selection of subjects with the Head of the appropriate Department.

Stage 4 (Honours) (Advanced Science Only)

MATH4103 or MATH4603 or MATH4903

** Up to 120 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104. Japanese and Korean are also available for students in Advanced Science.*

1060**Mathematics with Computer Science
(Advanced Science only)****Stage 1**

COMP1011, COMP2811

MATH1131 or MATH1141

MATH1231 or MATH1241

MATH1081

Elective subjects totalling 45 Credit Points*

Stage 2

MATH3010

COMP2011, COMP2031

MATH2011, MATH2501

MATH2301, MATH2400

MATH2801 or MATH2841

Level II or Level III elective subjects totalling 15 Credit Points*

(Recommended alternative strands: Applied Mathematics: MATH2120. Pure Mathematics: MATH2410.)

General Education subjects totalling 15 Credit Points

Stage 3

Level III Computer Science subjects totalling 30 Credit Points chosen from: COMP3111, COMP3121, COMP3311, COMP3411

Subjects totalling 15 Credit Points chosen from:

MATH3301, MATH3400, MATH3430

Further Level III Mathematics subjects totalling 60 Credit Points

Elective subjects totalling 15 Credit Points*

(Recommended alternative strands: Applied Mathematics: MATH3101 and at least one of MATH3161,

MATH3181, MATH3201. Pure Mathematics: MATH3411, MATH3430, MATH3521.)

General Education subjects totalling 15 Credit Points

Students should discuss their Level III selection of subjects with the Head of the appropriate Department. Students proposing to proceed to MATH4003 Mathematics and Computer Science Honours must complete 45 Credit Points of Level III Computer Science subjects.

Stage 4 (Honours)

MATH4003 or MATH4103 or MATH4603

** Up to 75 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Japanese and Korean are also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104.*

1061**Mathematics with Computing****Stage 1**

COMP1001, COMP1011

MATH1131 or MATH1141

MATH1231 or MATH1241

Elective subjects totalling 60 Credit Points*

Advanced Science students must include MATH1081 in Stage 1. Science students must include MATH1081 in one of Stages 1 or 2. The School will advise which Stage is appropriate depending on the student's mathematical background.

Stage 2

COMP2811

MATH2011,

MATH2120, MATH2301

MATH2501, MATH2520

MATH2841

Subjects totalling 15 Credit Points chosen from:

MATH2160, MATH2200, MATH2400, MATH2410

Elective subjects chosen from Mathematics and/or Computer Science totalling 15 Credit Points

General Education subjects totalling 15 Credit Points

Stage 3

MATH3010

COMP2011

MATH3301

Further Level III Mathematics subjects totalling 45 Credit Points

(MATH3400, MATH3411, MATH3430 are recommended)

Elective subjects chosen from Mathematics and/or

Computer Science totalling 22.5 Credit Points

General Education subjects totalling 15 Credit Points

Advanced Science students must complete elective subjects totalling 37.5 Credit Points from Mathematics and/or Computer Science. These students should discuss their

Level III selection of subjects with the Head of the appropriate Department.

Stage 4 (Honours) (Advanced Science only)

MATH4103 or MATH4603

** Up to 60 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104. Japanese and Korean are also available for students in Advanced Science.*

1006

Statistics

Stage 1

MATH1131 or MATH1141

MATH1231 or MATH1241

Elective subjects totalling 90 Credit Points*

Advanced Science students must include MATH1081 in Stage 1. Science students must include MATH1081 in one of Stages 1 or 2. The School will advise which Stage is appropriate depending on the student's mathematical background.

Stage 2

MATH2120

MATH2510 or MATH2011,

MATH2501, MATH2520,

MATH2801, MATH2810, MATH2831.

Elective subjects totalling 45 Credit Points* (or 37.5 if MATH2011 taken)

General Education subjects totalling 15 Credit Points

Stage 3

MATH3010

MATH3801, MATH3840, MATH3800, MATH3810

Statistics subjects totalling 30 Credit Points chosen from:

MATH3000 or MATH3001, MATH2840, MATH3820,

MATH3830, MATH3850, MATH3860, MATH3870,

MATH3880, MATH3890

Elective subjects totalling 30 Credit Points*

General Education subjects totalling 15 Credit Points

Advanced Science students must complete 97.5 Credit Points of Level III Mathematics subjects including 60 Credit Points of Level III Statistics subjects including MATH3000 or MATH3001 and, in addition, 22.5 Credit Points of elective subjects*. These students should discuss their Level III selection of subjects with the Head of the Statistics Department.

Stage 4 (Honours) (Advanced Science only)

MATH4903

**Up to 120 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian,*

Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104. Japanese and Korean are also available for students in Advanced Science.

1066

Statistics with Computer Science (Advanced Science only)

Stage 1

COMP1011, COMP2811

MATH1131 or MATH1141

MATH1231 or MATH1241

MATH1081

Elective subjects totalling 45 Credit Points*

Stage 2

COMP2011, COMP2031

MATH2501, MATH2510 or MATH2011

MATH2801, MATH2810, MATH2831, MATH2840

Level II or III elective subjects totalling 22.5 Credit Points* (or 15 if MATH2011 taken)

(MATH2301, MATH2400 are recommended)

General Education subjects totalling 15 Credit Points

Stage 3

MATH3010

Level III Computer Science subjects totalling 30 Credit Points chosen from: COMP3111, COMP3121,

COMP3311, COMP3411

MATH3800, MATH3810, MATH3000 or MATH3001

Level III Statistics subjects totalling 37.5 Credit Points

(or 30 if MATH3001 taken) chosen from: MATH3801,

MATH3820, MATH3830, MATH3840, MATH3850,

MATH3860, MATH3870, MATH3880, MATH3890

Further Level III Mathematics subjects totalling 15 Credit Points

Elective subjects totalling 7.5 Credit Points*

General Education subjects totalling 15 Credit Points

Students should discuss their Level III selection of subjects with the Head of the Statistics Department.

Stage 4 (Honours)

MATH4903

**Up to 75 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Japanese and Korean are also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104.*

1067**Statistics with Computing****Stage 1**

COMP1001, COMP1011

MATH1131 or MATH1141

MATH1231 or MATH1241

Elective subjects totalling 60 Credit Points*

Advanced Science students must include MATH1081 in Stage 1. Science students must include MATH1081 in one of Stages 1 or 2. The School will advise which Stage is appropriate depending on the student's mathematical background.

Stage 2

COMP2811

MATH2120

MATH2510 or MATH2011

MATH2501, MATH2520

MATH2801, MATH2810, MATH2831, MATH2840

Further Mathematics and/or Computer Science subjects totalling 22.5 Credit Points (or 15 if MATH2011 taken)

General Education subjects totalling 15 Credit Points

Stage 3

MATH3010

MATH3800, MATH3810

Further Level III Statistics subjects totalling 60 Credit

Points chosen from: MATH3000 or MATH3001,

MATH3801, MATH3820, MATH3830, MATH3840,

MATH3850, MATH3860, MATH3870, MATH3880,

MATH3890

Further Mathematics and/or Computer Science subjects totalling 22.5 Credit Points

General Education subjects totalling 15 Credit Points

Advanced Science students must complete 97.5 Credit Points of Level III Mathematics subjects including 60 Credit Points of Level III Statistics subjects including MATH3000 or MATH3001 and, in addition, 22.5 Credit Points of elective subjects. These students should discuss their Level III selection of subjects with the Head of the Statistics Department.

Stage 4 (Honours) (Advanced Science only)

MATH4903

**Up to 60 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104. Japanese and Korean are also available for students in Advanced Science*

1010**Mathematics and Finance
(Advanced Science only)****Stage 1**

ACCT1501, ACCT1511

ECON1101, ECON1102

MATH1131 or MATH1141

MATH1231 or MATH1241

FINS2612

COMP1001

Stage 2

MATH3010

MATH2110, MATH2130, MATH2160

MATH2501, MATH2610

MATH2901, MATH2910, MATH2931

FINS2613, FINS2624

General Education subjects totalling 15 Credit Points

Stage 3

MATH3101, MATH3161, MATH3301

MATH3610, MATH3620, MATH3630

MATH3901, MATH3980

Finance subjects 1 and 2*

General Education subjects totalling 15 Credit Points

Stage 4

MATH4012

MATH3181

MATH5695

MATH5965, MATH5816, MATH5835

Finance subjects 3 and 4*

** Finance subjects 1, 2, 3 and 4 are the subjects*

FINS3616, FINS3635

plus two subjects chosen with advice from #

FINS2622, FINS3625, FINS3630, FINS3633, FINS3634,

FINS3636, FINS3774+

+ requires approval of the Head of the School of Banking and Finance

not all subjects are offered in any year

Variation in Mathematics subjects may be allowed with permission of the Head of the School of Mathematics.

Skill in C/C++ programming is highly desired by year 4.

Honours in program 1010 may be awarded on the basis of a weighted average of the subjects studied over the complete program.

6810**Mathematics of Management
(Advanced Science only)**

This program includes subjects given by the Schools of Accountancy and of Economics. There has been an increasing trend towards more use of mathematics, and the use of more advanced mathematics, in scientific

management. This program trains mathematicians with an interest in the application of mathematics to management science. The mathematics content is that of a full Mathematics degree with Honours in either Applied or Pure Mathematics. Students completing this program with good records are eligible for entry to the Master of Commerce graduate degree program in the School of Accountancy. If appropriate subjects are selected, then this degree (MCom), which may be awarded by part-time study, qualifies the graduate for provisional membership of the Australian Society of Accountants; full membership is then granted after appropriate experience.

Stage 1

ACCT1501, ACCT1511
ECON1101, ECON1102
MATH1131 or MATH1141
MATH1231 or MATH1241
Elective subjects totalling 30 Credit Points*

Stage 2

MATH2011
MATH2120, MATH2160, MATH2180
MATH2501, MATH2520
MATH2801 or MATH2841
ACCT2522, INFS1602
Subjects totalling 15 Credit Points chosen from:
ACCT2542, INFS2603, FINS2613
General Education subjects totalling 15 Credit Points

Stage 3

MATH3010
Subjects totalling 30 Credit Points chosen from:
MATH3101, MATH3121, MATH3161, MATH3181,
MATH3801, MATH3050, MATH3060.
Further Level III Mathematics subjects totalling 45 Credit Points
Subjects totalling 30 Credit Points chosen from one of the strands:
1. ACCT3563, ACCT3583
2. INFS3605, INFS3607, INFS3608
3. FINS2624, FINS3625
Elective subjects totalling 7.5 Credit Points*
General Education subjects totalling 15 Credit Points
Students should discuss their Level III selection of subjects with the Head of the appropriate Department.

Stage 4 (Honours)

MATH4103 or MATH4603

**Up to 37.5 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Japanese and Korean are also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104.*

MEDICAL PHYSICS

Medical Physics is the application of physics to diagnosis, treatment and prevention of human disease and disability. There is a continuing demand for professional physicists in this area as new physical techniques are rapidly translated into new medical instruments. There is an increasing demand for health physicists in industry and the public service to monitor environmental and occupational sources of radiation and other hazards.

This program gives an essential strong background in conventional physics including electronics and computing, a general background in the biological sciences and some specialised knowledge in biophysics and medical physics.

Honours may be awarded. The basis is a suitably weighted performance over the last three stages of this four year advanced science degree.

0141

Medical Physics (Advanced Science only)

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002 (or PHYS1022 at distinction level)

Stage 2

BIOC2101 and BIOC2201 or
BIOC2181 and BIOC2291
MATH2011, MATH2120
PHYS2410, PHYS2001, PHYS2021, PHYS2011,
PHYS2031
One 56 hour or two 28 hour General Education subjects

Stage 3

ANAT2111 or ANAT2120
PHPH2112
PHYS2000,
PHYS3410, PHYS3041, PHYS3060, PHYS1601
Plus elective subjects to make a total of 120 Credit points chosen from:
MATH2520, MATH2160, MATH2841, MATH3121
PATH3202
PHYS3630, PHYS3710, PHYS3720, PHYS2601,
PHYS3010 or PHYS3210*, PHYS3050*, PHYS3760,
PHYS3110, PHYS3120, PHYS3310, PHYS3610
One 56 hour or two 28 hour General Education subjects

Stage 4

PHYS3021, PHYS3230, PHYS4411, PHYS4413,
SESC4410
Elective subjects totalling 30 Credit Points from the subjects listed for Stage 3 electives

** Students intending to undertake a higher degree in Physics would need to select PHYS3010 and PHYS3050.*

MICROBIOLOGY AND IMMUNOLOGY

Microbiology is the scientific study of the smallest forms of life namely, bacteria, viruses, archaea, fungi and protozoa. These fascinating organisms impact on our lives in many ways. On the negative side, they cause disease in humans, animals and plants, they spoil our food and can destroy textiles and structural materials. However, microorganisms are also of great benefit. They contribute to a better environment via recycling of organic wastes, maintenance of soil fertility and biodegradation of pollutants. Many foodstuffs, beverages, pharmaceuticals, eg. antibiotics and other industrial products, are products of microbial action. The genetic engineering of microorganisms is a fundamental aspect of molecular biology and the way of the future.

Immunology, the study of the immune system, has contributed significantly to modern medicine in areas such as blood transfusion, organ transplantation, allergic reactions and immunity to disease. In cell biology, immunology has advanced our understanding of differentiation, cell cooperation and the triggering of proliferation and differentiation by cell surface receptors.

Both Microbiology and Immunology also provide an excellent training in the scientific method and scientific communication. We aim to provide an undergraduate training that serves as a starting point for many careers within our disciplines and beyond. An energetic honours programme provides experience of scientific research and aims to further develop a wide range of skills.

4400

Microbiology and Immunology

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101, BIOC2201
BIOS2021
MICR2201, MICR2011
Elective subjects totalling 30 or 45 Credit Points*
One 56 hour or two 28 hour General Education subjects

Stage 3

MICR3021
Subjects totalling at least 45 Credit Points from
MICR3011, MICR3031, MICR3041, MICR3051,
MICR3061, MICR3071, MICR3081
Additional elective subjects to give a total of 345 Credit Points overall
One 56 hour or two 28 hour General Education subjects

Students proposing to undertake Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points, 60 of these Credit Points must be from Microbiology and Immunology.

Stage 4 (Honours)

MICR4013 or MICR4023

**BIOS2041 Biometry is recommended. Students in course 3970 intending to do Honours should only do 30 Credit Points of stage 2 electives. Other recommended elective subjects include: Biochemistry, Biotechnology, Biological Science.*

MOLECULAR GENETICS

Recent advances in Molecular Biology, especially the continuing development of recombinant DNA technology, have revolutionised our understanding of the structure, function and regulation of individual genes. These advances have opened up the exciting field of Molecular Genetics, one of the most rapid growth areas in biology. This marriage of Biochemistry, Molecular Biology and Genetics provides an exciting new approach for the study of all living organisms, including the human. Biochemistry and Molecular Genetics therefore represent fundamental components of biological and medical science and they will have increasingly important roles to play in many aspects of modern medicine, genetics and evolutionary biology.

4110

Molecular Genetics

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101 and BIOC2201
BIOS2021
CHEM2021 or CHEM2041
MICR2011 and MICR2201
Elective subjects totalling 30 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3

BIOC3121, BIOC3281
Subjects totalling at least 15 Credit Points from:
BIOC3131, BIOT3031 or MICR3021
Subjects totalling 15 or 30 Credit Points from:
BIOC3111, BIOC3141, BIOC3291, BIOT3011,
MICR3011, MICR3041 to give a total of at least 75
Credit Points from Level III from the above subjects.
Further subjects totalling 30 or 45 Credit Points to give a

final total of 345 Credit Points

Highly recommended: BIOC3251, BIOC3271, BIOT3061, MICR3051

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points

Stage 4 (Honours)

BIOC4428 or BIOC4318 or BIOS4013 or BIOT4073 or MICR4013

NEUROSCIENCE

This program introduces students to the biological and behavioural aspects of the nervous system. The program is based around the neuroscience subjects offered by the Schools of Anatomy, Physiology and Pharmacology, and Psychology.

Entry to the Neuroscience Programs is limited to Advanced Science students at Level II and academic merit is the sole criterion. Students planning this are advised to enrol initially in the Biological Sciences Holding Program (6817) and must apply and be accepted into the Anatomy quota at the time of pre-enrolment for Level II.

7312

Neuroscience A (Advanced Science only)

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PSYC1002

Stage 2

ANAT2111
BIOC2101 and BIOC2201, or
BIOC2181 and BIOC2291***
PHPH2112*
PSYC2001, PSYC2071 and PSYC2081
One 56 hour or two 28 hour General Education subjects

Stage 3

ANAT3411, ANAT3421
PHPH3121*, PHPH3131*
Level III Psychology subjects totalling 30 Credit Points **
Subjects totalling 30 Credit Points at Level II or Level III to complete 360 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 4

Subject to satisfactory progress throughout the course (normally a credit average), students may proceed to the Honours Stage. Before the commencement of Stage 2

students should consult with the appropriate Schools and the Neuroscience program coordinating committee consisting of representatives from the Schools of Anatomy, Physiology and Pharmacology, and Psychology, about the subjects required for a particular Honours program. Students should also note general guidelines for Advanced Science Stage 4.

**Student numbers in Physiology and Pharmacology subjects are limited. If quotas are exceeded, entry will be based on academic merit*

*** Select 1 subject (15 Credit Points) from Advanced Perceptual / Cognitive – PSYC3151, PSYC3161, PSYC3211, PSYC3211, PSYC3221, PSYC3231 and 1 subject (15 Credit Points) from Advanced Biological – PSYC3051, PSYC3241, PSYC3251, PSYC3261. Entrance to PSYC4023 requires students to have completed Psychology subjects with an average of at least 70% (PSYC1001 and PSYC1011 are not included in the average). Students whose average falls below 70% enrol in PSYC4033.*

**** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

1273

Neuroscience B (Advanced Science only)

Stage 1

BIOS1101, BIOS1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
CHEM1101 and CHEM1201
and either
PHYS1002 or PHYS1022 or
COMP1001 and 1 elective subject totalling 15 Credit Points

Stage 2

ANAT2111
BIOC2101 and BIOC2201 or
BIOC2181 and BIOC2291**
PHPH2112*
and subjects totalling 30 Credit Points from the following:
ANAT2211, BIOS2041, BIOS2021
CHEM2011, CHEM2021, PSYC1002
elective subjects totalling 15 Credit Points
or Level II subjects totalling 30 Credit Points from subjects offered from the Schools of Mathematics, Physics or Computer Science and Engineering and
One 56 hour or two 28 hour General Education subjects

Stage 3

ANAT3411, ANAT3421
PHPH3121*, PHPH3131*
and further Level III subjects totalling 60 Credit Points from among those offered in the Schools of Mathematics, Physics, Chemistry, Biochemistry, Physiology and Pharmacology, Computer Science and Engineering, Anatomy (Histology II recommended),

Pathology, and PSYC3031.

One 56 hour or two 28 hour General Education subjects

Stage 4

Subject to satisfactory progress throughout their course, students would normally be able to proceed to the Honours Stage. However, early in their course, and certainly before commencing Stage 3, students should consult with the appropriate Schools and the Neuroscience program coordinating committee consisting of representatives from the Schools of Anatomy, Physiology and Pharmacology, and Psychology, about the subjects required for a particular Honours program. Students should also note general guidelines for Advanced Science Stage 4.

** Student numbers in Physiology and Pharmacology subjects are limited. If quotas are exceeded entry will be based on academic merit.*

*** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

PHILOSOPHY

Philosophy is a wide ranging discipline, catering for a great diversity of interests, for instance, in science, reasoning, persons, and social issues, and encouraging critical and imaginative thought about the foundations of other subjects. Apart from providing considerable choices for students majoring in Philosophy, the diversity of Upper Level subjects makes it possible for students majoring in other disciplines to select subjects complementing their main interest.

Value of Upper Level Subjects in Philosophy

Specialisation in Philosophy

Students specialising in Philosophy must complete any two of the School's Level I subjects (30 Credit Points): PHIL1006 (Reasoning, Values and Persons), PHIL1007 (Ways of Knowing), PHIL1008 (Ethics and Society), PHIL1009 (Points of View). In addition, students must complete 6 Upper Level (II/III) subjects (90 Credit Points). Of these, at least four subjects must be chosen from List A, which includes subjects in Logic, Philosophy of Mind, Philosophy of Science, and areas of History of Philosophy relevant to those subject areas. Students normally take two Level II/III subjects in Stage 2, and four Level II/III subjects in Stage 3. Subject to approval of the School, which considers the individual subjects nominated by a student and the student's overall program in Philosophy, a student may be permitted to count up to 15 Credit Points offered outside the School toward specialisation in Philosophy.

List A

PHIL2106	Logic
PHIL2107	Advanced Philosophy of Science
PHIL2108	Ways of Reasoning

PHIL2109	Metaphysics (Realisms)
PHIL2116	Scientific Method
PHIL2117	Philosophical Logic
PHIL2118	Philosophy and Biology
PHIL2206	Contemporary Philosophy of Mind
PHIL2207	Issues in the Philosophy of Psychology
PHIL2208	Epistemology (Scepticisms)
PHIL2209	Epistemology (Knowledge and Justification)
PHIL2217	Personal Identity
PHIL2218	Philosophical Foundations of Artificial Intelligence
PHIL2219	Topics in Philosophy of Language
PHIL2226	Twentieth Century Analytic Philosophy
PHIL2228	Themes in Seventeenth Century Philosophy
PHIL2229	Themes in Eighteenth Century Philosophy
PHIL2417	Relativism: Cognitive and Moral
PHIL2518	Greek Philosophy: Issues in Ethics and Epistemology
PHIL3106	PreHonours Seminar

The remaining two subjects are to be chosen from other Upper Level Philosophy subjects.

Level II/III

Some Level II/III subjects deal with particular philosophical topics; others can be taken in sequence to give more sustained treatments of larger areas. Students may select freely among these, subject to stipulations regarding prerequisites. Students are welcome to seek advice and further information from the School.

In certain circumstances the prerequisite specified for a subject may be waived; for example, in the case of students who have already studied similar material, or who wish to take isolated subjects relevant to another discipline. Students who feel they have a case for a concession of this kind should consult the School.

Honours Entry Requirements

Students intending to proceed to an Honours degree in Philosophy must normally complete Stages 1 – 3 of Programs 5200 (Philosophy) or 5262 (Philosophy of Science) with an average of at least 70% in their Philosophy subjects, including at least one Distinction result; plus PHIL3106 (PreHonours Seminar). Subject to the approval of the School, which considers the individual subjects nominated by a student and the student's overall program in Philosophy, a student may be permitted to count up to 15 Credit Points offered outside the School toward satisfying the Honours entry requirements. Students contemplating Honours are urged to seek advice from the School early in their course.

5200 Philosophy

Stage 1

MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Any two of the following: PHIL1006, PHIL1007
PHIL1008, PHIL1009
Elective subjects totalling 60 Credit Points

Stage 2

Philosophy subjects totalling 30 Credit Points*
Elective subjects totalling 90 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3

Philosophy subjects totalling 60 Credit Points*
Elective subjects totalling 45 Credit points
One 56 hour or two 28 hour General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete Level II/III or Level III subjects totalling 105 Credit Points including PHIL3106.

Stage 4 (Honours)

PHIL4000

* Refer to List A above for compulsory subjects.

5206 Philosophy with Computer Science (Advanced Science only)

Stage 1

COMP1011, COMP1021
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Any two of the following: PHIL1006, PHIL1007,
PHIL1008, PHIL1009
Elective subjects totalling 15 Credit points

Stage 2

COMP2011, COMP2031
PHIL2218
Philosophy subjects totalling at least 30 Credit Points from:
PHIL2106, PHIL2806, PHIL2207, PHIL2107, PHIL2108,
PHIL2218, PHIL2116, PHIL2117, PHIL2118, PHIL2217,
PHIL2216, PHIL2109, PHIL2208, PHIL2209
One 56 hour or two 28 hour General Education subjects

Stage 3

COMP3411
A further 2 Computer Science subjects must be selected from: COMP3131, COMP3311, COMP3121, COMP3111
A further three subjects from Philosophy must be

selected from the previous list
One 56 hour or two 28 hour General Education subjects

Stage 4

The fourth Stage honours program allows specialisation in either computer Science or Philosophy or in the combined program. The specialisation is determined by the thesis. Students intending to specialise in philosophy must complete PHIL3106.

Philosophy of Science

The Philosophy of Science program provides a coherent sequence of subjects for advanced study within the areas of logic, methodology and philosophy of science, or is suitable for those who merely wish to deepen their comprehension of the subject matter of a major in another field. The program leads towards a core subject PHIL2107 Advanced Philosophy of Science in Stage 3.

5262 Philosophy of Science

For details of this program please consult with School of Philosophy and the School of Science and Technology Studies.

PHYSICS

The programs offered by the School (0100, 0110, 0121, 0141, 0161 and 0176) reflect the importance of Physics in science and technology at both the fundamental and at the applied levels.

0100 Physics (Advanced Science only)

Program 0100 Physics offers great flexibility in the choice of subjects. Students may take honours in either Physics or Physics/Geology.

Stage 1

MATH1131 or MATH1141*
MATH1231 or MATH1241*
PHYS1002
Elective subjects totalling 60 Credit Points** ***

Stage 2

MATH2011, MATH2120, MATH2520*
PHYS2000, PHYS2001, PHYS2011, PHYS2021,
PHYS2031
Elective subjects totalling 22.5 Credit Points****
One 56 hour or two 28 hour General Education subjects

Stage 3

PHYS3010, PHYS3021, PHYS3030, PHYS3041,
PHYS3050***, PHYS3060***

Level III elective subjects totalling 60 Credit points****

One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours)

Choose one of PHYS4103, BSSM4013

**Students are encouraged to select Higher Level Mathematics subjects where applicable.*

***Appropriate Level I electives include: COMP1001, PHYS1601, CHEM1101 and CHEM1201.*

****Students interested in Biophysics may replace PHYS3050 (or PHYS3060) with PHYS3410 provided CHEM1101, CHEM1201, BIOS1101 and BIOS1201 are completed in Stage 1 and BIOC2101 and BIOC2201 are taken in Stage 2.*

*****For students specialising in Theoretical Physics, additional mathematics subjects are specified. In Stage 2 students should include subject MATH2501 (or MATH2601) and in Stage 3 MATH3121 and Theoretical Physics subjects.*

0110**Physics**

Program 0110 Physics offers great flexibility in the choice of subjects for students enrolled in the BSc at pass level. This program is not available to advanced science students.

Stage 1

MATH1131 or MATH1141

MATH1231 or MATH1241

PHYS1002

PHYS1601 and/or COMP1001

Elective subjects to make a total of 120 Credit Points*

Stage 2

MATH2011, MATH2120

PHYS2000, PHYS2001, PHYS2011, PHYS2021,
PHYS2031

Elective subjects totalling 30 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 3

PHYS3021, PHYS3041, PHYS3060, PHYS3210,
PHYS3230, PHYS3630 or PHYS3610 or PHYS3050

Elective subjects totalling 45 Credit points

One 56 hour or two 28 hour General Education subjects

** CHEM1101 is recommended.*

0121**Physics and Astronomy
(Advanced Science only)**

This program provides the basic physics essential for a career in astronomy. It will not prevent specialisation in

some other field of physics if students' interests change during their studies.

There is astronomy content in each Stage of the program. There are special lectures and projects in the version of PHYS1002 for physics majors. The other astronomy subjects are PHYS2160 and PHYS3160 and a lecture subject and projects in the Honours Stage.

Stage 1

MATH1131 or MATH1141*

MATH1231 or MATH1241*

PHYS1002

Elective subjects totalling 60 Credit Points**

Stage 2

MATH2011, MATH2120, MATH2520*

PHYS2000, PHYS2001, PHYS2011, PHYS2021,
PHYS2031, PHYS2160

elective subjects totalling 15 Credit Points

One 56 hour or two 28 hour General Education subjects.

Stage 3

PHYS3010, PHYS3021, PHYS3030, PHYS3041,
PHYS3050, PHYS3060, PHYS3160

elective Level III subjects totalling 52.5 Credit Points

One 56 hour or two 28 hour General Education subject.

Stage 4 (Honours)

PHYS4103

** Students are encouraged to select Higher Level Mathematics subjects where available*

***Appropriate Level I electives include: CHEM1101, CHEM1201, PHYS1601, COMP1001*

0161**Physics with Computer Science**

Program 0161 (Physics with Computer Science) provides a strong background in Physics together with the computing skills necessary to fully utilise computers in research and industrial laboratories.

Stage 1

COMP1001, COMP1011

MATH1131 or MATH1141

MATH1231 or MATH1241

PHYS1002, PHYS1601

Elective subjects totalling 15 Credit Points

Stage 2

COMP2811

MATH2011, MATH2120, MATH2520 or PHYS2000**

PHYS2011, PHYS2021, PHYS2031

COMP2011

subjects totalling 15 Credit Points from PHYS2601,
MATH2301, COMP2021

One 56 hour or two 28 hour General Education subjects

Stage 3

PHYS2000****, PHYS2001, PHYS3010***, PHYS3021, PHYS3030***

further Level III Physics subjects totalling 30 Credit Points*

Level III Computer Science subjects totalling 30 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours) (Advanced Science Only)

PHYS4103

**In Advanced Science an additional 7.5 Credit Points from Level III Physics or Mathematics is required*

*** course 3970 take PHYS2000, AdvancedScience take MATH2520*

****PHYS3210 and PHYS3230 are substituted for PHYS3010 and PHYS3030 in course 3970.*

*****Advanced Science only*

ENGINEERING PHYSICS

This program combines a thorough knowledge of experimental physics, electronics, computing and instrumentation, optoelectronics and communications with elements of engineering practice and management. It is designed to produce graduates with skills and knowledge appropriate to the requirements of Australian industry.

An industrial project of one session's duration with an industrial sponsor of the program is included in Stage 4.

The program prepares graduates for membership of the Institution of Engineers, Australia, within two years of initial employment in an engineering field. Graduates will be accepted for membership of the Australian Institute of Physics.

Honours may be awarded. The basis is a suitably weighted performance over the last three stages.

0176**Engineering Physics (Advanced Science Course 3985 only)****Stage 1**

CHEM1800

COMP1001

MANF1100

MECH0130

MATH1131, MATH1231

PHYS1002, PHYS1601, PHYS2630

Stage 2

ELEC2030, ELEC2011

MATH2011, MATH2120, MATH2520

MATH2841, MATH3150

PHYS2011, PHYS2021, PHYS2030, PHYS2601

One 56 hour or two 28 hour General Education subject

Stage 3

ELEC3004, ELEC3013, ELEC3016

PHYS2000, PHYS2001, PHYS3021, PHYS3030 or

PHYS3230, PHYS3060, PHYS3310, PHYS3610,

PHYS3630, PHYS3710/3720, PHYS3760

One 56 hour or two 28 hour General Education subject

Stage 4

ELEC4010

PHYS3010 or PHYS3210, PHYS3041, PHYS3710/3720,

PHYS4764

elective subjects totalling 15 Credit Points chosen in consultation with the School (e.g. Accounting, Economics, Engineering)

PHYSIOLOGY AND PHARMACOLOGY

Physiology, the study of the processes and mechanisms which serve and control the various functions of the body, begins at Level II with a full year core subject Physiology 1.

Students majoring in Physiology (Program 7300) should note the prerequisites for Level III Physiology, normally: satisfactory completion of PHPH2112 Physiology 1 and BIOC2101 and BIOC2201, *or* BIOC2181 and BIOC2291*. Level III Physiology subjects provide the 60 Level III Credit Points required for a degree with a single specialisation in Physiology and can be taken with allied disciplines, such as Anatomy, Biochemistry and Molecular Genetics, Biological Science, Biotechnology, Chemistry, Microbiology and Immunology, Pharmacology or Psychology, to give a degree with a double specialisation. Note should be taken of the prerequisites and corequisites for the subjects taken with Physiology and restrictions on the entry to the Anatomy and Physiology and Pharmacology subjects.

Students majoring in Pharmacology (Program 7301) should note that the prerequisites for Pharmacology are normally the same as for Physiology, namely satisfactory completion of PHPH2112 Physiology 1 and either BIOC2101 and BIOC2201, *or* BIOC2181 and BIOC2291*. Pharmacology is a 30 credit Point subject at the Level III and students should note that the completion of program 7301 requires additional Level III subjects which must be chosen from the closely related subjects listed below in Physiology, Biochemistry and Molecular Genetics, Microbiology and Immunology, Chemistry, or Biotechnology. Where sufficient extra subjects are taken from these or allied subjects such as in Anatomy, Biological Science, Biotechnology or Psychology, a degree will then be taken with double specialisation. Note should also be taken of the prerequisites and corequisites for the subjects taken with Pharmacology and the restrictions on the entry to Anatomy and Physiology and Pharmacology subjects.

** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

7300**Physiology****Stage 1**

BIOS1101, BIOS1201

CHEM1101, CHEM1201

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

Elective subjects totalling 30 Credit Points

Stage 2*

PHPH2112*

BIOC2101 and BIOC2201, or

BIOC2181 and BIOC2291**

Elective subjects totalling 60 Credit Points

(Recommended electives: Anatomy, Biological Science, Biochemistry, Chemistry, Psychology, Microbiology)

One 56 hour or two 28 hour General Education subjects

Stage 3

PHPH3121*, PHPH3131*, PHPH3211*, PHPH3221*

Further subjects to give a total of 345 Credit Points

(Recommended: Anatomy, Biochemistry, Biological Science, Biotechnology, Microbiology and Immunology, Pharmacology or Pathology)

One 56 hour or two 28 hour General Education subjects

Students taking Stage 4 (Honours) must complete Level III subjects totalling 105 Credit Points

Stage 4 (Honours)

PHPH4218

The General Education requirements are met within the Honours Program through seminars, an essay and participation in discussion groups. Students should also note general guidelines for Advanced Science Stage 4.

** Student numbers in Physiology and Pharmacology subjects are limited. If quotas are exceeded, entry will be based on academic merit.*

*** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

Elective subjects totalling 60 Credit Points

(Recommended electives: Anatomy, Biological Science, Chemistry, Psychology)

One 56 hour or two 28 hour General Education subjects

** Student numbers in PHPH2112 are limited. If quota is exceeded, entry will be based on academic merit.*

*** Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School*

Stage 3

PHPH3152* and either:

subjects totalling at least 30 Credit Points selected from Level III Physiology subjects: PHPH3121, PHPH3131, PHPH3211 and PHPH3221

or subjects totalling at least 30 Credit Points selected from BIOC3111, BIOC3121, BIOC3261, BIOC3271 and BIOC3281

or subjects totalling at least 30 Credit Points selected from MICR3021, MICR3061 and MICR3081

or MICR3041 and MICR3051

or subjects totalling at least 30 Credit Points selected from CHEM3021, CHEM3041, CHEM3141, CHEM3121, CHEM3221.

or subjects totalling at least 30 Credit Points selected from BIOT3021, BIOT3011 and BIOT3061.

Further subjects to give a total of 345 Credit Points

One 56 hour or two 28 hour General Education subjects.

Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 105 Credit Points.

Stage 4 (Honours)

PHPH4258

The General Education requirements are met within the Honours program through seminars, an essay and participation in discussion groups. Students should also note general guidelines for Advanced Science Stage 4.

** Student numbers in Level III physiology subjects are limited. If quotas are exceeded, entry will be based on academic merit.*

PSYCHOLOGY

Psychology is a discipline of both scientific research and applied practice. As a science, psychology is concerned with the study of behaviour and its underlying mental and neural processes. Topics of study include learning, memory, cognition, perception, motivation, life-span development, personality, social interactions, and abnormal psychology. Psychology has many areas of application, especially in clinical, correctional, counselling, educational and organisational settings. In addition, people with training in psychology pursue careers in academic research, health research, developmental disabilities and rehabilitation; ergonomics; occupational health and safety; personnel selection, training, and management; vocational guidance; and marketing.

7301**Pharmacology****Stage 1**

BIOS1101, BIOS1201

CHEM1101, CHEM1201

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

Elective subjects totalling 30 Credit Points.

Stage 2

PHPH2112*

BIOC2101 and BIOC2201, or

BIOC2181 and BIOC2291**

English Proficiency

A high proficiency in English is needed to pass Psychology subjects.

1200**Psychology****Stage 1**

MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PSYC1001 and PSYC1011
Elective subjects totalling 60 Credit Points*

Stage 2

PSYC2001, PSYC 2061, PSYC2071, PSYC2081
Elective subjects totalling 60 Credit Points*
One 56 hour or two 28 hour General Education subjects

Stage 3

Level III Psychology subjects totalling 60 Credit Points
Elective subjects totalling 45 Credit Points*
One 56 hour or two 28 hour General Education subjects

** Suitable supporting subjects include Anatomy, Physiology, Genetics of Behaviour, Science and Technology Studies, and Philosophy. Students may contact the School for advice.*

1206**Psychology with Computer Science (Course 3978 Only)**

This program is for students with interests in computational modelling and artificial intelligence, on the one hand, and human information processing, cognition, and group decision making, on the other. The program should be particularly useful for those who will work in a commercial environment that requires both 'people skills' and an application oriented knowledge of computing. It would also serve as a good basis for interdisciplinary research in areas that include both Psychology and Computer Science.

Stage 1

COMP1011 and COMP1021
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
PSYC1001 and PSYC1011
Elective subjects totalling 15 Credit points

Stage 2

COMP2011 and COMP2031
PSYC2001, PSYC2011, PSYC2071 and PSYC2081
Elective subjects totalling 30 Credit Points from the list below*
One 56 hour or two 28 hour General Education subjects

Stage 3

COMP3111, COMP3411 and COMP3511
PSYC3001 and either PSYC3151 or PSYC3211
subjects totalling 45 Credit Points from the list below*,
Elective subjects including Level III Psychology subjects
totalling at least 30 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours)

COMP4913 or PSYC4023 or PSYC4033

Students proposing to proceed to the honours Stage in Psychology must take Psychology subjects totalling 120 Credit Points in Stages 2 and 3 (PSYC2001, PSYC2011, PSYC2071 and PSYC2081 at Level II and PSYC3001, either PSYC3151 or PSYC3211 and 2 other Psychology subjects at Level III). Entrance to PSYC4023 requires students to have completed Psychology subjects with an average of at least 70% (PSYC1001 and PSYC1011 are not included in the average). Students whose average falls below 70% enrol in PSYC4033.

Students proposing to proceed to the honours Stage in Computer Science must take Level III Computer Science subjects totalling 60 Credit Points

***Elective List**

COMP2021, Level III Computer Science subjects not otherwise specified
PSYC2061, PSYC3011, PSYC3141, PSYC3151,
PSYC3161, PSYC3211, PSYC3221, PSYC3241,
PSYC3251

SAFETY SCIENCE

Safety Science is the application of physical, behavioural and life sciences to the health and safety of people at work and in the community. This program provides a multidisciplinary background required for students wishing to specialise in safety science. Careers in safety science are mostly based in the workplace and the BSc in Safety Science therefore focuses on issues related to occupational health and safety. It is a requirement that all safety graduates have knowledge of: the structure and function of the body; chemical, physical and engineering principles; and a working competence in statistics. The proposed program structure attempts to provide some of this knowledge and these competencies.

This program has been designed in consultation with safety professionals and with industry with a view to training students in occupational health and safety, risk management, chemical safety, or ergonomics for both the private and public sectors. Contacts in industry and commerce suggest that graduates in safety science would be keenly sought to cope with the increasing emphasis of health and safety in business activities. These programs can also lead to postgraduate training in safety after suitable experience (normally at least two years work in a relevant area after graduating).

8000**Safety Science**

Safety science is a multidisciplinary subject with an emphasis on identification, assessment, control and risk management of workplace hazards and risks.

Stage 1

MATH1131 or MATH1141 or MATH 1011,
MATH1231 or MATH1241 or MATH 1021
PHYS1002 or PHYS1022
CHEM1101 and CHEM1201

One of these requirements is to be completed in Stage 2
BIOS1011 and BIOS1201 or
PSYC1001 and PSYC1011

Stage 2

BIOS1101 and BIOS1201 or
PSYC1001 and PSYC1011
MATH2801 or MATH2841 or BIOS2041 or PSYC2001 or
SESC6021

at least 30 credit points from any two of the following areas:

PHYS2011, PHYS2021, PHYS2031, PHYS1159,
PHYS2410, PHYS2810

(Note: Some of these subjects may have MATHS co-requisites)

or

CHEM2011 and CHEM2849

or

BIOC2101 or BIOC2181, BIOC2201 or BIOC2291,
BIOS2011, BIOS2021, MICR2201

or

PSYC2011, PSYC2061, PSYC2071, PSYC2081

Elective subjects totalling 15 Credit Points

One 56 hour or two 28 hour General Education subjects

Stage 3

SESC3111, SESC3311, SESC3611, SESC3621,
SESC4511

Elective subjects totalling 30 credit points

One 56 hour or two 28 hour General Education subjects

8100 (Advanced Science Only)**Safety Science with Physics**

Safety science is a multidisciplinary subject with an emphasis on identification, assessment, control and risk management of workplace hazards and risks.

Stage 1

MATH1131 or MATH1141,
MATH1231 or MATH1241
PSYC1001 and PSYC1011
CHEM1101 and CHEM1201
BIOS1011 and BIOS1201

Stage 2

PSYC1002

MATH2841

MATH2011, MATH2120, PHYS2011, PHYS2021,
PHYS2031

7.5 Credit Points from

PHYS1159, PHYS2410, PHYS2810

One 56 hour or two 28 hour General Education subjects

Stage 3

SESC3111, SESC3311, SESC3611, SESC3621
PHYS3110 or PHYS3120, PHYS3230, PHYS3760,
PHYS4411, SESC4410,

and 15 Credit Points from PHYS3630, PHYS3710,
PHYS1159, PHYS2410, PHYS2810

One 56 hour or two 28 hour General Education subjects

Stage 4

SESC4510, SESC4410, SESC4810, SESC4960
Elective subjects totalling 15 credits

8200 (Advanced Science Only)**Safety Science with Chemistry**

Safety science is a multidisciplinary subject with an emphasis on identification, assessment, control and risk management of workplace hazards and risks.

Stage 1

CHEM1101 and CHEM1201

MATH1131 or MATH1141,

MATH1231 or MATH1241

PHYS1002

BIOS1011 and BIOS1201

Stage 2

PSYC1002

MATH2841

CHEM2011, CHEM2021, CHEM2031, CHEM2041

Elective subjects totalling 15 Credit points

One 56 hour or two 28 hour General Education subjects
(15 Credits)

Stage 3

SESC3111, SESC3311, SESC3611, SESC3621
CHEM3041, CHEM3311

30 Credit Points from CHEM3021, CHEM3301,
CHEM3031, CHEM3101

One 56 hour or two 28 hour General Education subjects

Stage 4

SESC4510, SESC4410, SESC4810, SESC4960
Elective subjects totalling 15 credits

8400 (Advanced Science Only) Safety Science with Psychology

Safety science is a multidisciplinary subject with an emphasis on identification, assessment, control and risk management of workplace hazards and risks.

Stage 1

BIOS1011 and BIOS1201
MATH1131 or MATH1141 or MATH1011,
MATH1231 or MATH1241 or MATH1021
PHYS1022
PSYC1002

Stage 2

CHEM1101 and CHEM1201
PSYC2001
PSYC2011, PSYC2061, PSYC2071, PSYC2081
Elective subjects totalling 15 Credit points
One 56 hour or two 28 hour General Education subjects
(15 Credits)

Stage 3

SESC3111, SESC3311 or PSYC3141, SESC3611,
SESC3621
PSYC3121, PSYC3151, PSYC3211, PSYC3271
One 56 hour or two 28 hour General Education subjects

Stage 4

SESC4510, SESC4410, SESC4810, SESC4960
Elective subjects totalling 15 credits

SCIENCE AND TECHNOLOGY STUDIES

Science and Technology Studies offers an integrated program combining subjects in the History and Philosophy of Science and Technology (HPST) and in Science, Technology, and Society (SCTS).

Subjects in the History and Philosophy of Science and Technology (HPST) examine the history of scientific and technological development, the nature and philosophical implications of the knowledge and methods involved in this development, and the historical dynamics of scientific and technological change. Subjects in Science, Technology, and Society (SCTS) examine the social, economic, environmental and political dimensions of scientific and technological change, especially in the twentieth century.

6200 Science and Technology Studies

Stage 1

MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Level I HPST or SCTS subjects totalling 15 Credit Points
Elective subjects totalling 75 Credit Points (which may include one additional SCTS or HPST Subject)

Stage 2

HPST2106
SCTS2107
One additional HPST or SCTS subject totalling 15 Credit Points
Elective subjects totalling 75 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3

HPST or SCTS subjects totalling 60 Credit Points
Elective subjects totalling 45 Credit points
One 56 hour or two 28 hour General Education subjects
Students intending to proceed to Stage 4 (Honours) must complete HPST or SCTS subjects totalling 120 Credit Points including 105 Level II/III Credit Points with an average of credit or better

Stage 4 (Honours)

SCTS4106 (full time) or
SCTS4156 (part time)

ZOOLOGY

Animal Science is the study of the structure, function, classification, genetics, evolution, habits and distribution of animals and their relationship to each other and to the environment. The school has special expertise in animal behaviour, ecology, entomology, evolutionary studies and palaeontology, marine biology, neurobiology and physiology. The courses leading to the award of a science degree in Zoology are dependent on adequate background in biometry and biochemistry.

1745

Zoology

Stage 1

BIOS1101, BIOS1201
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective subjects totalling 30 Credit Points

Stage 2

BIOC2101, BIOC2201 or BIOC2181 and BIOC2291
BIOS2011, BIOS2021, BIOS2031, BIOS2041,
BIOS2061

Elective subjects totalling 15 Credit points

One 56 hour or two 28 hour General Education subjects

Stage 3

subjects totalling 60 Credit Points from BIOS3011,
BIOS3021, BIOS3031, BIOS3051, BIOS3071,
BIOS3081, BIOS3091, BIOS3111, BIOS3131

Elective subjects totalling 45 Credit points (which may
be also from this list)

One 56 hour or two 28 hour General Education subjects

Students proposing to proceed to Stage 4 (Honours) must
complete Level III subjects totalling 105 Credit Points

Stage 4 (Honours)

BIOS4038 (F/T), BIOS4034 (P/T)

Undergraduate Study

Specific Science degree courses

Besides the undergraduate studies in Science and Advanced Science there are other specific courses offered in the Faculty of Life Sciences and in the Faculty of Science and Technology. These are the Applied Geography Course (UAC429022), Applied Geology Course (UAC429021), Aviation Course (UAC429017), Biotechnology Course (UAC9018), Food Science and Technology Course (UAC429020), Business Information Technology Course 3971 (UAC429024), Optometry Course 3950 (UAC429025), and Combined Science/Optomety Course 3951, Psychology Full-time Degree Course 3431 (UAC429026), Textile Technology (UAC 429027, 429028, 429029).

There are also other degrees from Faculties other than Science which can be combined with a science degree.

stream additionally includes flying training to a minimum level of Commercial Pilots Licence (CPL) with additional options available dependent upon student progress and requirements. In lieu of flying training, the Operations Management stream offers a selection of subjects designed to provide students with a broad base of knowledge in the operational aspects of the aviation industry. The latter stream is ideally suited to those with previous airline experience but who wish to develop tertiary level skills and formalise their qualifications.

It should be noted that due to the block training nature of the program, teaching periods may not correspond to standard academic sessions.

A total of 345 Credit Points plus 30 Credit Points of General Education are required for the completion of the Bachelor of Aviation.

Board of Studies in Science and Mathematics

3980 Aviation Degree Course Full Time

Bachelor of Aviation BAv

The Aviation Course leads to the award of the degree of Bachelor of Aviation on the completion of a three year program. It is offered jointly by the Faculties of Science and Technology and Engineering. The main aim of the course is to provide an opportunity for students to prepare for a career in the aviation industry in the flying or managerial sectors. There are two distinct streams within the Bachelor of Aviation – Flying and Operations Management. Each stream consist of a core of subjects selected from the Faculties offering the program. The Flying

2001 Flying Stream

Stage 1
AVEN1310, AVEN1910
AVIA1100, AVIA1150, AVIA1900, AVIA1002
MATH1079
PHYS1889
SESC1560

Stage 2
AVEN2901, AVEN2902, AVEN2903
AVIA2003, AVIA2100, AVIA2800
MATH2079
SESC2560
Four 28 hour General Education Subjects

Stage 3
AVIA2700, AVIA3004
Choose 52.5 CP from:
AVEN3220, AVEN3230, AVEN3410, AVEN3610,
AVEN3710, MATH3270, PHYS2810, AVIA3800

2003**Operations Management Stream****Stage 1**

AVEN1310, AVEN1910
 AVIA1100, AVIA1150, AVIA1200, AVIA1300
 AVIA1900
 MATH1011, MATH1021
 PHYS1022
 SESC1560

Stage 2

AVIA2400, AVIA2700
 Choose 97.5 CP from:
 AVEN2210, AVEN2901, AVEN2902, AVEN2903
 AVIA2100, AVIA2200, AVIA2500, MATH2079,
 MATH2870, PHYS2850, IROB2721, SESC2560
 Elective subjects totalling 15 Credit Points
 Two 28 hour or one 56 hour General Education subject

Stage 3

AVIA3002
 Choose 87.5 CP from:
 AVEN3220, AVEN3230, AVEN3410, AVEN3610,
 AVEN3710, AVEN3930
 AVIA3400, AVIA3600, AVIA3700, AVIA3810, MATH3270
 PHYS2810
 Elective subjects totalling 15 Credit Points
 Two 28 hour or one 56 hour General Education subjects

Department of Biotechnology

Biotechnology can be defined as the use of various biological processes to make products and perform services. The essential feature of biotechnology therefore is the use of biological processes based on living cells and biochemical macromolecules such as proteins, DNA and RNA in a rapidly expanding range of activities of benefit to mankind. As such, biotechnology makes practical use of the recent scientific advances in areas such as molecular genetics.

The development of recombinant-DNA (r-DNA) technology has resulted in the ability to produce large quantities of any potentially useful product. Based on this technology, a new generation of biopharmaceuticals, including hormones, vaccines, anti-hypertensive and anti-inflammatory agents, are being developed which have the potential to revolutionise medicine.

Microorganisms and viruses are being modified for use in controlling plant and animal diseases and pests. Diagnostic kits are being developed for use in forensic science and in product identification and quality control. In addition, genetic improvements in agriculture, plants and animals are becoming a reality, as is the control of inborn genetic disorders in humans.

Bioprocesses are also used in the extraction of minerals from low grade ores, and modified and novel bioprocesses are being developed for the treatment of waste and degradation of recalcitrant molecules, an area of vital importance in our increasingly polluted planet.

The future for expansion in all the above areas is immense, and an ability to cope with the problems of the 21st century will be heavily dependent on these advances.

Course Outlines

The Department of Biotechnology offers undergraduate training in the BE Degree Course in Bioprocess Engineering, the BSc Degree Course in Biotechnology and in the BSc Degree Course through the Board of Studies in Science and Mathematics.

The BE Course in Bioprocess Engineering is four years full-time and has been designed to meet the requirements for membership of the Institution of Engineers, Australia.

The BSc (Biotechnology) Course is four years full-time and awarded with Honours to students who have distinguished themselves in coursework and in the final year project.

The BSc Course through the BSSM is three years for a Pass degree during which the student can study aspects of biotechnology in combination with another major in a relevant discipline, preferably biochemistry, microbiology or chemistry. The fourth Honours Year of this BSc Course includes further formal training in biotechnology as well as an extensive research project.

Degree Requirements**General Education Requirement**

The University requires all students to complete a coherent sequence of General Education subjects. The General Education Program is an integral part of the BSc Biotechnology course and gives students the opportunity to address some of the key questions they will face as individuals, citizens and professionals.

Students in the BSc Biotechnology course must complete General Education subjects totalling 168 hours, or 112 hours plus objective 5. General Education is designed to permit students to address questions concerning the design and responsible management of the human and planetary future.

Prerequisites and Corequisites

Where a choice of subjects is available in a program students must take care to satisfy prerequisites and corequisites. A prerequisite is a subject which must be completed prior to enrolment in the subject for which it is prescribed. A corequisite subject is one which must either be completed successfully before, or studied concurrently with, the subject for which it is prescribed.

Progression and Exclusion

Students whose performance is unsatisfactory will be asked to show cause at the end of the academic year why they should remain in their course of study. Any student who fails a subject twice, or is deemed to be making unsatisfactory progress, will be required to show cause.

Unsatisfactory progress may include:

- failure to achieve an average of 65 or higher in subjects attempted in an academic year;
- failing to pass Subjects totalling at least 60 Credit Points in one year;
- failing to complete the requirements for stage one of the course in the first two years of study.

Students required to show cause will be informed by the Registrar in writing. Students who apply to show cause will be assessed in accordance with the University's procedures. Failure to show cause can result in exclusion from a subject, the course, or transfer to the Science and Mathematics course (3970), provided that the progression requirements in that course have been met. Also see the section on progression and exclusion ('Restrictions on Students Re-enrolling') in the Student Guide.

Progression to Stage 4 Honours Program

Progression to Stage 4 is subject to academic performance. Students seeking to enrol in a Stage 4 honours program are required to have the approval of the Head of School and normally will be required:

- to have completed the requirements for Stages 1, 2 and 3 of the course and to have completed all General Education subjects
- to have attained an average of 65 or higher in each stage of the program.

Students who do not attain an average of 65 or higher in Stage 3 of the course are normally required to transfer to the Science and Mathematics course (3970) and take out the BSc Biotechnology award at pass level.

3052

Biotechnology Full-time Course

Bachelor of Science

BSc

This course in Biotechnology offers a comprehensive education in all aspects of modern applied biology. It leads to the award of a Bachelor of Science Degree over four years full-time study, with Honours for students who perform with merit.

Graduates in Biotechnology will be able to find employment in industries and other organisations involved with biopharmaceutical production and food processing, as well as in agricultural and environmental biotechnology.

Year 1

BIOS1101	Evolutionary and Functional Biology
BIOS1201	Molecules, Cells and Genes
CHEM1101	Chemistry 1A and
CHEM1201	Chemistry 1B
MATH1131	Mathematics 1A <i>or</i>
MATH1141	Higher Mathematics 1A <i>or</i>
MATH1011	General Mathematics 1B
MATH1231	Mathematics 1B <i>or</i>
MATH1241	Higher Mathematics 1B <i>or</i>
MATH1021	General Mathematics 1C
plus additional level 1 subjects totalling 30 Credit Points: recommended	
PHYS1002	Physics 1 <i>or</i>
PHYS1022	Introductory Physics 1 <i>or</i>
CHEN1020	Engineering 1CE

Year 2

BIOC2101	Principles of Biochemistry
BIOC2201	Principles of Molecular Biology
BIOS2011	Evolutionary and Physiological Ecology
BIOS2021	Introductory Genetics
MICR2011	Microbiology
MICR2201	Introductory Microbiology
CHEM2021	Organic Chemistry <i>or</i>
CHEM2849	Analytical Chemistry
plus 15 Credit Points at Level II	
2 General Education Subject(s)	

Year 3

BIOC3121	Molecular Biology of Nucleic Acids
BIOC3281	Recombinant-DNA Techniques and Eukaryotic Molecular Biology
BIOT3011	Biotechnology A
BIOT3061	Monoclonal Antibody and Genetic Techniques in Biotechnology
MICR3041	Immunology 1
MICR3071	Environmental Microbiology
plus an additional 2 Level III subjects to be selected from the following:	
BIOC3111	Molecular Biology of Proteins
BIOC3271	Cellular Biochemistry and Control
MICR3051	Immunology 2
2 General Education Subject(s)	

Year 4

BIOT3031	Microbial Genetics
BIOT3021	Biotechnology B
BIOT4053	Research Project
2 General Education Subject(s)	

3055**Bioprocess Engineering Full-time Course****Bachelor of Engineering
BE**

The first two years of the course are similar to the first two years of the Chemical Engineering degree course with the addition of basic training in Biology. The third year of the course contains basic training in Biochemistry, Microbiology as well as the Chemical Engineering subjects and an introduction to Bioprocess Engineering which will be further developed in the fourth year. The course has been designed so that graduates can find employment in the fermentation, food processing, pharmaceutical, agro-industrial and waste treatment industries.

Year 1

CHEM1101	Chemistry 1A and
CHEM1201	Chemistry 1B
CHEN1020	Engineering 1 CE
MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
PHYS1002	Physics 1
2 General Education subject/s	

Year 2

BIOS1201	Molecules, Cells and Genes
CEIC2010	Instrumental Analysis
CEIC2020	Computing
CEIC2030	Applied Thermodynamics and Rate Processes
CEIC2040	Applied Electrochemical and Surface Properties
CHEN2010	Materials and Energy Balances
CHEN2020	Flow of Fluids
CHEN2030	Heat Transfer
CHEN2040	Mass Transfer Fundamentals
CHEN2050	Chemical Engineering Laboratory 1
ELEC0807	Electrical Engineering 1E
INDC2050	Physical Processes Lab.
MATH2021	Mathematics 2
MATH2819	Statistics SA
2 General Education subject/s	

Year 3

BIOC2181	An Introduction to Biochemistry
BIOC2291	An Introduction to Molecular Biology
BIOT3100	Fermentation Processes
CEIC3010	Reaction Engineering
CHEN3010	Engineering Thermodynamics
CHEN3020	Numerical Methods
CHEN3030	Fluids II
CHEN3040	Separation Processes
CHEN3050	Particle Mechanics
CHEN3060	Process Plant Engineering I
CHEN3070	Process Control

CHEN3080	Chemical Engineering Laboratory II
MICR2201	Introductory Microbiology

Year 4

APSE0002	Social Issues in Science and Technology
BIOT4063	Research Project
BIOT4093	Biological Process Engineering
CHEN4030	Safety and Environment
CHEN4070	Process Dynamics and Control
CHEN4081	Design Project 1
CIVL0616	Structures
CHEN4110	Process Analysis and Synthesis
CHEN4120	Process Plant Management and Operation

**Department of Food Science and
Technology**

Food science and technology involves the understanding of basic sciences and the application of this knowledge to foods from the point of production, through handling, processing, preservation, distribution and marketing, up to consumption and utilisation by consumers. It is concerned with food processes, food commodities, food composition and food quality (including sensory properties, safety and nutritional value).

The study of food science and technology integrates many scientific disciplines. Its bases are in chemistry, physics, biochemistry and microbiology. Its borders merge with those of agriculture, engineering, human nutrition, public health, commerce, psychology and law. Biotechnology has a role of increasing importance in food science and technology.

The food scientist and food technologist are concerned with population food supplies and requirements, community wants and needs, and equitable distribution of foods to ensure human nutritional needs are met.

New knowledge is acquired in the laboratory, the pilot plant, and the community, and then applied to the development of safe, nutritious and palatable foods, beverages and food ingredients by optimisation of processes and equipment. Foods are studied in terms of their basic constituents and structures, and the changes they undergo when subjected to handling, processing and distribution.

The food scientist and food technologist are equally concerned with the development and selection of raw materials from agricultural, horticultural, animal and marine sources.

A safe, adequate, palatable and nutritious food supply is essential to human health. The food and beverage industry is of major economic importance and in Australia is the largest sector of manufacturing industry. Internationally, food production, processing and service are among the largest and most stable industries. The challenges are to increase the availability, variety, quality and quantity of foods economically and in line with the needs of the world population. The Australian industry has a major role to play

in supplying high quality foods to emerging overseas markets and there is a national and international demand for professionally trained people prepared to accept responsibility for the quality and safety of food.

The Department offers a four-year full-time course leading to the award of Bachelor of Science and a six-year part-time course leading to the award of the degree of Bachelor of Science (Technology). Graduates of both courses qualify for membership of the Australian Institute of Food Science and Technology, the US Institute of Food Technologists, and may qualify for membership of the Royal Australian Chemical Institute.

Graduate Diploma and Master of Applied Science courses in Food Science and Technology are offered for graduates in science or agriculture wishing to familiarise themselves with the principles of food science and technology.

The courses provide basic preparation for food science and technology careers in the food industry, the public sector, education, research, the food service industry, public health, management and marketing. Graduates may also find careers in health and environmental sciences, management of food resources and food wastes, and communication, and in areas such as dietetics after further training.

Course Outlines

3060

Food Science and Technology Full-time Course

Bachelor of Science BSc

This course is designed to provide depth and breadth in the relevant physical and biological sciences on which food science and technology is based. Students completing the Year 1 requirements are eligible for selection for admission to Year 2 of the course. It is strongly recommended that students obtain, before the completion of the course and during recess periods, as much professionally oriented or industrial experience as possible.

Note: The course is currently being revised. Year 2 of the New Course will be introduced in 1998.

Year 1 (New Course)

BIOS1101	Evolutionary and Functional Biology
BIOS1201	Molecules, Cells and Genes
CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
FOOD1100	Food in Society
MATH1141	Higher Mathematics 1A or
MATH1131	Mathematics 1A or

MATH1011	General Mathematics 1B
and	
MATH1241	Higher Mathematics 1B or
MATH1231	Mathematics 1B or
MATH1021	General Mathematics 1C
PHYS1002	Physics 1 or
PHYS1022	Physics 1 for Health and Life Scientists

Year 2 (New Course)

BIOC2101	Principles of Biochemistry or
BIOC2181	Introduction to Biochemistry
BIOC2201	Principles of Molecular Biology or
BIOC2291	Introduction to Molecular Biology
CHEM2021	Organic Chemistry
CHEM2041	Chemical and Spectroscopic Analysis
CHEM2819	Physical Chemistry for Food and Fibre Science and Technology
FOOD1210	An Introduction to Sensory Analysis
FOOD3210	Introductory Nutrition
FOOD4220	Computer Applications
MATH2889	Applied Statistics SF
MICR2218	Microbiology

Year 3 (Old Course)

BIOT3041	Principles of Biotechnology
CHEM3926	Instrumental Methods of Food Analysis
CHEM3929	Food Chemistry
FOOD1310	Food Preservation
FOOD1320	Plant Food Science
FOOD1330	Animal Food Science
FOOD1340	Quality Evaluation and Control
FOOD1350	Food Technology Laboratory
FOOD2310	Food Microbiology
FOOD3310	Nutrition
FOOD4310	Food Process Engineering
FOOD4320	Computer Applications
General Education subject/s	

Year 4 (Old Course)

SESC3310	Social Issues in Science and Technology
FOOD1400	Project
FOOD1410	Field Excursions
FOOD1420	Food Legislation
FOOD1430	Food Industry Management
General Education Subject/s	
Plus three or more of the following electives to a total of not less than 42.5 credit points.	
FOOD1440	Food Quality and Product Development
FOOD1450	Food Processing Wastes
FOOD1460	Cereal Technology
FOOD1470	Postharvest Technology of Foods
FOOD2410	Advanced Food Microbiology
FOOD2430	Quality Assurance and Food Microbiology
FOOD2440	Microbial Food Spoilage
FOOD2450	Foodborne Microorganisms of Public Health Significance
FOOD2460	Food and Beverage Fermentations
FOOD2470	Microorganisms as Food Processing Aids and Ingredients
FOOD3410	Nutrient Analysis of Foods
FOOD3420	Population and Applied Nutrition

FOOD3430	Special Dietary Foods and Ingredients
FOOD4420	Food Packaging
FOOD4430	Advanced Food Engineering A
FOOD4440	Advanced Food Engineering B

or such other electives to a total of not less than 42.5 credit points, as approved by the Head of Department. Year 4 totals at least 120 credit points.

During Years 3 and 4 of the course excursions are made to various food industries. Detailed reports of some of these visits are required.

Detailed reports of the students' activities during their periods in industry are required.

3065

Honours in Food Science Full-time Course

Bachelor of Science (Honours) BSc (Hons)

This course is designed to provide extensive research training in some aspects of food science and technology, at undergraduate level. The research orientation of the course, compared to the Graduate Diploma, facilitates entry into a research higher degree (MSc/PhD) upon completion of Honours at a satisfactory level.

Entry to the course requires satisfactory completion of a Bachelor degree, or equivalent, in an area considered relevant to food science and technology. Students who have completed a four-year Bachelor course, in which Honours has already been awarded, are specifically excluded.

The major component of the course is an extensive research project, conducted throughout one year of full time study. Candidates also take 10 credit points of subjects within the Department, or such other subjects as approved by the Head of Department, in each session, and complete a program of General Studies, dealing with social and ethical issues relevant to food science and technology. Honours is awarded on the basis of performance in the research project and satisfactory completion of coursework.

Compulsory Subjects

FOOD9410	Honours Research Project
FOODXXXX*	
General Education	

**Subjects offered by the Department of Food Science and Technology or as approved by the Head of Department and dependent on the background of the candidate. Credit points for coursework subjects may be concentrated in one session.*

3070

Food Science and Technology Part-time Course

Bachelor of Science (Technology) BScTech

This course is designed for students who are employed in the food processing industries. It extends over six part-time years of study, and leads to the award of the degree of Bachelor of Science (Technology). Students are required to complete an approved program of industrial training of not less than twelve months prior to the award of the degree. Industrial training should normally be completed concurrently with attendance in the course, but with the approval of the Head of Department may be completed after completion of the prescribed course of study.

The course covers the same subject matter as the first three years of the full-time course. For the first two years students follow a common course in which general biology is taken, and thereafter specialise in the biological sciences, which are fundamental to the study of food science and technology. The subjects of Stages 4, 5 and 6 may be available only in day-time classes, and substantial day-time release from industry may be required. Students who have completed the requirements of this course and have qualified for the award of the degree of Bachelor of Science (Technology) may proceed to the award of the degree of Bachelor of Science by attending for one full-time year and completing the subjects listed in Year 4 of the full-time course. Students desiring to proceed to the award of a BSc degree must apply to the Head of the Department not later than 31 December of the year in which the sixth stage is completed.

Stages 1 and 2

BIOS1101	Evolutionary and Functional Biology
BIOS1201	Molecules, Cells and Genes
CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
FOOD1100	Food in Society
MATH1141	Higher Mathematics 1A or
MATH1131	Mathematics 1A or
MATH1011	General Mathematics 1B
MATH1241	Higher Mathematics 1B or
MATH1231	Mathematics 1B or
MATH1021	General Mathematics 1C
PHYS1002	Physics 1 or
PHYS1022	Physics 1 for Health and Life Scientists

Note: Physics and Mathematics are usually taken as Stage 1, the other subjects as Stage 2

Stage 3 (New Course)

BIOC2101	Principles of Biochemistry or
BIOC2181	Introduction to Biochemistry
BIOC2201	Principles of Molecular Biology or
BIOC2291	Introduction to Molecular Biology
CHEM2021	Organic Chemistry
CHEM2041	Chemical and Spectroscopic Analysis

Stage 4 (New Course)

CHEM2819	Physical Chemistry for Food and Fibre Science and Technology
FOOD1210	An Introduction to Sensory Analysis
FOOD3210	Introductory Nutrition
FOOD4220	Computer Applications
MATH2889	Applied Statistics SF*
MICR2218	Microbiology

*Subject number/name to be determined/approved by BSSM or equivalent

Stage 5 (Old Course)

BIOT3041	Principles of Biotechnology
CHEM3929	Food Chemistry
FOOD2310	Food Microbiology
FOOD3310	Nutrition
FOOD4310	Food Process Engineering
FOOD4320	Computer Applications
General Education subject/s	

Stage 6 (Old Course)

CHEM3926	Instrumental Methods of Food Analysis
FOOD1310	Food Preservation
FOOD1320	Plant Food Science
FOOD1330	Animal Food Science
FOOD1340	Quality Evaluation and Control
FOOD1350	Food Technology Laboratory
General Education subject/s	

School of Geography

Geography is the study of spatial and temporal variations of the phenomena which make up the world of humanity.

The cultural significance of geography lies in its contribution to an understanding of the total environment. The geographer's skills also find practical application in the conservation and planned development of resources. Increasing numbers of geographers are employed as professionals in these applications. For instance, geomorphologists and biogeographers are undertaking resource inventory surveys and environmental assessment, and human geographers are engaged as urban and regional planners.

Course outlines

The School of Geography offers a four-year full-time course (3010). This course allows specialisations in environmental systems, urban management, resource management, or spatial information technologies.

Themes addressed in the courses include the use and management of scarce resources, the interaction between people and environment, soil conservation, vegetation management, land use conflict, place and identity, and spatial inequalities in economic and social well-being.

First year subjects involve systematic studies of the physical, human, and technological bases of geography. There is a progressive specialisation in the following years,

with an emphasis on field observation, data handling, policy and management. Several units in geography include laboratory and project work.

The Geographical Society

It is hoped that students taking geography as a degree will participate in the activities organised by the Geographical Society. The Society is open to new ideas and to students who are concerned with fostering an interest in geography outside their formal studies. Informal seminars are organised on subjects of interest to geographers.

Social activities have always been an important part of the Society and they have provided more than adequate opportunities for students to get to know each other and for students and staff to improve communication.

Course 3010

Bachelor of Science**BSc****(4 years, full-time)**

This is a four-year full-time course leading to the award of the degree of Bachelor of Science. The course aims to train professional geographers for entry into applied fields. This vocationally-oriented Applied Geography course provides an analytical approach to understanding and investigating some of society's more pressing problems.

Entry to stage 4 of the Bachelor of Science in Applied Geography is dependent upon academic performance in stage 2. Unsatisfactory performance in Geography subjects will prevent progression to stage 4. Students who do not achieve a credit average in second year geography subjects will be transferred into Program 2700 (Geography) of Course 3970 (Bachelor of Science).

New Course to be introduced in 1998**Stage 1**

GEOG1601	Global Development, Economy and Environment
GEOG1701	Environmental Systems and Analysis
GEOG1801	Spatial Information Technologies
one of:	
MATH1011	General Mathematics 1B or
MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
and one of:	
MATH1021	General Mathematics 1C or
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
and an additional 45 CP of Level 1 subjects:	
(see School advisers for recommended subjects)	

Stage 2* (New Course)

GEOG2001	Field Techniques
GEOG2101	Geographical Data Analysis

select three subjects from:

- GEOG2611 The Australian City
- GEOG2621 Regions, Resources and Spatial Systems
- GEOG2711 Australian Climate and Vegetation
- GEOG2721 Soils and Landforms
- GEOG2811 Introduction to Remote Sensing

select another three subjects from the above list, from third year, or from other Schools (see School advisers for recommended subjects):

One 56 hour or two 28 hour General Education subjects

Students continuing onto Year 3 in 1998 to contact School of Geography in order to determine Program requirements.

Stage 3*

- GEOG2811 Introduction to Remote Sensing
- GEOG3000 Field Project 3

select six subjects from:

- GEOG3025 Geomorphology
- GEOG3032 Remote Sensing Applications
- GEOG3041 Mathematical Models for Spatial Analysis
- GEOG3192 Urban and Regional Development
- GEOG3421 Special Research Methods
- GEOG3411 Special Topic
- GEOG3611 Surveys and Interviewing in Geography
- GEOG3621 Place and the Politics of Identity
- GEOG3631 Population Geography
- GEOG3671 Transport and Land Use
- GEOG3711 Biogeography
- GEOG3721 Pedology
- GEOG3761 Environmental Change
- GEOG3821 Geographic Information Systems Applications

- GEOG3861 Computer Mapping

select one other subject from the above list or from another School subject to approval by the Head of School.

One 56 hour or two 28 hour General Education subjects

Students continuing onto Year 4 in 1998 to contact School of Geography in order to determine Program requirements.

Stage 4*

- GEOG3911 Environmental Impact Assessment
- GEOG4010 Field Project 4
- GEOG4031 Project
- GEOG4042 Practical Applications

Two subjects from:

- GEOG4052 Advanced Spatial Analysis
- GEOG4062 Advanced Environmental Analysis

Or subjects from other Schools, subject to approval by the Head of School.

**The subjects offered, and course requirements, in third year will be altered in 1999.*

interest in the use of earth science for the benefit of humanity, including, for example, the search for and evaluation of metallic ore-bodies and accumulations of fossil fuels, or the application of geological knowledge to a range of engineering and environmental problems.

Course Outlines

The Applied Geology course provides a comprehensive education in all aspects of earth science. It leads to the award of a Bachelor of Science (BSc) degree in four stages normally taken over four years full-time study, with honours for students who perform with merit throughout the course program. The fourth stage can be taken part time over two years, normally Years 4 and 5.

Students learn the fundamental principles of geology through lectures, laboratory work, projects and field tutorials. At the same time they gain the practical skill and knowledge of geological applications necessary for employment in research, industry or government.

Graduates are prepared by the course to enter any branch of the geological profession, or to undertake further studies leading to a higher degree. They are also well equipped to change their field of employment as different opportunities arise.

No previous knowledge of geology is required to enter this course but a sound background in mathematics together with at least one other science subject is essential.

Students who have not undertaken chemistry at HSC level should take chemistry at the introductory level (CHEM1401 and CHEM1101) in Year 1, and CHEM1201 in the summer session before commencing Year 2.

Reciprocal courses are offered through the Board of Studies in Science and Mathematics in Geology (double major), Geochemistry, Geophysics, Earth and Environmental Science and courses that combine a single major in Geology with Physics, Chemistry, Mathematics or Botany and Zoology. These courses are all of three years full-time duration leading to a BSc at Pass level. An optional fourth year leading to Honours is available for students achieving a good academic standing.

3000

Applied Geology Full-time

Bachelor of Science BSc

Stage 1

- CHEM1401 Introductory Chemistry A and
- CHEM1101 Chemistry 1A and
- CHEM1201 Chemistry 1B

Department of Applied Geology

Geology is 'the science of the earth', and as such covers a broad spectrum of knowledge on the constitution and evolution of our planet. Applied Geology involves a specific

or

CHEM1101 Chemistry 1A *and*
 CHEM1201 Chemistry 1B
 GEOL1101 Geological Processes *and*
 GEOL1201 Geological Environments

one of:

MATH1011 General Mathematics 1B
 MATH1131 Mathematics 1A
 MATH1141 Higher Mathematics 1A

and one of:

MATH1021 General Mathematics 1C
 MATH1231 Mathematics 1B
 MATH1241 Higher Mathematics 1B

and either:

PHYS1002 Physics 1 *or*
 PHYS1022 Physics For Health and Life Sciences

or

BIOS1101 Evolutionary and Functional Biology *and*
 BIOS1201 Molecules, Cells and Genes

or

GEOG1701 Environmental Processes and Analysis

and

GEOG1601 Global Development, Economy and
 Environment in Australia

Stage 2

GEOL2100* Field Studies: Sedimentology and
 Palaeontology
 GEOL2110 Mineralogy
 GEOL2120 Sedimentary Processes and
 Environments
 GEOL2131* Geomapping 1
 GEOL2170 Earth Structures 1
 GEOL2180 Introduction to Igneous and Metamorphic
 Rocks
 GEOL2200* Field Studies: Petrology, Structure and
 Field Mapping
 GEOL2220 Sedimentary Rocks and Clay Minerals
 GEOL2231* Environmental Geophysics
 GEOL2250 Surficial and Coastal Geology
 GEOL2260 Geomapping 2
 GEOL2290 Groundwater Hydrology
 General Education subject/s

Stage 3

GEOL3101 Ore Deposits
 GEOL3110 Igneous and Metamorphic Processes
 GEOL3120 Stratigraphy and Palaeontology
 GEOL3131* Field Studies: Stratigraphy, Structure and
 Geologic Mapping
 GEOL3170 Earth Structures 2
 GEOL3201* Field Studies: Ore Deposits, Structural
 and Metamorphic Geology
 GEOL3231* Exploration Geophysics
 GEOL3241* Sedimentary Basin Resources
 GEOL3250 Engineering and Environmental Geology
 GEOL3280* Exploration and Environmental
 Geochemistry

General Education subject/s

General Education (Objective 5)

Stage 4

GEOL4100 Geological Communication
 GEOL4130 Evaluation of Geological Data
 GEOL4140 Project Management
 GEOL4180 Analysis of Natural Materials
 GEOL4102* Special Topics in Applied Geology
 GEOL4204 Field Project
 Applied Geology Part-time Program
 Part-time study is only available in Stage 4.

Stage 4a (P/T)

GEOL4102* Special Topics in Applied Geology
 GEOL4203 Field Project (P/T)

Stage 4b (P/T)

GEOL4100 Geological Communication
 GEOL4130 Evaluation of Geological Data
 GEOL4140 Project Management
 GEOL4180 Analysis of Natural Materials
 GEOL4203 Field Project (P/T)

**Includes Geological Fieldwork*

3100

Industrial Chemistry

Full-time

Bachelor of Science

BSc

Industrial Chemistry is a four year professional (prescribed) science course that is concerned with the application of science and technology to the chemical industry. It is a well rounded course which prepared graduates for a challenging and flexible career path.

Industrial chemists are capable of fulfilling a multiplicity of roles – as research scientists, development chemists, technical representatives and as plant/company managers.

The industrial chemistry course at the University of New South Wales is the only one of its type in Australia. It has the unique advantage of being in a school which offers both science and engineering degrees. It is the only science course whose graduates are eligible for full membership of the Australian Institute of Engineers as well as the RACI. The fourth year of the course is a compulsory honours year.

Degree Program

Stage 1

CHEM1101, CHEM1201
 INDC1020
 MATH1131, MATH1231 *or*
 MATH1141, MATH1241
 PHYS1002

Stage 2

CEIC2010, CEIC2020, CEIC2030, CEIC2040
 CHEM2021, CHEM2031
 INDC2010, INDC2020, INDC2030, INDC2050
 MATH2021, MATH2819,
 PHYS2920
 General Education Subjects

Stage 3

BIOT3100
 CEIC3010, CEIC4010
 CHEM3829
 INDC3010, INDC3031, INDC3041, INDC3050,
 INDC3060, INDC3070, INDC3080, INDC3090
 POLY3010
 General Education Subjects

Stage 4

APSE0002,
 CEIC4020
 INDC4040, INDC4060, INDC4070, INDC4080,
 INDC4090, INDC4130
 POLY4010
 General Education Subjects

3971
Business Information Technology
Full-time
Bachelor of Science
BSc

This is an industry linked education course leading to the award of the qualification Bachelor of Science. The course draws on three core disciplinary areas: Information Systems, Accounting, and Computer Science.

The course has been designed in conjunction with the Information Systems industry to provide for the needs of Australian businesses. The course combines the normal requirements for the award of the degree with coordinated industrial experience in the sponsoring organisations. A scholarship is payable from a fund donated by the sponsoring organisations. Entry to the course is limited to students awarded a scholarship through the BIT selection Procedure.

Consideration for entry to the course may proceed only on the basis of an application directly to Co-Op program Office at the University of New South Wales and application through UAC.

Students who are academically acceptable for the 3971 course but who are not offered a scholarship should consider registering for first Stage entry into the 1400 program. If scholarships become available at the end of Stage 1, students undertaking the 1400 program may be offered transfer to the 3971 course.

An Honours option is also available within the four Stage BIT course. This option is available to students who perform well in Stages 1 and 2 and require additional courses in Stages 3 and 4; although it may also be possible to finalise the honours program within the first semester of a fifth Stage (possibly part-time).

Objectives of the Course

This four Stage course teaches Information Systems (see Program 1400 in 3970 for a description) and provides industrial training linked to that teaching. The three industrial training periods in the course are each of approximately six months duration, running from January of Stages 2 and 4, and July of Stage 3 of the program.

Degree Program**Stage 1**

ACCT1501, ACCT1511
 COMP1011, COMP1021
 INFS1602, INFS1603
 MATH1131 or MATH1141 or MATH1011
 MATH1231 or MATH1241 or MATH1021

Stage 2

ECON1101
 INFS2603, INFS2607, INFS2609, INFS2691
 Elective subjects totalling 15 Credit points
 One 56 hour or two 28 hour General Education subjects

Stage 3

INFS3605, INFS3608, INFS3616, INFS3692
 MATH2841
 Elective subjects totalling 30 Credit Points
 Honours students additionally take INFS3606 and a further elective subject totalling 15 Credit Points

Stage 4 (Pass Degree)

INFS3606, INFS3611, INFS4693
 subjects totalling 30 Credit Points including at least 15 Credit Points at Level III
 One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours Degree)

INFS3611, INFS4693, INFS4794, INFS4886, INFS4887,
 INFS4893, INFS4898
 One option must be chosen from INFS4805, INFS4810,
 INFS4811, INFS4812, INFS4825, INFS4848, INFS4853,
 INFS4857, INFS4891
 Choose elective subjects totalling 15 Credit Points from Level III
 One 56 hour or two 28 hour General Education subjects (which alternatively could be taken in Stage 3).

School of Materials Science and Engineering

The field of Materials Science and Engineering offers unlimited possibilities for innovation and development. Attention is being focussed on developing and processing metals, ceramics, polymers and composites with improved properties.

The activities of the materials engineer range from materials production, including their extraction from ores and their refining, to the design, development, processing and recycling of materials for use in aerospace, transportation, electronics, energy conversion, and biomedical systems.

Advanced materials can provide a major competitive advantage in virtually every part of a country's manufacturing industry. Because Australia is a country rich in minerals, materials science has been designated as a priority area for research and development. Examples of recent and significant developments include the emergence of environmentally friendly and economical metal processing methods; advanced surface coatings; electrical ceramics; engineering polymers, and advanced composites.

The School of Materials Science and Engineering provides education and training for students to prepare them for a significant and important career in the materials industry.

The School of Materials Science and Engineering is in a good position to provide the increased numbers of graduates necessary for development of these new initiatives in materials. It is the only school in Australia which offers professional courses in ceramic engineering, metallurgical engineering, and materials engineering as well as providing postgraduate specialisation in these fields.

The School is extremely well equipped with a wide range of advanced computing, thermal analysis, mechanical testing, X-ray, optical and electron microscopy facilities.

Ceramic engineers are needed in increasing numbers both in Australia and overseas countries and the School offers the only degree course in Ceramic Engineering in Australasia. This course trains students in the relation between the structure and the properties of ceramic materials, the engineering and process chemistry of their manufacture and the design principles of their use.

Careers open to graduates fall into three broad categories. Some go initially into activities associated directly with production, i.e. the design and layout of plants, supervision of their construction and control of their operations. Others move into research and development in industrial laboratories or research institutions. The final group enters fields outside of Ceramic Engineering directly, where the graduate's background in materials and engineering is utilised. In all cases, graduates with organising ability frequently move into management if they have an interest in this side of the industry.

In Australia, a number of government research organisations are active in ceramic research, e.g. the Australian Nuclear Science and Technology Organisation, and the Divisions of Materials Science and Building Research of the CSIRO. Investigations with more immediate applications are carried out in industrial laboratories. Even when the basic principles of a process have been worked out in the laboratory, its successful transfer to an industrial scale requires a great deal of effort and expertise. This is an area which offers great scope for further development in Australia.

Graduates in Ceramic Engineering are eligible for membership of the Institution of Engineers, Australia, the Institute of Ceramics, Great Britain, the Royal Australian Chemical Institute and the National Institute of Ceramic Engineers, USA

It is compulsory that, before completion of the course, students in Ceramic Engineering must obtain a minimum of twelve weeks' professionally oriented or industrial experience.

Ceramic Engineering and Ceramics

The ceramic industry produces an enormous volume and variety of products used in engineering applications, building construction and in our everyday life. As well as the traditional bricks, roof tiles, sheet and container glass and tableware, ceramics have been found essential as abrasives, refractories, enamels and in electrical and electronic applications and nuclear fuels. In many of these cases, ceramic articles make possible the manufacture of other products either by being a key component, such as an electronic or magnetic part, or by forming the material of construction of, for example, a blast furnace or an abrasive wheel.

Modern ceramics comprise such a varied and complex group of materials that a high level of training is required to control their manufacture with the required precision and to supervise their proper use.

Metallurgical Engineering

The metallurgical profession has developed in importance in keeping with growth of Australian metal and mineral industries. These industries are recognised as being important to the Australian economy and there is a strong demand for professional metallurgists in all sectors of these industries, as well as in the manufacturing industry.

Graduate metallurgists have a wide choice of type of employment and location. They may work in production, technical control or development, in metal or mineral producing plants in locations such as Newcastle, Port Kembla, Broken Hill, Mt Isa, Townsville, Gladstone, Port Pirie, Whyalla, Kwinana, Kalgoorlie or Pilbara; or in manufacturing plants, including the automobile, aircraft, and construction industries located mainly in the population centres.

In the metal industry, opportunities for a career in management are excellent, since it is a tradition in this industry that management should be in the hands of technical people. If graduates are inclined towards research and development, they will find considerable scope in various government, university, and industrial research laboratories.

The undergraduate courses in metallurgical engineering and metallurgy are broadly-based on engineering and physical sciences and have been designed to prepare graduates for employment in any field of metallurgy within the metal and manufacturing industries or in research institutions.

Graduates in Metallurgical Engineering are eligible for membership of the Institution of Engineers, Australia, the Australasian Institute of Mining and Metallurgy and the Institution of Metals and Materials Australasia.

Students are required to have gained at least twelve weeks of approved industrial experience before graduation. Industrial experience is usually obtained during the long recess periods.

Materials Engineering

Materials Engineering is a new and broad-ranging discipline which applies the principles of science and engineering to the design and development of metallic, ceramic and plastic materials and, to their manufacture into goods and their subsequent performance in service.

Materials Engineering is founded on the relationship between structure and properties, an understanding of which permits materials to be engineered to specific end use requirements. Virtually every man-made material is now the subject of study of the Materials Engineer.

Due to an increasing demand for optimised materials, graduates in Materials Engineering are presented with an outstanding range of job opportunities.

Many graduates pursue an industrial career either in the materials producing industries, the utilities, or manufacturing sector. Materials and process development and selection, supervision of manufacturing and production processes, technical trouble shooting and testing, are areas in which Materials Engineers are commonly engaged. Alternatively, graduates may pursue a research career, working in laboratories run by materials producing companies, and statutory commonwealth and state government departments. Graduates with an organising ability frequently move into management both in industry and research. Since materials engineering is a broadly-based scientific/engineering discipline, there is considerable flexibility in career selection.

Graduates in Materials Engineering are eligible for membership of the Institution of Engineers, Australia.

Students are required to have gained at least twelve weeks of professionally oriented or industrial experience in an area of industrial setting involving processing, production, characterisation, analysis, testing etc.

Ceramic Engineering and Ceramics

A four-year full-time course in Ceramic Engineering leading to the award of the BE degree, and a six-year part-time course in Ceramics leading to the award of the BSc (Tech) degree, are offered within the School.

3025

Ceramic Engineering Full-time Course

Bachelor of Engineering BE

Year 1

CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
MATH1131	Mathematics 1A <i>or</i>
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B <i>or</i>
MATH1241	Higher Mathematics 1B
MATS1001	Introduction to Materials Industry
MATS1011	Introduction to Materials Engineering
MATS1021	Introduction to Computing
MECH0130	Engineering Drawing and Descriptive Geometry
MECH0440	Engineering Statics
PHYS1002	Physics 1

Year 2

CHEM2818	Physical Chemistry
MATH2021	Mathematics 2
MATS1002	Microstructural Analysis
MATS1022	Materials Process Principles
MATS1032	Materials Engineering 1A
MATS1042	Crystallography and X-Ray Diffraction
MATS1052	Materials Engineering 1B
MATS1062	Mechanical Properties of Materials
MATS1072	Physics of Materials
MATS1082	Thermodynamics of Materials 1
MATS1092	Materials and Design 1
MATS1102	Numerical Methods
MATS1112	Phase Equilibria
General Education subject/s	

Year 3

FUEL0040	Fuel Engineering for Ceramic Engineers
INDC3070	Instrumentation and Process Control 1
MATH2869	Applied Statistics SC
MATS1093	Thermodynamics of Materials 2
MATS1113	Ceramic Process Principles 1
MATS1243	Management 1
MATS1163	Chemistry of the Solid State
MATS2123	Ceramic Process Principles 2
MATS2133	Ceramic Raw Materials
MATS2143	Ceramic Equipment
MATS2153	Ceramic Processing Laboratory

MATS2183	Refractories
MATS2203	Physico Chemical Ceramics Laboratory
MATS2213	Diffusion
MATS2273	Chemistry of Ceramic Processes
MINE7341	Mineral Process Engineering
General Education subject/s	

Year 4

APSE0002	Social Issues in Science and Technology
CEIC4010	Process Economics 1
CEIC4070	Laboratory Automation for Ceramic Engineers
MATS1244	Management 2
MATS1254	Design Project
MATS1294	Electrical Ceramics
MATS1464	Materials Seminar
MATS1534	Design with Brittle Materials
MATS2254	Ceramic Engineering Design
MATS2264	Sintering of Ceramics
MATS2284	Thermal Properties of Ceramics
MATS3524	Project (Ceramic Engineering)
MATS4333	Fracture Mechanics

3030**Ceramic Engineering Part-time Course****Bachelor of Science Technology
BSCTech****Stage 1**

MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
PHYS1002	Physics 1

Stage 2

CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
MATS1001	Introduction to Materials Industry
MATS1011	Introduction to Materials Engineering
MATS1021	Introduction to Computing
MECH0130	Engineering Drawing and Description
	Geometry
MECH0440	Engineering Statics

Stage 3

CHEM2818	Physical Chemistry
MATH2021	Mathematics 2
MATS1072	Physics of Materials
MATS1082	Thermodynamics of Materials 1
MATS1092	Materials and Design 1
MATS1102	Numerical Methods
General Education subject/s	

Stage 4

MATS1002	Microstructural Analysis
MATS1022	Materials Processes Principles
MATS1032	Materials Engineering 1A
MATS1042	Crystallography and X-ray Diffraction
MATS1052	Materials Engineering 1B
MATS1062	Mechanical Properties of Materials
MATS1112	Phase Equilibria
General Education subject/s	

Stage 5

FUEL0040	Fuel Engineering for Ceramic Engineers
MATH2869	Applied Statistics SC
MATS1113	Ceramic Process Principles 1
MATS2123	Ceramic Process Principles 2
MATS2133	Ceramic Raw Materials
MATS2143	Ceramic Equipment
MATS2153	Ceramic Processing Laboratory
MATS2203	Physico Chemical Ceramics Laboratory

Stage 6

INDC3070	Instrumentation and Process Control 1
MATS1093	Thermodynamics of Materials 2
MATS1163	Chemistry of the Solid State
MATS1243	Management 1
MATS2183	Refractories
MATS2213	Diffusion
MATS2273	Chemistry of Ceramic Processes
MINE7341	Mineral Process Engineering
General Education subject/s	

Metallurgical Engineering

A four-year full-time course in metallurgical engineering leading to the award of the BMetE degree (Physical Metallurgy or Process Metallurgy Major) and a six-year part-time course in metallurgy leading to the award of the BSc(Tech) degree are offered within the School.

3125**Metallurgical Engineering Full-time Course****Bachelor of Metallurgical Engineering
BMetE**

Students entering the Bachelor of Metallurgical Engineering program may elect to major in either Process Metallurgy or Physical Metallurgy. Selection of these alternative study programs may be deferred until the end of the second year of full-time study.

The Process Metallurgy option is designed to produce graduates with training appropriate to the primary metallurgy industry while the Physical Metallurgy option provides a training more suited to the manufacturing industry.

Year 1 of the course consists of physics, chemistry, mathematics and engineering subjects and is essentially the same as that for a number of other engineering and science courses offered in the Faculty of Science and Technology.

Year 2 introduces Materials Science and Materials Engineering subjects supported by chemistry and mathematics and is common with Year 2 in the full-time Ceramic Engineering and Materials Engineering Courses.

Physical Metallurgy and Metallurgical Engineering are introduced in Years 3 and 4. In Year 3 the major strands are supported by other engineering subjects and in Year 4 by a thesis project, seminar and professional electives.

Students are required to have gained at least twelve weeks of approved industrial experience before graduation, and to have submitted satisfactory reports on such work. Industrial experience is usually obtained during the long recess periods at the ends of Years 2 and 3.

During the course, visits are made to various metallurgical works, and students are required to submit reports on some of these.

Students may complete the first one or two years of their degree at their local university engineering school, and then transfer with advanced standing to UNSW.

Year 1

CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
MATS1001	Introduction to Materials Industry
MATS1011	Introduction to Materials Engineering
MATS1021	Introduction to Computing
MECH0440	Engineering Statics
MECH0130	Engineering Drawing and Descriptive Geometry
PHYS1002	Physics 1

Year 2

CHEM2818	Physical Chemistry
MATH2021	Mathematics 2
MATS1002	Microstructural Analysis
MATS1022	Materials Process Principles
MATS1032	Materials Engineering 1A
MATS1042	Crystallography and X-ray Diffraction
MATS1052	Materials Engineering 1B
MATS1062	Mechanical Properties of Materials
MATS1072	Physics of Materials
MATS1082	Thermodynamics of Materials 1
MATS1092	Materials and Design 1
MATS1102	Numerical Methods
MATS1112	Phase Equilibria
General Education subject/s	

Year 3 (Physical Metallurgy Major)

MATH2869	Applied Statistics SC
MATS1093	Thermodynamics of Materials 2
MATS1183	Non-Ferrous Physical Metallurgy

MATS1213	Design for Corrosion Control
MATS1243	Management 1
MATS1283	Ferrous Physical Metallurgy
MATS2213	Diffusion
MATS2223	Phase Transformations
MATS2273	Chemistry of Ceramic Processes
MATS3443	Polymer Science
MATS4333	Fracture Mechanics
MATS4513	Deformation of Metals
MATS4523	Strengthening Mechanisms in Metals
MATS4533	Metal Forming
MATS4543	Fractographic Analysis
MATS4553	Non-Destructive Testing
General Education subject/s	

Year 4 (Physical Metallurgy Major)

APSE0002	Social Issues in Science and Technology
MATS1214	Welding and other Joining Processes
MATS1224	Materials Characterisation
MATS1234	Heat Resisting Alloys
MATS1244	Management 2
MATS1254	Design Project
MATS1284	Light Alloys
MATS1304	Composite Materials
MATS1384	Ferrous Physical Metallurgy 2
MATS1414	Surface Treatments and Wear
MATS1464	Materials Seminar
MATS3524	Project (Metallurgical Engineering)
MATS4154	Mechanical and Thermal Processing of Metals
MATS9650	Pyrometallurgical Processes
Professional Electives*	

Year 3 (Process Metallurgy Major)

FUEL0050	Fuel Engineering
INDC3070	Instrumentation and Process Control 1
MATH2869	Applied Statistics SC
MATS1043	Heat, Fluid and Mass Flow in Materials Processing
MATS1093	Thermodynamics of Materials 2
MATS1183	Non-Ferrous Physical Metallurgy
MATS1213	Design for Corrosion Control
MATS1243	Management 1
MATS1283	Ferrous Physical Metallurgy
MATS2183	Refractories
MATS5213	Metallurgical Plant Practice
MATS5263	Extractive Metallurgy
MATS5314	Kinetics and Mass Transfer in Metallurgical Processes
MINE7341	Mineral Process Engineering

Year 4 (Process Metallurgy Major)

APSE0002	Social Issues in Science and Technology
MATS1214	Welding and other Joining Processes
MATS1244	Management 2
MATS1254	Design Project
MATS1414	Surface Treatments and Wear
MATS1464	Materials Seminar
MATS3524	Project (Metallurgical Engineering)
MATS4553	Non-Destructive Testing
MATS5253	Metallurgical Reaction Engineering

MATS5324	Modelling of Metallurgical Processes
MATS5384	Air pollution Control in the Metallurgical Industry
Professional Electives*	

*A list of Professional Electives will be made available at the end of the Year 3 program and choices for the following year arrived at.

Metallurgy – Part-time Course

Bachelor of Science (Technology) BSc(Tech)

This course is designed for students who are employed in the metallurgical and manufacturing industries and extends over six part-time years of study. Some of the subjects of stages 3, 4, 5 and 6 may be available only in day-time classes, and one day or more of release from industry per week may be required.

The course essentially covers the same subject matter as the first three years and part of Year 4 of the full-time Metallurgical Engineering course and involves the same major strands of study in Physical Metallurgy and Metallurgical Engineering.

In the later stages of the course, there is less emphasis on primary metallurgy than in the full-time course and there is more emphasis on secondary Metallurgical Engineering which is developed to Year 4 level, while Physical Metallurgy is taken to Year 3 level.

Students are required to complete an approved program of industrial training of not less than twelve months prior to the award of the degree.

Industrial training should normally be completed concurrently with attendance in the course, but with approval of the Head of School may be completed after completion of the prescribed course of study.

Stage 1

MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
PHYS1002	Physics 1

Stage 2

CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
MATS1001	Introduction to Materials Industry
MATS1011	Introduction to Materials Engineering
MATS1021	Introduction to Computing
MECH0440	Engineering Statics
MECH0130	Engineering Drawing and Description Geometry

Stage 3

CHEM2818	Physical Chemistry
MATH2021	Mathematics 2

MATS1072	Physics of Materials
MATS1082	Thermodynamics of Materials 1
MATS1092	Materials and Design 1
MATS1102	Numerical Methods
General Education subject/s	

Stage 4

MATS1002	Microstructural Analysis
MATS1022	Materials Process Principles
MATS1032	Materials Engineering 1A
MATS1042	Crystallography and X-ray Diffraction
MATS1052	Materials Engineering 1B
MATS1062	Mechanical Properties of Materials
MATS1112	Phase Equilibria
General Education subject/s	

Stage 5

MATS1183	Non-Ferrous Physical Metallurgy
MATS1283	Ferrous Physical Metallurgy
MATS1384	Ferrous Physical Metallurgy 2
MATS2213	Diffusion
MATS2223	Phase Transformations
MATS4513	Deformation of Metals
MATS4523	Strengthening Mechanisms
MATS4533	Metal Forming
MATS4543	Fractographic Analysis
General Education subject/s	

Stage 6

MATS1164	Welding Science and Technology
MATS1213	Design for Corrosion Control
MATS1414	Surface Treatments and Wear
MATS1464	Materials Seminar
MATS4144	Mechanical and Thermal Processing of Materials
MATS4204	Industrial Metallurgy Project
General Education subject/s	

Materials Engineering

A four-year full-time course in materials engineering leading to the award of the BMatE degree is offered within the School.

3615

Materials Engineering Full-time Course

Bachelor of Materials Engineering BMatE

Year 1

CHEM1101	Chemistry 1A
CHEM1201	Chemistry 1B
MATH1131	Mathematics 1A or

MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
MATS1001	Introduction to the Materials Industry
MATS1011	Introduction to Materials Engineering
MATS1021	Introduction to Computing
MECH0130	Engineering Drawing and Descriptive Geometry
MECH0440	Engineering Statics
PHYS1002	Physics 1

Year 2

CHEM2818	Physical Chemistry
MATH2021	Mathematics 2
MATS1022	Materials Process Principles
MATS1002	Microstructural Analysis
MATS1032	Materials Engineering 1A
MATS1042	Crystallography and X-ray Diffraction
MATS1052	Materials Engineering 1B
MATS1062	Mechanical Properties of Materials
MATS1072	Physics of Materials
MATS1082	Thermodynamics of Materials 1
MATS1092	Materials and Design 1
MATS1102	Numerical Methods
MATS1112	Phase Equilibria
General Education subject/s	

Year 3

MATH2869	Applied Statistics SC
MATS1093	Thermodynamics of Materials 2
MATS1183	Non-Ferrous Physical Metallurgy
MATS1213	Design for Corrosion Control
MATS1243	Management 1
MATS1283	Ferrous Physical Metallurgical 1
MATS2213	Diffusion
MATS2223	Phase Transformations
MATS2273	Chemistry of Ceramic Processes
MATS3443	Polymer Science and Engineering
MATS4333	Fracture Mechanics
MATS4513	Deformation of Metals
MATS4523	Strengthening Mechanisms in Metals
MATS4533	Metal Forming
MATS4543	Fractographic Analysis
MATS4553	Non-Destructive Testing
General Education subject/s	

Year 4

APSE0002	Social Issues in Science and Technology
MATS1414	Surface Treatments and Wear
MATS1244	Management 2
MATS1254	Design Project
MATS1304	Composite Materials
MATS1464	Materials Seminar
MATS2264	Sintering of Ceramics
MATS2284	Thermal Properties of Ceramics
MATS3524	Project (Materials Engineering)
MATS3564	Polymer Engineering 1
MATS3574	Polymer Engineering 2
Professional Electives*	

*A list of Professional Electives will be made available at the end of the Year 3 program and choices for the following year arrived at.

3950**Optometry Degree Course
Full-time****Bachelor of Optometry
BOptom**

The School provides a four Stage full-time course in Optometry leading to the award of the degree of Bachelor of Optometry, at either the Pass or Honours level. Professional training including clinical optometry are interwoven with basic studies of visual and ocular science over the four Stages of the course. The only entry point into Optometry will be at the Stage 1 level.

Degree Program**Stage 1**

BIOS1201	Molecules Cells and Genes
CHEM1809	Biological Chemistry for Optometry Students
MATH1051	Mathematics 1F
OPTM1201	Ocular and Visual Science IA
OPTM1202	Clinical Optometry I
OPTM1203	Physical and Geometrical Optics
OPTM1204	Dispensing
OPTM1211	Ocular and Visual Science 1B
PHYS1999	Physics (Optometry)

Stage 2**Full Stage**

OPTM2106	Pathology for Optometry Students
OPTM2107	Microbiology for Optometry Students
OPTM2205	Measurement of Light and Colour
OPTM2208	Diagnosis of Ocular Disease
OPTM2301	Ocular and Visual Science II
OPTM2302	Clinical Optometry II
OPTM2303	Spectacle Lens and Optical Systems
MATH2819	Statistics SA
PHPH2122	Principles of Physiology
PSYC2116	Human Development (Optometry)

Stage 3

OPTM3208	Diagnosis and Management of Ocular Disease
OPTM3301	Visual Science III
OPTM3302	Clinical Optometry III
OPTM3309	Ocular Science III
PSYC3506	Psychology for Optometrical Practice
Two 56 hour or four 28 hour General Education subjects	

Stage 4

MDCN8001	Principles of Medicine for Optometry Students
OPTM4301	Visual Science IV
OPTM4302	Clinical Optometry IV
OPTM4310	Research Project
OPTM4311	Current Issues in Optometry and Visual Science
OPTM4312	Optometry and the Professional Environment

3951

Combined Science / Optometry Course**BSc BOptom****Conditions for the combined course leading to the award of the degrees of BSc BOptom**

1. Undergraduates* of The University of New South Wales who have satisfied the examiners in at least the first two Stages of the Optometry degree course may be admitted to the Science degree course with advanced standing for the purpose of qualifying for the award of the two degrees of BSc BOptom. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean of the Faculty of Science and Technology.

2. In order to qualify for the award of the degree of BSc, students so admitted shall be required to complete the appropriate general studies subjects and no less than 60 Credit Points of either Level II or Level III and a further 60 Credit Points from other Level III subjects, in accordance with the Science and Mathematics Course regulations. The subjects submitted for the award of the Bachelor's degree under these regulations must include at least 60 Credit points from Level III subjects chosen from related disciplines in accordance with the Science Course regulations.

3. In order to qualify for the award of the degree of BOptom, students so admitted shall complete the requirements of the Optometry degree course.

**In Rule 1, the word 'undergraduates' includes graduands, ie persons may be admitted under these rules if they have met all requirements for a first degree which has not yet been conferred and admission under these rules shall be no bar to the subsequent award of the first degree.*

3431

Psychology Degree Course**Full-time****Bachelor of Science (Psychology)****BSc(Psychol)**

Psychology is a discipline of both scientific research and applied practice. As a science, psychology is concerned with the study of behaviour and its underlying mental and neural processes. Topics of study include learning, memory, cognition, perception, motivation, life-span development, personality, social interactions, and abnormal psychology. Psychology has many areas of application, especially in clinical, correctional, counselling, educational, and organisational settings. In addition, people with training in psychology pursue careers in academic research, health

research, developmental disabilities and rehabilitation; ergonomics; occupational health and safety; personnel selection, training, and management; vocational guidance; and marketing.

The four-Stage full-time course leads to the degree of Bachelor of Science (Psychology). The course is designed to provide the student with (1) a sound understanding of psychological theory, research skills, and psychological techniques, (2) elective studies in areas of individual interest, and (3) supporting studies in mathematics and/or biology (a minimum of 30 Credit Points at Level I), and in arts or social sciences (a minimum of 30 Credit Points at Level I).

Registration as a Psychologist

In order to become a member of the professional body, the Australian Psychological Society (APS), and for registration as a psychologist in New South Wales, students first need a university bachelor degree which includes four years of approved training in psychology. The BSc(Psychol) course provides four years of approved training in psychology. Students must also follow this by completing an accredited 5th and 6th year academic course such as the PhD or the Master of Psychology degree in the Applied or Clinical fields as offered by this University. An alternative of two years of supervised experience in professional practice may be undertaken for registration as a psychologist in New South Wales.

A full statement on the effect of changes to registration requirements for current and new undergraduate students is available from the School of Psychology.

Degree Program**Stage 1**

PSYC1001 and PSYC1011

BIOS1101 and BIOS1201 or

one of MATH1131 or MATH1141 or MATH1011 and

one of MATH1231 or MATH1241 or MATH1021

Philosophy subjects or Science and Technology Studies subjects or other approved Arts and Social Sciences discipline at Level I to the value of 30 Credit Points.

Choose elective subjects at Level I to the value of 30

Credit Points from Arts and Social Sciences or Science.

Stage 2

PSYC2001, PSYC2011, PSYC2061, PSYC2071,

PSYC2081, PSYC2091

Level II subjects to the value of 30 Credit Points

following on from one of the Level I non-psychology subjects taken (30 Credit Points) which constitutes a recognised sequence of two Stages.

General Education (112 hours).

Stage 3

PSYC3001, PSYC3011, PSYC3201 and PSYC3291.

Select 1 subject from each of the following areas and 1 other Level III Psychology subject:

Advanced Perceptual / Cognitive – PSYC3151, PSYC3161, PSYC3211, PSYC3221, PSYC3231; Advanced Biological – PSYC3051, PSYC3241, PSYC3251, PSYC3261; Advanced Social – PSYC3121, PSYC3141, PSYC3271, PSYC3281.

Stage 4

PSYC4003 or PSYC4013

Prerequisites and Corequisites

Before enrolling in any subject (or equivalent units of a subject) the student shall have attended the classes and shall have satisfied the examiners in all relevant prerequisite subjects. The student should refer to the appropriate Faculty Handbook for a statement of subject prerequisites and/or corequisites.

Study Load

This is a four-stage full-time course. In any one year students must enrol in the full load specified for a particular stage. Only in exceptional circumstances will students be allowed to enrol in a reduced program for a stage, and this requires the permission of the Head of School of Psychology.

Progression and Exclusion

Students must maintain Honours level performance for progression from each of Stages 1, 2 and 3. Any student who fails to achieve an average of 65 percent or higher in psychology subjects undertaken in a stage (based on the first attempt result for each subject) will be deemed to be making unsatisfactory progress and will be required to show cause.

Students required to show cause will be informed by the Registrar in writing. Students who apply to show cause will be assessed in accordance with the University's procedures. Failure to show cause will result in exclusion from the course. Students should also see the section on progression and exclusion ('Restrictions on Students Re-enrolling') in the Student Guide.

Award of the Degree

In order to graduate students must satisfy requirements for the award by passing all subjects specified for the course.

The final grading for the degree is based on performance in all Psychology subjects excluding PSYC1001 and PSYC1011 taken over the four Stages. The degree may be awarded at either Pass level or with Honours.

School of Materials Science and Engineering

Department of Textile Technology**Head of Department**

Professor MT Pailthorpe

Textile Technology is concerned with the conversion of both natural and man-made fibres into an extremely wide variety of finished products. These products range from fabrics for apparel, soft furnishings, floor coverings and industrial use to such specialised textiles as tyre cord, ropes, protective clothing, sailcloth, parachute fabrics, medical dressings, composite materials, and many others.

In Australia, the Textile Industry has developed mainly in the past seventy years and today it is one of our largest manufacturing groups. As in overseas countries, the impact of science and technology is bringing rapid changes to the Industry, and a consequence of this has been a strong demand for personnel skilled in Textile Technology, Management and Design.

The Department of Textile Technology offers courses in Textile Technology **3170**, Textile Management **3175** and Textile Design and Technology **3177**. These courses extend over four years full-time study and lead to the award of the degree of Bachelor of Science. For the award of Honours, students need to have distinguished themselves in formal studies, laboratory exercises, and in their final year project. The BSc Textile Technology program is accredited by the Textile Institute as fulfilling the academic requirements for its Associateship (CText AT1), so that graduates are eligible to apply for this professional qualification upon completion of the required period of relevant work experience.

Students must complete a minimum of 40 working days approved industrial training, of which at least 30 working days training must be taken at the end of Year 3.

It is important to stress that the specialised nature of the training provided within the Department of Textile Technology does not mean a restricted range of job opportunities after graduation. Career possibilities extend through the textile industry, allied industries (such as the production of textile chemicals), private consultants, government departments and authorities, teaching at secondary and tertiary levels, and pure or applied research in various organisations.

Graduates may be employed in quality control, technical management, research and development, international trade, production or general management. Within the textile industry, graduates may, for example, enter any of the following areas; the manufacture of natural and or man-made fibres, yarns, fabrics, etc; dyeing, printing and finishing of textiles, quality assurance, marketing and retailing.

Course Outlines

3170 Textile Technology Full-time Course

Bachelor of Science BSc

Textile Chemistry, Textile Physics, Textile Engineering Options

The conversion of textile raw materials into their finished products is simply a succession of, and an interaction between, a number of chemical, physical and engineering processes. It follows, therefore, that the disciplines involved in the study of textile technology, in addition to the technological aspects, include a study in depth of one of the following: chemistry, engineering or physics.

Graduates will qualify for membership for one of the following professional bodies: the Royal Australian Chemical Institute; the Institution of Engineers, Australia; or the Australian Institute of Physics.

All students take a common first year, and they need not choose the option they desire to follow until the end of that year.

In Year 2 and Year 3 students specialise in one of three options of the course, viz. Textile Chemistry, Textile Physics or Textile Engineering. In Year 4 all students take the same subjects.

Year 1

CHEM1101	Chemistry 1A, and
CHEM1201	Chemistry 1B
MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B
PHYS1002	Physics 1 or
PHYS1022	Physics for Health and Life Scientists*
TEXT1201	Introductory Textile Technology
TEXT1301	Fibre Science 1

*For admission into the Textile Physics or Textile Engineering options, students must complete the subject: PHYS1002.

Textile Chemistry

Year 2

CEIC2010	Instrumental Analysis
CHEM2021	Organic Chemistry
CHEM2819	Physical Chemistry for Food and Fibre Science
TEXT2101	Fibre Science 2
TEXT2201	Textile Statistics
TEXT2301	Yarn Technology 1

TEXT2401	Fabric Technology 1
TEXT2501	Computing Applications
General Education subject/s	

Year 3

CHEM3021	Organic Chemistry
Plus one of the following Chemistry electives	
CHEM2031	Inorganic Chemistry and Structure or
CHEM3121	Synthetic Organic Chemistry or
CHEM3321	Applied Organic Chemistry
or an alternative as approved by the Head of Department	
TEXT3101	Textile Structures 1
TEXT3301	Yarn Technology 2
TEXT3401	Fabric Technology 2
TEXT3501	Finishing Technology A
TEXT3601	Colour Science
TEXT3602	Colouration Technology
TEXT3801	Textile Engineering
General Education subject/s	

Textile Physics

Year 2

MATH2100	Vector Calculus
MATH2120	Mathematical Methods for Differential Equations
PHYS2001	Mechanics and Computational Physics
PHYS2011	Electromagnetism and Thermal Physics
PHYS2021	Quantum Physics and Relativity*
TEXT2101	Fibre Science 2
TEXT2201	Textile Statistics
TEXT2301	Yarn Technology 1
TEXT2401	Fabric Technology 1
TEXT2501	Computing Applications
General Education subject/s	

*Note: because of prerequisite requirements students wishing to take certain year 3 electives may substitute PHYS2031 Laboratory in Year 2, and take PHYS2021 Quantum Physics and Relativity in Year 3.

Year 3

PHYS2031	Laboratory*
Plus Physics electives averaging not less than 3 hours per session, selected from the following:	
PHYS3021	Statistical Mechanics and Solid State Physics
PHYS3060	Advanced Optics
PHYS3110	Experimental Physics B1
PHYS3120	Experimental Physics B2
PHYS3410	Biophysics
PHYS3710	Advanced Laser and Optical Applications
(offered odd numbered years only)	
or an alternative as approved by the Head of Department	
TEXT3101	Textile Structures 1
TEXT3301	Yarn Technology 2
TEXT3401	Fabric Technology 2
TEXT3501	Finishing Technology A
TEXT3601	Colour Science
TEXT3602	Colouration Technology

TEXT3801 Textile Engineering
General Education subject/s

**See note for Year 2*

Textile Engineering

Year 2

CIVL0616 Structures
ELEC0807 Electrical Engineering 1E
MATH2021 Mathematics 2
MECH1110 Graphical Analysis and Communication
MECH1300 Engineering Mechanics 1
TEXT2101 Fibre Science 2
TEXT2201 Textile Statistics
TEXT2301 Yarn Technology 1
TEXT2401 Fabric Technology 1
TEXT2501 Computing Applications
General Education subject/s

Year 3

ELEC0808 Electrical Engineering 2E
MECH2300 Engineering Mechanics 2A
MECH2310 Engineering Mechanics 2B
MECH2600 Fluid Mechanics 1
MECH2700 Thermodynamics 1
TEXT3101 Textile Structures 1
TEXT3301 Yarn Technology 2
TEXT3401 Fabric Technology 2
TEXT3501 Finishing Technology A
TEXT3601 Colour Science
TEXT3602 Colouration Technology
General Education subject/s

Year 4 (All Options)

APSE0002 Social Issues in Science and Technology
MANF0420 Production Management or
TEXT4003 Project
TEXT4013 Seminar
TEXT4101 Textile Structures 2
TEXT4201 Processing Laboratory*
TEXT4202 Textile Quality Control
TEXT4501 Finishing Technology B
TEXT4601 Field Trip#
TEXT4701 Textile Industry Studies
TEXT4702 Textile Management*

**Co-Op Program students only.*

#Non Co-Op Program students only.

The Textile Management course provides a comprehensive knowledge of all the textile sciences and technologies. In addition the course includes studies in economics, accounting, marketing, management, and other areas of commerce.

The course is designed to meet the need for executives in the textile and allied industries. A wide choice of electives is available in the third year of the course. This allows students to either gain a broad knowledge of the various areas of commerce, or to specialise in one of the following areas: Applied Economics; Accounting and Financial Management; or Strategic Marketing Management. The BSc Textile Management program will be considered for accreditation by the Textile Institute as fulfilling the academic requirements for its Associateship (CTextATI). We expect to have this program accredited in 1998.

Year 1

CHEM1101 Chemistry 1A or
CHEM1401 Introductory Chemistry A
ECON1101 Microeconomics 1 or
ECON1103 Microeconomic Principles
ECON1102 Macroeconomics 1 or
ECON1104 Macroeconomic Principles
MATH1131 Mathematics 1A or
MATH1141 Higher Mathematics 1A or
MATH1011 General Mathematics 1B
MATH1231 Mathematics 1B or
MATH1241 Higher Mathematics 1B or
MATH1021 General Mathematics 1C
PHYS1936 Physics 1 (Textile Management)
TEXT1101 Science for Textiles
TEXT1201 Introductory Textile Technology
TEXT1301 Fibre Science 1

Year 2

ACCT9001 Introduction to Accounting A and
ACCT9002 Introduction to Accounting B and
IROB1701 Industrial Relations 1A and
IROB2718 Human Resources Management or
ACCT1501 Accounting and Financial Management 1A and
ACCT1511 Accounting and Financial Management 1B
MARK2012 Marketing Fundamentals
MARK2052 Marketing Research
TEXT2101 Fibre Science 2
TEXT2201 Textile Statistics
TEXT2301 Yarn Technology 1
TEXT2401 Fabric Technology 1
TEXT2501 Computing Applications
General Education subject/s

Year 3

TEXT3101 Textile Structures 1
TEXT3301 Yarn Technology 2
TEXT3401 Fabric Technology 2
TEXT3501 Finishing Technology A
TEXT3601 Colour Science
TEXT3602 Colouration Technology
TEXT3801 Textile Engineering

Plus 2 Commerce electives selected from the following:

3175

Textile Management Full-time Course

Bachelor of Science

BSc

The production and marketing of textile products involves a number of manufacturing processes, and requires an understanding of basic management principles.

ACCT2522	Accounting and Financial Management 2A
ACCT2542	Accounting and Financial Management 2B
FINS2613	Business Finance 2A
IROB1701	Industrial Relations 1A
ECOH2301	Management Strategy and Business Development
ECON2103	Business and Government
ECON2104	Australian Macroeconomic Policy
INFS1602	Computer Information Systems 1
INFS2603	Computer Information Systems 2
LEGT7711	Legal Environment of Commerce
LEGT7731	Marketing and Distribution Law
MARK3043	International Marketing
MARK3073	Brand Management
MARK3083	Strategic Marketing Management
or an alternative as approved by the Head of Department	
General Education subject/s	

Year 4

APSE0002	Social Issues in Science and Technology
MANF0420	Production Management or
TEXT4003	Project
TEXT4013	Seminar
TEXT4101	Textile Structures 2
TEXT4201	Processing Laboratory*
TEXT4202	Textile Quality Control
TEXT4501	Finishing Technology B
TEXT4601	Field Trip#
TEXT4701	Textile Industry Studies
TEXT4702	Textile Management*

*Co-Op Program students only

#Non Co-Op Program students only

3177**Textile Design and Technology Full-time Course****Bachelor of Science
BSc**

The design and production of textile goods involves a number of manufacturing processes, and requires an understanding of basic design and manufacturing principles. The Textile Design and Technology course provides a comprehensive knowledge of all the textile science and technologies. In addition the course includes studies in the history of art and design, basic design, and textile design. The course is structured to meet the needs of designers in the textile and allied industries. The BSc Textile Design and Technology program is currently being considered for accreditation by the Textile Institute as fulfilling the academic requirements for its Associateship (CTextATI) when the first students complete the program in 2000. Thus we expect to have this program accredited by 2001.

Year 1

CHEM1101	Chemistry 1A or
CHEM1401	Introductory Chemistry A
COFA5113	Interactive Systems Design and Responsible Management
IDES1021	Basic Design
IDES1061	History of Art, Architecture and Design
IDES1031	Design Studio 1
MATH1131	Mathematics 1A or
MATH1141	Higher Mathematics 1A or
MATH1011	General Mathematics 1B
MATH1231	Mathematics 1B or
MATH1241	Higher Mathematics 1B or
MATH1021	General Mathematics 1C
PHYS1936	Physics 1 (Textile Management)
TEXT1101	Science for Textiles
TEXT1301	Fibre Science 1

Year 2

IDES1401	Visual Thinking and Drawing
TEXT2101	Fibre Science 2
TEXT2201	Textile Statistics
TEXT2301	Yarn Technology 1
TEXT2401	Fabric Technology 1
TEXT2501	Computing Applications
TEXT2901	Textile Design 1
General Education subject/s	

Year 3

COFA5216	Design and Computers 1
TEXT3101	Textile Structures 1
TEXT3301	Yarn Technology 2
TEXT3401	Fabric Technology 2
TEXT3501	Finishing Technology A
TEXT3601	Colour Science
TEXT3602	Colouration Technology
TEXT3801	Textile Engineering
TEXT3901	Textile Design 2
General Education subject/s	

Year 4

COFA5316	Professional Practice
TEXT4003	Project
TEXT4013	Seminar
TEXT4101	Textile Structures 2
TEXT4202	Textile Quality Control
TEXT4501	Finishing Technology B
TEXT4601	Field Trip
TEXT4701	Textile Industry Studies
TEXT4901	Textile Design 3

3220**Wool and Pastoral Sciences Full-time Course****Bachelor of Science****BSc**

As a result of the UNSW2000 exercise, the Department of Wool and Animal Science was disestablished on 30 June 1997. Hence, no new enrolments will be accepted into course 3220. The WOOL subjects listed in this handbook are available only to students currently enrolled in course 3220 to allow them to complete their course. Year 3 and year 4 programs for individual students have been approved by the Head of Department.

Professional and Combined degrees with Science

Board of Studies in Science and Mathematics and another Faculty

3930**Combined Science / Arts Course****BSc/BA**

The double degree of BSc/BA normally requires an additional Stage of study, and enables students to complete a major sequence in a School, Department, or Program of the Faculty of Arts and Social Sciences while proceeding with their studies in Science. In each Stage of the combined degree course, students normally take subjects totalling 75.5 or 90 Credit Points from science and 30 or 45 Credit Points from Arts and Social Sciences.

For admission to the course, students must satisfy the entry requirements to the Board of Studies in Science and Mathematics as well as to the Faculty of Arts and Social Sciences. In addition to the requirements of the BSc program being undertaken, students must complete a minimum of 135 Credit Points in subjects offered by Schools, Departments or Programs within the Faculty of Arts and Social Sciences, including an approved major sequence of 105 Credit Points. This degree is administered by the Board of Studies in Science and Mathematics.

3935**Combined Science / Social Science Course****BSc/BSocSc**

For information about this double degree please consult with the Board of Studies in Science and Mathematics and the Faculty of Arts and Social Sciences.

Board of Studies in Science and Mathematics 4075

Combined Science / Education Course

Bachelor of Science / Bachelor of Education BSc BEd

The Bachelor of Science Bachelor of Education combined degree course leads either to the award of the degree at pass level, requiring four years study, or to the award of the degree at honours level, requiring 5 years of study.

Pass Degree

In order to qualify for the pass degree students must:

- satisfy requirements in the education studies subjects offered in years 1, 2 and 3 and 4 as specified in the programs below.
- obtain at least 315 Credit Points including no more than 150 level I credit points, in science subjects(except in

the case of the mathematics program, where elective subjects from the BA degree course may be included), in an approved four year program which consists of:

- at least a major sequence in an area corresponding to one of the teaching subjects together with suitable complementary subjects from other areas such as Biochemistry, Biology, Chemistry, Geology, Mathematics, Microbiology and Immunology, Physics and Physiology and Pharmacology.
- the year 4 subject HPST2106 the Scientific Theory.
- complete 15 Credit Points in approved General Education subjects.

Note: Students enrolled prior to 1998 should follow the program as specified in their first year of enrolment.

Approved Programs

Each student must select one of the programs of study approved for the course by the Board of Studies in Science and Mathematics.

Subject descriptions for Education Studies subjects appear in the Arts and Social Sciences Faculty handbook.

The approved programs are as follows:

0158 Physics

Stage 1

EDST1101, EDST1102
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002

Stage 2

One Education Studies elective subject*
MATH2011, MATH2520, MATH2120
PHYS2001, PHYS2011, PHYS2021, PHYS2031
Either BIOS1101 or GEOL1101
One General Education subject*

Stage 3

One Education Studies elective subject*
PHYS3010 or PHYS3210, PHYS3030 or PHYS3230,
PHYS3021, PHYS3041, PHYS3050, PHYS3060
3 Subjects from BIOS1101, BIOS1201, GEOL1101,
GEOL1201
One General Education subject*

Stage 4

HPST2106
EDST1446, EDST1447, EDST1448, EDST1449,
EDST1450
One Education Studies elective subject**

Students proposing to proceed to year 5 (honours) in Physics must complete 90 level III Credit Points.

Stage 5

PHYS4103 or PHYS113

Students are encouraged to select higher level Mathematics subjects where applicable.

* Does not apply to students who commenced before 1996

† Students enrolled before 1998 are to complete two electives.

** May not apply to students who commenced before 1998.

0258 Chemistry

Stage 1

CHEM1101, CHEM1201
EDST1101, EDST1102
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PHYS1002 or PHYS1022

Stage 2*

One Education Studies elective subject*
BIOS1101
CHEM2011, CHEM2021, CHEM2031, CHEM2041,
CHEM2000
GEOL1101
Either BIOS1201 or GEOL1201
One General Education subject*

Stage 3

One Education Studies elective subject*
60 Level III Chemistry Credit Points of which at least 45
Credit Points are from:
CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose Science Elective subjects totalling 45 Credit
Points
One General Education subject*

Stage 4

HPST2106
EDST1446, EDST1447, EDST1448, EDST1449,
EDST1450
One Education Studies elective subject**

Students proposing to proceed to stage 4 (Honours) must complete level 3 Chemistry subjects totalling 105 Credit Points

Stage 5

CHEM4003

* Does not apply to students who commenced before 1996

† Students enrolled before 1998 are to complete two electives.

** May not apply to students who commenced before 1998.

1058**Mathematics****Stage 1**

COMP1001

EDST1101, EDST1102

MATH1131 or MATH1141

MATH1231 or MATH1241

Elective subjects totalling 45 Credit Points*

Stage 2

One Education Studies elective subject†

MATH1081, MATH2501, MATH2510, MATH2120

At least one subject from level II statistics

At least 15 Credit Points from: MATH2520, MATH2400,

MATH2410, MATH2100, MATH2301

Elective subjects totalling 30 Credit Points*

One General Education subject **

Stage 3

One Education Studies elective subject†

MATH3560, MATH3570

Further Level III Mathematics subjects totalling 45 Credit Points

Elective subjects totalling 45 Credit Points*

One General Education subject**

Stage 4

HPST2106

EDST1444, EDST1445, EDST1448, EDST1449,

EDST1450

One Education Studies elective subject††

Students proposing to proceed to stage 5 (honours) in Mathematics must complete 90 level III Credit Points in Mathematics subjects, Some of which should be at the higher level.

Stage 5

MATH4003 or MATH4103 or MATH4603 or MATH4903

* Up to 120 Credit Points may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104.

** Does not apply to students who commenced before 1996

† Students enrolled before 1998 are to complete two electives.

†† May not apply to students who commenced before 1998.

1758**Biological Science****Stage 1**

BIOS1101, BIOS1201

CHEM1101, CHEM1201

EDST1101, EDST1102

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

Stage 2

One Education Studies elective subject†

BIOC2101, BIOC2201 or

BIOC2181, BIOC2291

BIOS2011, BIOS2021

A further 45 Credit Points of elective subjects to provide prerequisites for stage 3

One General Education subject *

Stage 3

One Education Studies elective subject†

Subjects Totalling 60 Credit Points Chosen from one area from the Schools of Biochemistry and Molecular Genetics, Biological Science or Microbiology and Immunology or Physiology and Pharmacology

Elective subjects totalling 45 Credit Points

One General Education subject *

Students intending to take a major sequence (a minimum of 60 Credit Points) from any one of these Schools should seek the advice of the School concerned as to a suitable combination of subjects.

Stage 4

HPST2106

EDST1446, EDST1447, EDST1448, EDST1449,

EDST1450

One Education Studies elective subject††

Students proposing to proceed to Stage 5 (Honours) must complete Level III subjects totalling 105 Credit Points including a major sequence from one of the above Schools.

Stage 5 (Honours)

The honours program in the School in which the major sequence was undertaken

* Does not apply to students who commenced before 1996

† Students enrolled before 1998 are to complete two electives.

†† May not apply to students who commenced before 1998.

2558**Geology****Stage 1**

EDST1101, EDST1102

GEOL1111, GEOL1211

MATH1131 or MATH1141 or MATH1011

MATH1231 or MATH1241 or MATH1021

and either

PHYS1002 or PHYS1022

Stage 2

One Education Studies elective subject†

BIOS1101

CHEM1101, CHEM1201

45 Credit Points from: GEOL2100, GEOL2110,

GEOL2120, GEOL2170, GEOL2180, GEOL2200,
GEOL2220

IElective subjects totalling 15 Credit Points
One General Education subject *

Stage 3

One Education Studies elective subject[†]
60 Credit Points from: GEOL2131, GEOL2231,
GEOL2250, GEOL3101, GEOL3110, GEOL3120,
GEOL3170, GEOL3241, GEOL3250, GEOL3280
Elective subjects totalling 45 Credit Points
One General Education subject *

Stage 4

HPST2106
EDST1446, EDST1447, EDST1448, EDST1449,
EDST1450
One Education Studies elective subject^{††}

Students proposing to proceed to Stage 5 (Honours) must
complete Level III subjects totalling 105 Level III Credit
Points in Geology.

Stage 5 (Honours)

GEOL4303(F/T) or GEOL4343(P/T)

** Does not apply to students who commenced before 1996.*

† Students enrolled before 1998 are to complete two electives.

†† May not apply to students who commenced before 1998.

Honours Degree

At the conclusion of Year 3 or Year 4, whichever is
appropriate, students who have satisfied any prerequisite
conditions may be permitted to apply for admission to the
Honours Year in Education, in Mathematics, or in any of
the Science disciplines. Students who satisfy the
requirements of the Honours Year as well as those for the
award of the BSc BEd combined degree graduate with the
award BSc BEd(Hons).

Honours in a Science Discipline or Mathematics

Students wishing to proceed to the award of the degree at
Honours Level must further complete:

1. any additional requirements as prerequisites for entry
to the Honours Level program in the school concerned,
and
2. in their fourth or fifth year of study, an approved Honours
Level program in the School concerned.

Honours in Education

BSc BEd students may enrol in Honours in Education
Studies in their fifth year of study if they have met the
prerequisites. See under subject number EDST4000
Education Honours (Research) in the Faculty of Arts and
Social Sciences Handbook.

Conditions for the award

Board of Studies in Science and Mathematics and the Faculty of Engineering

3611

Combined Science / Aeronautical Engineering Course

Bachelor of Engineering / Bachelor of Science
BE BSc

3661

Combined Science / Industrial Engineering Course

Bachelor of Engineering / Bachelor of Science
BE BSc

3681

Combined Science / Mechanical Engineering Course

Bachelor of Engineering / Bachelor of Science
BE BSc

3701

Combined Science / Naval Architecture Course

Bachelor of Engineering / Bachelor of Science
BE BSc

3725

Combined Science / Electrical Engineering Course

Bachelor of Engineering / Bachelor of Science
BE BSc

3730

Combined Science / Civil Engineering Course

Bachelor of Engineering / Bachelor of Science BE BSc

For details of the Combined Science/Aeronautical Engineering, Industrial Engineering, Mechanical Engineering, Electrical Engineering, Civil Engineering and Naval Architecture Courses refer to the Faculty of Engineering Handbook.

Board of Studies in Science and Mathematics and the Faculty of Medicine

3820 Combined Science and Medicine Course

Bachelor of Science / Bachelor of Medicine and Bachelor of Surgery BSc MB BS

For details of the Combined Science / Medicine Course refer to the Faculty of Medicine Handbook.

Board of Studies in Science and Mathematics and the Faculty of Commerce and Economics

3996 Combined Science / Commerce Course

Bachelor of Science / Bachelor of Commerce BSc BCom

For details of the Combined Science / Commerce Course refer to the Faculty of Commerce and Economics Handbook.

Board of Studies in Science and Mathematics and the Faculty of Law

4770 Combined Science / Law Course

Bachelor of Science / Bachelor of Laws BSc LLB

For details of the Combined Science / Law Course refer to the Faculty of Law Handbook.

Subject Descriptions

Undergraduate Study

Descriptions of all subjects are presented in alphanumeric order within organisational units. For academic advice regarding a particular subject consult with the contact for the subject as listed. A guide to abbreviations and prefixes is included in the chapter 'Handbook Guide', appearing earlier in this book.

Note/s: Some subjects that appear in this section may be restricted to students for whom the subject comprises a compulsory part of their program. Other subjects are electives in a range of programs. Where program 1000 is mentioned any of the mathematics or statistics programs may be substituted.

Accounting

Accounting Level I

ACCT1501

Accounting and Financial Management 1A

Staff Contact: School Office

CP15 S1 or S2 L2 T2

Note/s: Restricted to programs 0600, 1000, 1006, 1400, 6810, Courses 3681, 3971, 3978 and 3979. Not available in Year 1 of programs 0600, 1000, 1006, 1400 or Course 3978. May be counted in combined degree courses 3611, 3661 and 3701 only in special circumstances.

This is the first subject in a sequence of subjects dealing with the profession and practice of accounting and the literature associated with it. It illustrates the analysis and design of a financial accounting system which processes financial data and produces financial reports geared to the information needs of interested parties. It introduces students to the design of accounting systems based on double-entry book-keeping and incorporating other internal controls; also, to the problems of accounting for cash,

debtors, inventories and property plant equipment. It also provides a critical introduction to the ideas underlying accounting practice and to issues associated with the uses and limitations of traditional financial reports. In so doing it introduces students to the practice of literature evaluation.

ACCT1511

Accounting and Financial Management 1B

Staff Contact: School Office

CP15 S1 or S2 L2 T2

Prerequisite: ACCT1501

Note/s: Restricted to programs 0600, 1000, 1006, 1400, 6810 and Courses 3971, 3978 and 3979.

The second subject in a sequence of accounting subjects and includes financial accounting topics such as an examination of the regulatory environment of financial reporting: the definition and recognition of assets, liabilities, revenues and expenses; and accounting for corporations. Aspects of managerial and investor decision making are covered including financial statement and cash flow analysis, an examination of cost/volume/profit relationships in a single product firm, and short term budgeting.

Accounting Level II

ACCT2522

Accounting and Financial Management 2A

Staff Contact: School Office

CP15 S1 L2 T2

Prerequisite: ACCT1511

Note/s: Excluded ACCT2532. Restricted to programs 0600, 1000, 1006, 1400, 6810 and Courses 3971, 3978 and 3979.

Management Accounting is directed towards the effective use of organisational resources. Organisations create value through the use of resources, and can enhance such value by focusing and reconfiguring their internal processes in various ways; that is, by changing the ways in which they conduct business and perform work. It is argued that, in world class organisations, the management of time, flexibility, quality integration, variability and interdependence is critical to sustained value generation. This course

explains how management accounting supports such value generation, within changing organisational processes.

ACCT2542

Accounting and Financial Management 2B

Staff Contact: School Office

CP15 S2 L2 T2

Prerequisite: ACCT1511

Note/s: Excluded ACCT2552. Restricted to programs 0600, 1000, 1006, 1400, 6810 and Courses 3971, 3978 and 3979.

This intermediate financial accounting subject builds on the foundation laid in ACCT1501 and ACCT1511. It is intended for students who will be involved in the preparation or use of financial statements whether as accountants, financial executives, auditors, financial analysts or legal advisors. The effort to establish an agreed conceptual framework. The contracting cost framework for the analysis of financial reporting. Accounting for capital instruments. More advanced aspects of the definition, recognition and measurement of assets and liabilities. Lease accounting. Tax effect accounting. An introduction to consolidated accounts. Published financial reports including analysis of the current regulatory requirements. Accounting for the extractive industries, superannuation plans and employee entitlements.

Accounting Level III

ACCT3563

Accounting and Financial Management 3A

Staff Contact: School Office

CP15 S1 or S2 L2 T2

Prerequisite: ACCT2542

Note/s: Restricted to programs 1400, 6810 and Courses 3971 and 3979. Excluded ACCT3573.

This is the final financial reporting subject following ACCT1501, ACCT1511 and ACCT2542. This examines accounting, reporting and legal problems associated with the preparation of consolidated accounts for complex structures, significant investments in joint arrangements and other inter-corporate holdings, generic trust designs, securitisation structures, cross-border forex dealings and translations, off-balance sheet mechanisms and structures, 'green' accounting, the gender issue, Mabo and Wik determinations, cultural and heritage assets, and new generation financial instruments.

ACCT3583

Accounting and Financial Management 3B

Staff Contact: School Office

CP15 S1 or S2 T3

Prerequisite: ACCT2522

Note/s: Excluded ACCT3593. Restricted to programs 1400, 6810 and Courses 3971 and 3979

Strategic management accounting for the contemporary competitive environment. Topics include: environmental and value chain analysis, customer value and shareholder value analysis, strategic cost analysis, pricing, investment appraisal, product and customer profitability, strategic

resource management and management information systems. These issues are explored through professional and disciplinary literatures and cases describing Australian and international practice.

Anatomy

Anatomy Level II

ANAT2111

Introductory Anatomy

Staff Contact: Dr B Freeman

CP15 S1 HPW6

Prerequisites: BIOS1101, BIOS1201

Note/s: Restricted to program 7000 or in the Anatomy Quota.

Introduction to gross anatomy, based on a study of prosected specimens. Musculoskeletal, cardiovascular, respiratory, gastrointestinal, genitourinary and nervous systems. General topographical and surface anatomy.

ANAT2211

Histology 1

Staff Contact: A/Prof P Waite

CP15 F HPW3

Prerequisites: BIOS1101, BIOS1201

Corequisite: ANAT2111

Note/s: Restricted to program 7000 or in the Anatomy Quota.

Theory and practical aspects of modern histological techniques. Basic histology, including the morphological and functional properties of epithelial, connective, muscle and nervous tissues. Systematic histology, including a histological examination of the major systems of the body; cardiovascular, respiratory, lymphatic, integumentary, digestive, endocrine, urinary, reproductive and nervous (including eye and ear) systems. Emphasis on the ability to interpret histological sections and selected electron micrographs of mammalian tissues and organs and to relate morphology to tissue and organ function.

Anatomy Level III

ANAT3121

Visceral Anatomy

Staff Contact: Dr K Ashwell

CP15 S2 HPW6

Prerequisite: ANAT2111

Note/s: Restricted to program 7000 or in the Anatomy Quota.

Detailed study of the visceral system, including autonomic nervous system, head and neck regions and the cardiovascular, respiratory, gastrointestinal and genitourinary systems. Tutorials include clinical cases and surface and radiological anatomy.

ANAT3131**Functional Anatomy 1***Staff Contact: Prof D Tracey*

CP15 S1 HPW6

Prerequisite: ANAT2111**Note/s:** Restricted to program 7000 or in the Anatomy Quota.

Functional anatomy of the musculoskeletal system in the head and neck and upper limb. Includes biomechanics of connective tissue in particular bone, cartilage and tendon. Tutorials involve study of prosected specimens, X rays and surface anatomy; students also carry out their own dissections of the upper limb.

ANAT3141**Functional Anatomy 2***Staff Contact: Prof D Tracey*

CP15 S2 HPW6

Prerequisite: ANAT3131**Note/s:** Restricted to program 7000 or in the Anatomy Quota.

Functional anatomy of the musculoskeletal system in the trunk and lower limb. Includes functional aspects of muscle and a discussion of the mechanics and energetics of walking and running. Tutorials involve study of prosected specimens, Xrays and surface anatomy; students also carry out their own dissections of the lower limb.

ANAT3231**Cell Biology***Staff Contact: Dr M Hill*

CP15 S1 HPW4

Prerequisites: BIC2101 or BIOC2201 or BIOC2181 or BIOC2291 or PHPH2112**Note/s:** Restricted to program 7000 or in the Anatomy Quota.

To develop an understanding of the anatomy and biology of the cell. Cell biology combines traditional anatomical methods with recent cell and molecular biology techniques. Key concepts will include developmental differentiation of the cell, its polarity, motility, cytoskeleton, signal transduction mechanisms and outcomes. An introduction to concepts of cell and extracellular matrix interactions will also be covered.

ANAT3311**Mammalian Embryology***Staff Contact: Dr M Hill*

CP15 F HPW3

Corequisites: ANAT2211, ANAT2111**Note/s:** Restricted to program 7000 or in the Anatomy Quota.

History of embryology and its development as a science. The mammalian reproductive system. Gametogenesis. Fertilisation and cleavage. Development and implantation of blastocyst. Cell biology of early development. Development of embryonic disc, embryonic membranes, placenta. Comparative mammalian placentation. Human embryogenesis. Development of human fetus. Characteristics of external form. Teratology. Human organogenesis. Compara-

tive mammalian development. Biochemistry and embryogenesis.

ANAT3411**Neuroanatomy 1***Staff Contact: Dr E Tancred*

CP15 S1 HPW6

Prerequisites: ANAT2211, ANAT2111**Note/s:** Restricted to program 7000 or in the Anatomy Quota.

Nerve cells and glial cells, cytoarchitecture of brain and spinal cord. Functional anatomy of sensory and motor processing, and higher cerebral functions such as language and emotions. Blood supply of the central nervous system, cerebrospinal fluid and membranous coverings. Comparative anatomy of the brain.

ANAT3421**Research Topics in Neuroscience***Staff Contact: A/Prof P Waite*

CP15 S2 HPW3

Prerequisite: ANAT3411**Note/s:** Entry is by approval of Head of School

Focuses on selected areas of contemporary neuroscience research interest. Includes: brain development and axon guidance, peripheral nerve regeneration, spinal cord injury, pain pathways, visual system function, cortical plasticity, brain imaging, mechanisms of learning and memory, motor systems and the neuropathology in degenerative disorders. The subject is organised in seminar format with discussion of original research papers. It is ideal for students considering doing Honours as it provides a background to current research problems and the opportunity to undertake a small project.

Anatomy Level IV**ANAT4000****Anatomy 4***Staff Contact: Dr M Hill*

CP120 F

Prerequisite: Completion of Year 3 of program 7000 or equivalent including Level III subjects totalling 90 Credit Points, at least 4 of which must be Anatomy subjects.

An honours program consisting of the preparation of a thesis proposal, an undergraduate thesis and participation in School seminars.

The General Education requirements are met within the Honours Program through seminars, essays and participation in School seminars.

ANAT4509**Anatomy 4B Honours Project***Staff Contact: Dr M Hill*

CP90 F

Prerequisite: Completion of Year 3 of Program 7000 or equivalent, including Level III subjects totalling 90 Credit Points of which at least 4 must be Anatomy subjects. Excluded: ANAT4000

An honours program consisting of a thesis proposal, a short undergraduate thesis in the form of a scientific paper, and participation in School seminars. For the award of honours, this subject must be taken in conjunction with other subjects totalling 60 Credit Points (normally including ANAT4510) approved by the Head of School.

ANAT4510

Basic Research Methods

Staff Contact: Dr K Ashwell

CP15 F

Prerequisite: Acceptance into Honours year.

An introduction to basic research techniques and methods, appropriate for Honours level. Topics will include: laboratory safety, light and electron microscopy, photography, laboratory techniques and equipment, quantitative methods, stereology, analysis of data, presentation of data.

Aviation

AVIA1002

Flying Training 1

Staff Contact: Capt G Clynick

CP30 S2 HPW 2

Prerequisite: Nil

Note/s: restricted to Course 3980 Program 2001.

Excluded: AVIA1000

Practical flying training and associated ground training for stage 1. Covering practical and theory requirements for issue of PPL (Private Pilots Licence) and theory requirements for CPL (Commercial Pilots Licence), this subject encompasses flight training phases; 1,2,3,4 & 5 as detailed in UNSW Manual of Flight Training.

AVIA1100

Crew Resource Management 1

Staff Contact: Capt J Faulkner

CP 7.5 S1 HPW2

Note/s: Excluded: PROF0102

This subject deals with the effective use of all resources in the aviation decision making process with focus on the mechanism of communication within the hierarchy of the cockpit and the cabin. Evaluation of communication will focus on the impact of modern technology, changes in methods of communication, and the reduction in crew numbers.

AVIA1150

Air Traffic Control

Staff Contact: Mr J Guselli

CP7.5 S1 HPW2

Note/s: Excluded: AVIA1103

This subject is concerned with the history, development and practical application of Air Traffic Services and their relationship to the commercial and regulatory aspects of commercial aviation. The topics are focussed on both

operational and administrative structures within the industry. Emphasis is placed on the role of ATS from the perspective of a service provider. Topics include ATC history, structure, legal aspects and implications. Other significant aspects include communications, safety, noise abatement and the development of future systems.

AVIA1200

Instructional Techniques 1

Staff Contact: Mr B Buckley

CP 7.5 S2 HPW2

Note/s: Excluded: PROF1002

This subject introduces students to current theory and practice in instruction and instruction design. The role of the flight instructor is examined in the light of psychological and educational theory. Practice in instructional techniques is provided in a micro-teaching centre in which video records of students are used as the basis of effective feedback. Students are introduced to instruction based on competency development and assessment.

AVIA1300

Aeronautical Knowledge

Staff Contact: Capt G Clynick

CP7.5 S2 HPW2

Designed for management students who may not have or intend to gain, any flying experience, this subject provides a broad based cross section of the fundamental theory of flight operation similar to that addressed within the initial theory component for stage 1 flying stream students. Topics include basic theory of flight, aircraft systems and performance, regulations and navigation.

AVIA1900

Economics of Management

Staff Contact: Mr R Robertson

CP7.5 S2 HPW2

Excluded: PROF0203

This subject covers covers the economics of an airline and how the management of economic problems are analysed. Demand analysis and its relation with price and economic conditions covers revenue issues. Costs and supply are studied with reference to available airline costing information. The interaction of demand and supply are then studied and how airlines manage this aspect.

AVIA2003

Flying Training 2

Staff Contact: Capt G Clynick

CP45 S1 HPW

Prerequisite: AVIA1002

Note/s: Restricted to Course 3980 program 2001.

Excluded: AVIA2000

Practical flying training and associated ground training for stage 2. Covering Theory requirement for CIR (Command Instrument Rating), practical requirements for issue of CPL (Commercial Pilots Licence), theory and practical requirements for issue of a NVFR (Night Visual Rating) and a Multi Engine aircraft endorsement, this subject

encompasses flight training phases; 6,7 and 8 as detailed in UNSW Manual of Flight Training.

AVIA2100

Crew Resource Management 2

Staff Contact: Capt J Faulkner

CP7.5 S2 HPW2

Prerequisites: AVIA1100

Note/s: Excluded: PROF0202

The interrelationships between Captain and crew will be used to illustrate the principle of the hierarchy of command. Effective teamwork will be developed through negotiation of the principles of communications and effective decision management. This course will build on the principles illustrated in CRM 1.

AVIA2200

Instructional Techniques 2

Staff Contact: Mr B Buckley

CP7.5 S1 HPW2

Note/s: Excluded: PROF2002

This subject provides students with models of effective Flight Instruction emphasising principles of effective communication. Aspects of adult learning theory and practices, communication, human motivation, attention, perception and memory are incorporated in students' planning, delivery and evaluation of instruction sessions.

AVIA2400

Aviation Regulations 1

Staff Contact: Mr R Barstch

CP7.5 S1 HPW2

Note/s: Excluded: AVIA2403

Aviation Regulations 1 introduces the Laws and regulations under which an aviation operation functions. Beginning with regulatory authority and source, this subject develops an understanding and awareness of both the direct operational aspects of regulations and the commercial considerations that they demand. The emphasis is that of routine implications of the Civil Aviation Act, Civil Aviation regulations and orders.

AVIA2500

Airline Marketing

Staff Contact: Mr R Robertson

CP7.5 S1 HPW2

This subject uses the classic approach to marketing management but is most entirely focussed on how this is achieved in the industry. The approach is of practical nature. The course studies airline market research, marketing strategy development, product development, pricing strategies and yield management, distribution and promotion strategies. The course encourages and emphasises current airline marketing behaviour as examples of the theory.

AVIA2700

Flight Safety 1

Staff Contact: Capt J Faulkner

CP7.5 S1 HPW2

Note/s: Excluded: PROF2001

Subjects covered include the use of quick access recorders for fleet performance monitoring, corporate structures for safety departments and accident/incident analysis. Safety auditing, emergency planning and in-flight security will be studies.

AVIA2800

Management of General Aviation

Staff Contact: Capt G Clynick

CP7.5 S1 HPW2

This subject covers broad range of the management decisions faced by the airlines. This subject introduces the aviation environment within which the airline management functions and makes economic decisions. Revenue issues are studies with demand analysis, and an airline ability to manage price and to predict loads. The key elements of supply and cost are analysed by reference to available airline data. The final aspect studied is the combination of the demand and supply issues.

AVIA3002

Aviation Operations Management

Staff Contact: Mr R Robertson

CP30 S3 HPW

Prerequisites: AVIA1203, AVIA2400, AVIA2700, AVIA1900

Corequisites: AVEN3930, AVIA3810

Note/s: Excluded:

The subject studies most aspects of airline management. The course is practical in nature and will involve a number of visits from airline and airport managers, and a visit by the class to an airline. The course studies fleet, strategic, scheduling and route planning before moving onto aircraft maintenance, aircrew scheduling, disruption management, airport management, freight management.

AVIA3004

Advanced Flying Training

Staff Contact: Capt G Clynick

CP60 S2 HPW n/a

Prerequisites: AVIA2003

Note/s: Restricted to course 3980 program 2001.

Excluded AVIA3000

Practical flying training and associated ground training for stage 3. Covering practical and requirements for issue of CIR (Command Instrument Rating), theory and practical requirements for issue of a Grade Three Instructor Rating* and Theory requirements for the issue of an ATPL (Airline Transport Pilots Licence) and final refresher flying, this subject encompasses flight training phases; 9,10,11 and 12 as detailed in UNSW Manual of Flight Training.

*In lieu of the Grade three Instructor ratings, students may select from options of; Airline entry training or advance aircraft endorsement.

AVIA3400**Aviation Regulations 2***Staff Contact: Dept of Aviation Office*

CP7.5 S2 HPW2

Prerequisites: AVIA2403**Note/s:** Excluded: AVIA2413

Aviation Regulations 2 builds on the fundamental concepts introduced in Aviation Regulations 1. The emphasis of this subject is the legal ramification for pilots and operations managers imposed by the Civil Aviation Act and associated regulations. Specific case studies will form a large part of this subject.

AVIA3600**Simulations Applications***Staff Contact: Capt G Clynick*

CP7.5 S2 HPW2

Note/s: Excluded: AVIA2603

This subject addresses the broad application of simulation to the aviation industry. While the emphasis will be on aircraft simulations, aspects of operations systems simulations will also be covered. The perspective of this subject will that of end user application, particularly from management and training of human resource basis.

AVIA3700**Flight Safety 2***Staff Contact: Capt J Faulkner*

CP7.5 S2 HPW2

Prerequisites: AVIA2700**Note/s:** Excluded: PROF3001

The emphasis will be on the holistic aspects of flight safety from an operations management perspective, with specific reference to technical and human factors and corporate philosophies which incorporate aspects of flight safety. The course will incorporate a small research project.

AVIA3800**Management of Regional Airlines***Staff Contact: Capt G Clynick*

CP7.5 S1 HPW2

A further development to AVIA2800, this subject will provide students with the information pertinent to business and corporate operations with the regional airlines sectors of the industry. Aspects covered include requirements for low capacity airlines AOC,s and current state and national requirements for such operations.

AVIA3810**Airport Management and Security***Staff Contact: Mr R Armstrong*

CP7.5 S2 HPW2

Note/s: Excluded: AVIA3703

This is an industry based subject which brings the generalities of large management into the specific context of senior airport authorities. Aviation regulations and local government issues that pertain will also be covered.

Banking and Finance**Banking and Finance Level II****FINS2613****Business Finance***Staff Contact: School Office*

CP15 S1 or S2 L2 T1

Prerequisites: FINS2612 or any two of ACCT1511, ECON1102 and MATH1231**Note/s:** Restricted to programs 1400, 6810.

Looks at the essential aspects of financial decision making in business including: factors influencing capital expenditure decisions; alternative approaches to valuation; factors affecting the formulation of the capital structure; and influence of the capital market environment.

Banking and Finance Level II/III**FINS2612****Capital Markets and Institutions***Staff Contact: School Office*

CP15 S1 or S2 L2 T1

Corequisites: ECON1102 and MATH1231 or completion of Stage 1**Note/s:** Restricted to program 1400.

Analysis of markets for financial assets including the money, bond, stock and futures markets; the structure of interest rates; flow of funds of financial institutions; the regulatory structure of markets and the interrelations among markets.

Banking and Finance Level III**FINS2624****Investments***Staff Contact: School Office*

CP15 S1 or S2 L2 T1

Prerequisite: FINS2613**Note/s:** Excluded FINS2714 and FINS3615. Restricted to programs 1400 and 6810.

Introduces investment theory and practice. The first part of the subject develops the primary asset pricing models, including CAPM and APT models, examines relevant empirical tests, and applies the models to the problem of measuring portfolio performance. This is followed by a study of investment management in the social, ethical and economic context. Topics include security analysis of bonds and equities; the use of options, futures and forwards in portfolio hedging and risk management; and current issues in portfolio management including 'green' funds, passive vs active management, index funds and international diversification.

FINS3625**Applied Corporate Finance***Staff Contact: School Office*

CP15 S1 or S2 L2 T1

Prerequisite: FINS2613**Note/s:** Restricted to programs 1400, 6810.

This subject focuses on advanced issues associated with the investment and financing decisions of corporations. Topics include mergers and takeovers, management buy outs, executive compensation schemes, advanced capital budgeting problems, and issues in treasury management. The treatment includes a discussion of ethical issues.

Biochemistry and Molecular Genetics

Head of School: A/Prof M Edwards**Coordinator of Undergraduate Studies:** Dr A Bagnara**School Secretary:** Ms G McWhinney

Registration for Laboratory Classes in Biochemistry

It is *essential* for all students to register for a laboratory class for *each* biochemistry subject. This is normally done through the pre-enrolment process by completing the appropriate registration form (Form BIOC/REG/98) during the pre-enrolment. Failure to do this may prejudice your chances of obtaining a locker for your preferred laboratory class.

Note: Some subjects that appear in this section may be restricted to students for whom the subject comprises a compulsory part of their program.

Biochemistry Level II

BIOC2101**Principles of Biochemistry***Staff Contact: Dr I McFarlane, A/Prof M Edwards*

CP15 S1 HPW6

Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002

Note/s: Excluded BIOC1319, BIOC2312, BIOC2372, CHEM2929. Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program.

Introduces modern biochemistry, covers fundamental aspects of the structure-function relationships of proteins and an overall coverage of intermediary metabolism. Major topics covered include: the nature and function of enzymes; the metabolic working of cells, tissues and organs; the interrelationships between the pathways of carbohydrate, lipid and amino acid metabolism; the vital role of enzymes and hormones in catalysis and metabolic regulation; the

energy-trapping mechanisms of animals and plants; interesting variations on the central metabolic pathways in various life forms. Practical work to complement the lectures and to introduce the principles of biochemical analysis.

BIOC2181**An Introduction to Biochemistry***Staff Contact: Dr A Bagnara, A/Prof M Edwards*

CP15 S1 HPW6

Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002

Note/s: Excluded BIOC1319, BIOC2101, BIOC2312, BIOC2372, CHEM2929. This subject provides a comprehensive introduction to Biochemistry as an alternative to BIOC2101 for students who do not intend to proceed to Level III Biochemistry. It does not fulfill the prerequisite requirements for Level III Biochemistry but the Head of School may give approval for students with a grade of credit to enrol in Level III subjects.

Introduces to modern biochemistry, covers fundamental aspects of the structure-function relationships of proteins and an overall coverage of intermediary metabolism. Major topics covered include: the nature and functions of enzymes; the metabolic working of cells, tissues and organs; the interrelationships between pathways of carbohydrate, lipid and amino acid metabolism; the vital roles of enzymes and hormones in catalysis and metabolic regulation; the energy trapping mechanisms of animals and plants; interesting variations on the central metabolic pathways in various life forms. Practical work to complement the lectures and to introduce the principles of biochemical analysis.

This subject covers essentially the same material as in BIOC2101 Principles of Biochemistry, but in less detail and with more emphasis on the function of organisms and less emphasis on some of the underlying chemical mechanisms.

BIOC2201**Principles of Molecular Biology***Staff Contact: A/Prof T Stewart, Mr H Shooy*

CP15 S2 HPW6

Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002

Note/s: Excluded BIOC2291, BIOC2312, BIOC2372.

Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program.

Provides an introduction to modern molecular biology and covers the molecular mechanisms of gene expression and the fundamental aspects of recombinant DNA technology. The major topics covered include: The structure and function of DNA and RNA. The replication and transcription of DNA. Translation of the genetic code into an amino acid sequence during protein synthesis. Regulation of gene expression. Manipulation of DNA including fragmentation by restriction enzymes, cloning of DNA fragments into vectors, hybridization analysis and principles of DNA sequencing. Protein structure and function, protein engineering and site-directed mutagenesis. Amplification

of DNA by the polymerase chain reaction (PCR). Practical work to complement the lectures.

BIOC2291

An Introduction to Molecular Biology

Staff Contact: Dr G King, Mr H Shoory

CP15 S2 HPW6

Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002

Note/s: Excluded BIOC2201, BIOC2312, BIOC2372.

This subject provides a comprehensive introduction to Molecular Biology as an alternative to BIOC2201 for students who do not intend to proceed to Level III Biochemistry. It does not fulfill the prerequisite requirements for Level III Biochemistry but the Head of School may give approval for students with a grade of credit to enrol in Level III subjects.

Provides an introduction to modern molecular biology and covers the molecular mechanisms of gene expression and the fundamental aspects of recombinant DNA technology. The major topics covered include: the structure and function of DNA and RNA; the replication and transcription of DNA; translation of the genetic code into an amino acid sequence during protein synthesis; regulation of gene expression. Manipulation of DNA including: fragmentation by restriction enzymes; cloning of DNA fragments into vectors; hybridization analysis and principles of DNA sequencing. Protein structure and function. Amplification of DNA by the polymerase chain reaction (PCR). Practical work to complement the lectures.

This subject covers essentially the same material as in BIOC2201 Principles of Molecular Biology, but in less detail and with more emphasis on the general applications and less emphasis on some of the underlying mechanisms.

Biochemistry Level III

BIOC3111

Molecular Biology of Proteins

Staff Contact: Dr G King

CP15 S1 HPW6

Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201, CHEM2021 or CHEM2041

Modern aspects of the structure function relationships of proteins including discussion of the latest techniques of protein characterisation. Topics include: separation and analytical procedures; determination of amino acid sequence data; the nature of protein and protein ligand interactions including aspects of substrate binding, enzyme kinetics and enzyme mechanisms; the molecular architecture of proteins from the standpoint of the relationships among primary, secondary, tertiary and quaternary structures; aspects of protein engineering. Practical work illustrates and complements the lectures and provides experience with modern techniques of protein molecular biology.

BIOC3121

Molecular Biology of Nucleic Acids

Staff Contact: Dr A Bagnara

CP15 S1 HPW6

Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201, CHEM2021 or CHEM2041

Detailed analysis of gene structure and function including: structure and properties of polynucleotides such as DNA and RNA; structure of chromatin; mechanisms and regulation of gene replication, transcription and translation; recombinant DNA technology, nucleic acid sequencing, DNA-DNA and DNA-RNA hybridisation as important tools of modern molecular biology; protein production using recombinant DNA systems. Practical work illustrates and complements the lectures and provides experience with contemporary biochemical techniques.

BIOC3131

Biochemistry and Genetic Engineering of Plants

Staff Contact: Dr I McFarlane

CP15 S1 HPW6

Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

The techniques of recombinant DNA technology and plant tissue culture with their application to the modification and improvement of plant productivity.

Plant organ, tissue and cell culture, organogenesis, embryo-genesis and clonal plant propagation. The long term preservation of germplasm and plant genetic resources. Products from cultures, plant cells and the technology of plant cell culture. Structure and expression of plant genes. Plant molecular biology including cloning plant genes and vectors for gene cloning. Genetic manipulation of plants to improve their natural resistance to pests, disease and environmental stress. Practical work provides training in the basic techniques of plant tissue culture with application of selected techniques to plant genetic engineering.

BIOC3141

Human Genetics

Staff Contact: Dr L Lai

CP15 S1 HPW6

Prerequisite: BIOS2021

The principles and concepts of human genetics and methods used to study the nature and extent of genetic differences; mechanisms of inheritance and gene expression, gene linkage and patterns of inheritance; principles and applications of population genetics and cytogenetics; modern molecular techniques for human gene mapping, gene localisation, disease and the prospects of gene therapy; genetic fingerprinting and current ethical issues in human genetics.

BIOC3251**Human Biochemical Genetics***Staff Contact: Dr L Lai*

CP15 S2 HPW6

Prerequisites: BIOC2101, BIOS2021 or BIOC3141

Inherited variation of blood group proteins, their possible selective roles, and their application to the study of biological relationships between populations and recent advances in their gene characterisation. Inherited DNA variation or restriction fragment length polymorphism and variable number of tandem repeats, their application to studies of genetic diseases and of human populations. General approach from two loci per chromosome. Application of statistical techniques to analysing population data.

BIOC3261**Human Biochemistry***Staff Contact: A/Prof P Schofield*

CP15 S2 HPW6

Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

Covers the aspects of metabolism that are of particular relevance to the human. The major topics covered will be selected from: Nutrition, exercise, neurochemistry, xenobiotics, nucleotide and one-carbon metabolism, genetic diseases and molecular aspects of parasitology. The role of triglyceride, cholesterol and lipoprotein metabolism in human health, and other selected areas of human nutrition. Exercise, the metabolic fuels utilised and the use of in vivo NMR to monitor changes in energy metabolism. Specialised aspects of endocrinology and neurochemistry including prostaglandins, leukotrienes, enkephalins and endorphins. The interrelation of purines, pyrimidines, folate and cobalamin metabolism in humans. Xenobiotics: the metabolism of foreign compounds by humans. Biochemical aspects of genetic disease including the use of recombinant DNA techniques for prenatal diagnosis and carrier detection. Molecular studies of malaria and other parasites of the human. Practical work to amplify the lectures.

BIOC3271**Molecular Cell Biology***Staff Contact: A/Prof M Edwards*

CP15 S2 HPW6

Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

Cell biology from a molecular viewpoint. Biochemical aspects of cellular organisation and how they are integrated and controlled. The arrangement of the component molecules of organelles, their function in integrated cellular metabolism and the molecular interactions between the cells of multicellular organisms. The biochemistry of the cytoskeleton, carriers and intracellular transport systems. The regulation of cellular processes at the molecular endocrine level. Growth and differentiation. Aspects of cancer metabolism, the biochemistry of cell to cell communication and the structure and function of the extracellular matrix. Practical work amplifies the lectures.

BIOC3281**Recombinant DNA Techniques and Eukaryotic Molecular Biology***Staff Contact: Prof I Dawes*

CP15 S2 HPW6

Prerequisite: BIOC3121

The organisation of the genomes of higher organisms derived mainly from the application of recombinant DNA technology and related techniques. Methods used for the isolation, identification and characterisation of eukaryotic genomes in terms of the organisation of single copy and repeated sequences and of coding and non-coding sequences and of several gene clusters, eg the alpha and beta globin gene cluster. Mechanisms known to operate in the control of eukaryotic gene expression, both at the DNA level and at the level of RNA processing. Review of several specialised genetic systems in plants and animals such as mitochondria, chloroplasts and RNA and DNA tumour viruses. Practical work provides training in the use of sterile techniques and in working with polynucleotides under nuclease-free conditions, using basic techniques such as hybridisation and DNA sequencing.

BIOC3291**Genes, Genomes and Evolution***Staff Contact: Dr A Wilton*

CP15 S2 HPW6

Prerequisite: BIOS2021

Current concepts and theories in genetics concentrating on Eukaryotes including humans. The generation of variation examined at the molecular level for fundamental genetic process of mutation, recombination and repair. The evolution of the genome, maintenance of variation, the effects of mutations and their relevance to disease. Ecological genetics and molecular evolution, genetics of cellular division process and developmental genetics. Practical uses of genetics including the use of transposable elements to manipulate genetic stock, transgenesis, genetics of cancer, pedigree analysis, disease gene mapping, gene therapy, cytogenetics. Unusual genetic mechanisms. Perspectives on genetics, history and future. Practical work and exercises to complement the lectures.

Biochemistry Level IV**BIOC4318/BIOC4618****Biochemistry 4 (Honours)***Staff Contact: Prof I Dawes*

CP120 F

Prerequisite: Completion of program 4100 including Level III subjects totalling 120 Credit Points 60 of which must be from Biochemistry subjects.

Advanced training in selected areas of biochemistry including a supervised research program that places emphasis on the use of specialised techniques relevant to the research area. A written thesis on the research is required.

The General Education requirements are met within the Honours Program by seminars, an essay and participation in discussion groups.

BIOC4428/BIOC4629

Molecular Genetics 4 (Honours)

Staff Contact: Prof I Dawes

CP120 F

Prerequisite: Completion of program 4110 including Level III subjects totalling 120 Credit Points.

Advanced training in selected areas of molecular genetics including a supervised research program that places emphasis on the use of specialised techniques relevant to the research area. A written thesis on the research is required.

The General Education requirements are met within the Honours Program by seminars, an essay and participation in discussion groups.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Medicine Handbook.

BIOC1319

Biochemistry for Medical Students

BIOC2329

Medical Biochemistry and Genetics

Biological Science

Biological Science Registration Centre

(for courses in Botany and Zoology)

This will be held in Biology Lab B (Room G21, Biological Sciences Building) as follows:

18-19 Feb 10.00-15.00

23-26 Feb 10.00-17.00

Students must obtain practical slots at that time for:

BIOS2011	Evolutionary and Physiological Ecology
BIOS2021	Introductory Genetics
BIOS2051	Flowering Plants
BIOS2061	Vertebrate Zoology
BIOS3071	Conservation Biology and Biodiversity
BIOS3111	Population and Community Ecology

Pre-enrolment in another faculty does NOT automatically entitle you to a place in your chosen practical time. You must register at the Biological Science Registration Centre.

Students enrolling in subjects other than those listed above do not need to sign on at the Biological Science Registration Centre but need to attend the first lecture of the relevant course for practical assignments and further details. The

location and timetable of lectures and practicals for all subjects in the School of Biological Science (Botany and Zoology) can be obtained from the Biological Science Registration Centre, Room G21 or from the notice boards on the fifth floor of the Biological Sciences Building

Note: Some subjects that appear in this section may be restricted to students for whom the subject comprises a compulsory part of their program.

Biological Science Level I

BIOS1101

Evolutionary and Functional Biology

Staff Contact: Dr ML Augee

CP15 S2 HPW6

Note/s: Excluded: BIOS1301 and BIOS1021.

The subject examines the evolutionary history of life on earth and the relationship between environment, adaptation and function. Animal and plant physiology are covered with an emphasis on adaptation to Australian environmental conditions.

Note/s: There are no prerequisites. Practical and tutorial seat assignments must be obtained at the Biological Science Student Office (Rm G27 Biological Sciences Bld) BEFORE Session 2 starts. You need to purchase the subject guide at the same time, as it contains essential details about assessment, practical work and the equipment required for practicals.

BIOS1201

Molecules, Cells and Genes

Staff Contact: Dr ML Augee

CP15 S1 HPW6

Prerequisites: HSC Exam Score Required: 2 unit Science (Physics) 53-100, or 2 unit Science (Chemistry) 53-100, or 2 unit Science (Geology) 53-100, or 2 unit Science (Biology) 53-100, or 3 unit Science 90-150, or 4 unit Science 1-50. Excluded: BIOS1011 and BIOS1301.

Note/s: Practical and tutorial seat assignments must be obtained at the Biology Enrolment Centre on the day of enrolment. The course guide is available for purchase during enrolment week. Equipment required for practical classes is listed in the Course Guide and must be purchased before session starts. Students must consult if for details of the course and assessments.

The subject is concerned with the basic characteristics of life. The chemistry of life is covered with emphasis on the way in which living things construct and break down macromolecules. The way in which the genetic code controls these processes depends to a great extent on the structure and function of cell components, and cell biology is a major component of the subject. The final topic is genetics - the way in which the genetic code is inherited and the ways in which it can be modified.

Biological Science Level II

BIOS2011

Evolutionary and Physiological Ecology

Staff Contact: Dr P Steinberg

CP15 S1 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201

Note/s: Students must enrol at the Biological Science Registration Centre, Room G21, Biological Sciences Building. For further details, see Faculty timetable.

Introduction to functional relationships between living organisms and the environments in which they live. Emphasis on interactions within and between populations, ecological energetics, ecophysiology, and the theory of evolution by natural selection. Plants, animals and microbes are covered. Also serves as an introduction to the process of scientific enquiry.

BIOS2021

Introductory Genetics

Staff Contact: Dr W Sherwin, Dr A Wilton

CP15 S2 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201, CHEM1101

Corequisite: CHEM1201

Note/s: Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program. Students must enrol at the Biological Science Registration Centre, Room G21, Biological Sciences Building. For further details, see Faculty timetable.

Genome structure and life cycles in prokaryotes and Eukaryotes: DNA, gene mapping, cytogenetics. Genetic transmission, mutation, recombination. Gene regulation, interaction and development. Genetic variation and evolution of molecules, populations and species: Mating, selection, migration, population size, mutation, environment. Applications, including humans and genetic engineering.

BIOS2031

Biology of Invertebrates

Staff Contact: A/Prof P Greenaway

CP15 S2 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201

Note/s: Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program.

A comparative study of morphology, taxonomy, functional biology and evolutionary relationships of invertebrates. Emphasis on major phyla and marine forms. Practical work includes anatomy of living and preserved specimens (including dissections) and a compulsory fieldcamp. Personal expenses will be incurred.

BIOS2041

Biometry

Staff Contact: Dr S Maloney

CP15 S1 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201

Note/s: Excluded MATH2801, MATH2901, MATH2841.

Application of statistics to biological data. The main probability distributions. Estimation statistics and tests of hypotheses. Parametric and nonparametric anovas and linear regression/ correlation (chi square, normal, students't, F). Goodness of fit testing. A. priori and A. posteriori comparisons. Introduction to factorial analysis.

BIOS2051

Flowering Plants

Staff Contact: Prof A Ashford

CP15 S2 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201

Note/s: Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program. Students must enrol at the Biology enrolment Centre, Room G21, Biological Sciences Building. For further details, see Faculty timetable.

Basic plant biology including cell structure, plant morphology and anatomy, water and sugar transport, seed structure and physiology, plant growth and development arborescence, leaves and photosynthesis, roots, micro-organisms and nutrition, evolution of land plants and plant taxonomy. Practical work: plant anatomy and light microscopy; collection of numerical data and a statistical analysis, plant identification

BIOS2061

Vertebrate Zoology

Staff Contact: Dr M Augee

CP15 S1 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201

Note/s: Excluded 45.301, 17.732. Practical class allocations must be obtained during re-enrolment week from room G21, Biological Science Building. Enrolment in this subject may be subject to quota restrictions. Such restrictions will only apply to students taking this subject as an elective part of their program.

Comparative study of the Chordata, with particular reference to the vertebrates, including morphology, systematics, evolution and natural history, with reference to selected aspects of physiology and reproduction. Practical work to supplement lectures.

The course includes projects or field excursions. These may involve personal expenses.

Biological Science Level III

BIOS3011

Animal Behaviour

Staff Contact: Dr D Croft

CP15 S2 HPW6

Prerequisite: BIOS2031 or BIOS2061

Theory and practice in the biological study of animal behaviour: ethology and behavioural ecology. The observation and description of behaviour along with the development, function and evolution of behaviour in an ecological context are examined as important elements in the analysis of behaviour, particularly social behaviour. Topics include foraging behaviour, communication, home range, territorial behaviour, aggression and dominance, sexual behaviour, mate choice, mating systems, play and social organisation. Examples are drawn from the Australian fauna and both field and laboratory work are included.

BIOS3021

Comparative Animal Physiology

Staff Contact: A/Prof A Beal

CP15 S1 HPW6

Prerequisite: BIOS2031 or BIOS2061

The physiology of invertebrates and vertebrates including the special features of Australian mammals. The topics examined include reproduction, hormones, nerves, blood, circulation, respiration and kidneys with emphasis on the control and integration of organ systems and body functions.

BIOS3031

Ecological Physiology

Staff Contact: Prof T Dawson, A/Prof P Greenaway

CP15 S2 HPW6

Prerequisite: BIOS2031 or BIOS2061

Physiological adaptation to habitat in animals. The problems imposed by environmental conditions on salt and water balance, excretion, gas exchange, metabolism and temperature regulation/acclimation will be considered. Underlying themes include the colonisation of land from aquatic habitats and adaption to severe habitats. Emphasis will be placed on the Australian fauna. A field trip to Western NSW is part of the course and students will incur expenses.

BIOS3051

Insect Diversity and Management

Staff Contact: Dr C Orton

CP15 S1 HPW6

Prerequisite: BIOS2031

Note/s: Not offered in 1998.

Insect diversity, classification and identification, internal and external anatomy. Insect ecology, physiology and behaviour, including pheromones. Management of urban and agricultural insect pests, insecticides and their action, resistance, advantages and disadvantages of pest control methods. Practical classes to illustrate lectures. Students must present insect collection for assessment.

BIOS3061

Plant Ecosystem Processes

Staff Contact: A/Prof R McMurtrie

CP15 S1 HPW6

Prerequisite: Any 2 Level II Science subjects

Interactions of plants with their soil and atmospheric environments. Plant growth and decomposition processes. Cycling of carbon, water and nutrients in plant ecosystems. Role of fungi in ecosystems. Mineral nutrition and water uptake in plants. Root systems. Plant strategies for improving mineral nutrition. The role of symbiosis in mineral nutrition. Impacts of global change on vegetation. Role of terrestrial ecosystems in the global carbon budget. Relating vegetation to climate.

BIOS3071

Conservation Biology and Biodiversity

Staff Contact: Dr W Sherwin

CP15 S1 HPW6

Prerequisites: BIOS1011 and BIOS1021 or BIOS1101 and BIOS1201, plus any 2 Level II Biological Science subjects (the latter may be waived upon application to the subject coordinator)

Note/s: Students must enrol at the Biology Enrolment Centre, Room G21, Biological Sciences Building. For further details, see Faculty timetable.

Applications of community biology, population ecology and genetics to management of environmental problems in nature and artificial ecosystems, including Australian examples. Nature and importance of global diversity, Management and design of programs for the conservation of species and ecosystems, including reserves, off site conservation, and computer simulations. Field excursions are compulsory and will involve expense to individual students.

BIOS3081

Ocean Biology and Fisheries

Staff Contact: Dr I Suthers

CP15 S1 HPW6

Prerequisite: MSCI2001 or Level II Biological Science subjects totalling 30 Credit Points

Note/s: A compulsory field trip will be held during the mid-session break.

Marine pelagic and estuarine habitats. The practical application of theory to the ocean environment and its effect on the life of marine organisms. Emphasis on the biology of phytoplankton, zooplankton and fish, together with the study of fisheries. Includes management, marine technology, computer simulations, conservation, other marine vertebrates, aquaculture and environmental concerns. Technical skills, taxonomy and sampling design. Personal expenses will be incurred.

Complements BIOS3091 Marine Botany and Ecology.

BIOS3091**Marine Botany and Ecology***Staff Contact: Prof R King*

CP15 S2 HPW6

Prerequisite: MSCI2011 or Level II Biological Science subjects totalling 30 Credit Points

Marine benthic habitats. Biology and physiology of algae, seagrasses, mangroves and saltmarsh. Community dynamics on rocky shores and reefs. Mariculture and biotechnology. Plant/animal interactions and population dynamics of marine benthic invertebrates. Fieldwork is included.

Complements BIOS3081 Ocean Biology and Fisheries.

BIOS3111**Population and Community Ecology***Staff Contact: Prof B Fox*

CP15 S2 HPW6

Prerequisites: BIOS1021 and MATH1032 or MATH1231 or MATH1042 or MATH1241 or MATH1021

Factors regulating dynamics of interacting populations, renewable resource management, ecosystem stability, cycles and chaos, simulation modelling in ecology, niche theory, competition, habitat selection, community structure, species diversity, island biogeography, ecological gradients. Succession following disturbance (fire, mining, or logging). Participation in fieldwork is essential.

BIOS3121**Plant Systematics and Development***Staff Contact: A/Prof C Quinn*

CP15 S1 HPW6

Prerequisite: BIOS2051

Techniques of plant systematics, including the recognition and classification of species, genera and higher order taxa. Assessment of evolutionary relationships using molecular and other data, and the use of computer models to reconstruct and test hypothetical phylogenies. Modern approaches to the exploration of plant ultrastructure and development, including the use of the electron microscope. The main emphasis is placed on seed plants.

BIOS3131**Mammalogy***Staff Contact: Prof M Archer*

CP15 S2 HPW6

Prerequisite: BIOS2061

An introduction to the origin and nature of mammals, their evolutionary patterns, diversity, contemporary and historical biogeography, community structure, life history strategies compared with those from other lands, field techniques and aspects of conservation biology. Focus on endemic Australian mammals: monotremes, marsupials, bats, cetaceans, rodents, dingos and humans. Includes field excursions. Field excursions may incur personal expenses; personal expenses may be incurred.

BIOS3151**Lower Plants and Fungi***Staff Contact: Prof A Ashford*

CP15 S1 HPW6

Prerequisite: BIOS2051**Note/s:** Not offered in 1998

Examines the structural diversity and evolution of plants, with emphasis on non-seed-bearing land plants (ferns, lycopods, mosses and liverworts) and fungi. The adaptive significance of some of the characteristics features of the major groups are explored.

Biological Science Level IV**BIOS4018****Biological Science 4 (Honours) Full-time***Staff Contact: A/Prof C Quinn*

CP120

Prerequisite: Completion of program 1700 including Level III subjects totalling 105 Credit Points**BIOS4014****Biological Science 4 (Honours) Part-time***Staff Contact: A/Prof C Quinn*

CP60 F

Prerequisite: Completion of program 1700 including Level III subjects totalling 105 Credit Points**BIOS4028****Botany 4 (Honours) Full-time***Staff Contact: A/Prof C Quinn*

CP120 F

Prerequisite: Completion of program 1743 including Level III subjects totalling 105 Credit Points, 4 of which must be Botany subjects or a closely related discipline**BIOS4024****Botany 4 (Honours) Part-time***Staff Contact: A/Prof C Quinn*

CP60 F

Prerequisite: Completion of program 1743 including Level III subjects totalling 105 Credit Points, 4 of which must be Botany subjects or a closely related discipline**BIOS4034****Zoology 4 (Honours) Part-time***Staff Contact: A/Prof C Quinn*

CP60 F

Prerequisite: Completion of program 1745 including Level III subjects totalling 105 Credit Points 4 of which must be Zoology subjects**BIOS4038****Zoology 4 (Honours) Full-time***Staff Contact: A/Prof C Quinn*

CP120 F

Prerequisite: Completion of program 1745 including Level III subjects totalling 105 Credit Points 4 of which must be Zoology subjects

The General Education requirements are met within these Honours Programs by seminars, an essay and participation in discussion groups.

Biotechnology

Biotechnology Level III

BIOT3011

Biotechnology A

Staff Contact: Dr D Glenn

CP15 S1 L3 T3

Prerequisites: BIOC2101, BIOC2201

The basic principles involved in the operation of microbial processes on an industrial scale. Includes: the selection, maintenance and improvement of microorganisms; the influence of physical and chemical factors on the microbial environment; the control of environmental factors; the effects of operational patterns on batch and continuous flow cultivation; aeration and agitation; scaleup of microbial processes; air and media sterilisation; the harvesting, purification and standardisation of products; the principles involved in microbial processes for chemical, pharmaceutical and food production, microbial waste treatment and environmental control. The laboratory component includes manipulation of microorganisms, laboratoryscale fermenter operation, microbial enzyme isolation and may include visits to industrial fermentation plants and industrial seminars.

BIOT3021

Biotechnology B

Staff Contact: Prof P Rogers

CP15 S2 L2 T4

Prerequisite: BIOT3011

Application of principles of biotechnology to the analysis and design of microbial processes of industrial relevance (ethanol, single cell protein, fermented foods and beverages, amino acids and vitamins, microbial polysaccharides, microbial enzymes, secondary metabolites including antibiotics, products of mammalian cell culture, waste treatment processes, microbial leaching and metal recovery from low grade minerals). Emphasis on quantitative approach: mass and heat balance calculations, kinetic and thermodynamic analysis, equipment design and specification, process design, process simulation, plant location, application of optimisation techniques. The economics of microbial processes are considered and comparison made with alternative modes of production or treatment. The economics of agroindustry in Australia using microbial processes. Marketing of fermentation products, clinical trials required, legal constraints, patent rights. Technical and economic feasibility studies. A design project is included based on experimental data.

BIOT3031

Microbial Genetics

Staff Contact: Dr D Glenn, Dr F Foong

CP15 S1 L2 T4

Prerequisites: BIOS2021, BIOC2101, BIOC2201 and MICR2011

Note/s: Excluded MICR3021.

Suitable for students majoring in Microbiology, Biochemistry, Biotechnology and Genetics. Major topics include genetics of bacteriophage, bacteria and yeasts, mutation and repair, plasmids, gene transfer, transposable genetic elements, gene cloning (genetic engineering) and two component regulatory systems.

The practical component includes a session long practical that involves *E. coli* transposon mutagenesis, gene library construction and complementation of auxotrophic mutants. Additional shorter practicals focus on bacterial and phage restriction/modification systems, UV mutagenesis and DNA repair, gene transfer between bacterial species and gene exchange and gene exchange with hyperthermophilic archaea.

BIOT3061

Monoclonal Antibody and Genetic Techniques in Biotechnology

Staff Contact: Dr S Mahler

CP15 S2 L2 T4

Prerequisites: BIOC2101, BIOC2201

Recent developments in biotechnology have resulted in techniques which are widely applied in industrial, clinical, veterinary, agricultural and research laboratories. Many of these techniques have resulted from the development of monoclonal antibodies and the development of gene probes. The course includes: antibody structure; production of monoclonal antibodies, cell fusion, hybridoma selection, culture techniques, purification; analytical techniques employing monoclonal antibodies (RIA, ELISA); therapeutic application of antibodies, immunotoxins; gene probes; restriction fragment length polymorphisms (RFLP); gene probes for disease detection, identification of bacteria and viruses; forensic application of DNA fingerprinting. Tutorial and practical work to complement the lectures.

BIOT3100

Fermentation Processes

Staff Contact: Dr F Foong/Dr J Foster

CP 5 SS T2

Note/s: Restricted to courses 3055

Factors governing the use of microorganisms in industrial processes, including the selection, maintenance and improvement of microorganisms, the control of environmental factors, batch and continuous flow operational patterns, product recovery, process optimisation and waste disposal. Demonstrations of the operation and control of fermenter systems and of microbial process simulation.

BIOT3041**Principles of Biotechnology***Staff Contact: Dr J Foster*

CP7.5 S2 L2 T1

Lecture component of BIOT3100 Fermentation Processes plus tutorial.

Biotechnology Level IV**BIOT4053****Research Project***Staff Contact: Dr S Mahler*

CP90 F T18

Note/s: Restricted to courses 3052

The experimental investigation of some aspects of biotechnology.

BIOT4063**Research Project***Staff Contact: Prof P Rogers/Dr C Marquis*

CP30 S1 T2 S2 T10

Note/s: Restricted to courses 3055

The experimental investigation of some aspects of bioprocess engineering.

BIOT4073/BIOT4083**Biotechnology (Honours)***Staff Contact: Prof N Dunn*

CP120 F

Prerequisite: Completion of Level III subjects totalling 120 Credit Points 4 of which must be Biotechnology or related discipline

Advanced formal training in selected areas of biotechnology and participation in one of the School's research projects.

The General Education requirements are met within the Honours Program by seminars, an essay and participation in discussion groups.

BIOT4093**Biological Process Engineering***Staff Contact: Dr C Marquis*

CP30 F L2 T4

Prerequisite: MICR2201**Note/s:** Restricted to courses 3055

This course includes coursework material in bioprocess engineering principles, aspects of food engineering and modern biotechnology techniques. Also incorporated in this subject is a practical component. Bioprocess engineering principles covered include basic metabolic pathways, stoichiometry and kinetics of growth and product formations, heat balances, secondary metabolic productions and structural kinetic models, sterilisation, oxygen mass transfer, mixing, instrumentation, downstream processing, legal and ethical issues related to biotechnology products. Food engineering areas covered include the application of modelling techniques to drying and heat transfer. Modern biotechnology methods covered include a variety of methods to generate and characterise production of monoclonal antibodies including hybridoma

production, recombinant methods and phage display of antibodies.

Board of Studies in Science and Mathematics

Board of Studies in Science and Mathematics Level IV**BSSM4013/BSSM4019****Geology and Physics 4 (Honours)**

CP120 F

Prerequisites: Completion of Program 0100 including Level III subjects totalling 120 Credit Points

Combines Geology and Physics in Program 0100, made by arrangement with the Heads of the two Schools.

BSSM4023/BSSM4029**Ecology 4 (Honours)***Staff Contact: A/Prof B Fox*

CP120 F

Prerequisite: Completion of Program 6851, 6852 or 6853 including Level III subjects totalling 90 Credit Points

BSSM4103/BSSM4109**Genetics 4 (Honours)***Staff Contact: Prof I Dawes*

CP120 F

Prerequisite: Completion of Program 6840 including Level III subjects totalling 90 Credit Points

The General Education requirements are met by participation in the program offered by the supervisor's School.

Chemical Engineering and Industrial Chemistry

Polymer Science**POLY3010****Polymer Science***Staff Contact: A/Prof R Burford*

CP15 S1 L2 S2 L2 Lab2

Prerequisites: CHEM2011, CHEM2021, MATH2021, MATH2819

Co or prerequisite: INDC3090

Note/s: Restricted to Combined degree course 3681.

Polymerisation chemistry and processes. Step and radical chain polymerization. Ionic (including stereoregular)

polymerisation. Methods including bulk, suspension, emulsion, solution and gas phase polymerisation. Industrially important polymers and their manufacture. Principles of analysis. Molecular weight distribution. Thermodynamics of polymer solutions. Polymer chain conformation. Viscoelasticity. Mechanical behaviour. Polymer morphology. Thermal behaviour and analysis. Chemistry and physics of elastomers. Elements of polymer compounding and fabrication. New polymers.

Chemistry

Chemistry Level 1

CHEM1101

Chemistry 1A

Staff Contact: Dr P Chia

CP15 S1 or S2 HPW6

Prerequisites: HSC Exam Score Range

Required : 2 unit Mathematics 60-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100 and 2 unit Chemistry 65-100 or 3 unit Science 90-150 or 4 unit Science 1-200 or 2 unit Physics 75-100, or CHEM1401 65 or higher.

Note: Students who have not undertaken chemistry or physics at HSC Level should take CHEM1401 before proceeding to CHEM1101. However, no more than 30 Credit Points of Chemistry at Level 1 may be counted towards a Science degree.

Atomic structure and periodicity. Structure and shapes of molecules. Chemical reactions; types, rates and mechanisms. Reactions of organic compounds.

CHEM1201

Chemistry 1B

Staff Contact: Dr P Chia

CP15 S2 or Summer Session, HPW6

Prerequisite: CHEM1101

Properties of gases and liquids. Thermodynamics. Atmospheric chemistry. Solids and solubilities. Acids and bases. Aqueous chemistry. Electrochemistry.

CHEM1401

Introductory Chemistry A

Staff Contact: Dr P Chia

CP15 S1 HPW6

Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 60-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100

Note/s: This subject is only for students who do not have the prerequisites for CHEM1101.

Stoichiometry and solution stoichiometry. States of matter, changes of state, phase diagrams, gases, liquids, solids, solutions. Thermodynamics, enthalpy, entropy, free energy. Oxidation and reduction, electrode potentials. kinetics.

Chemistry Level II

CHEM2011

Physical Chemistry

Staff Contact: A/Prof R Read

CP15 S2 HPW6

Prerequisites: CHEM1101 and CHEM1201 or CHEM1002, MATH1231 or MATH1241 or MATH1021

First, second and third laws of thermodynamics. Applications of thermodynamics. Chemical and phase equilibria. Principles and applications of electrochemistry. Colloid, interface and surface chemistry. Reaction kinetics, temperature and concentration dependence of reaction rates, reaction mechanisms.

CHEM2021

Organic Chemistry

Staff Contact: Dr R Read

CP15 S2 HPW6

Prerequisite: CHEM1101 and CHEM1201 or CHEM1002

Applications of spectroscopy in structure elucidation. Reactive intermediates, addition and rearrangement reactions, carbonyl group chemistry. Chemistry of aromatic compounds.

CHEM2031

Inorganic Chemistry and Structure

Staff Contact: Dr R Read

CP15 S1 HPW6

Prerequisite: CHEM1101 and CHEM1201 or CHEM1002

Concepts and consequences of quantum theory. Electronic and geometric structure of atoms and molecules. Solid state chemistry. Coordination chemistry. Transition and Post-transition metal chemistry. Chemistry of non-transition elements.

CHEM2041

Chemical and Spectroscopic Analysis

Staff Contact: Dr R Read

CP15 S1 HPW6

Prerequisites: CHEM1101 and CHEM1201 or CHEM1002, MATH1021 or MATH1231 or MATH1241

Principles and applications of chemical and analytical spectroscopy. Statistical treatment of data. Titrimetric and potentiometric analysis. Separation techniques.

Chemistry Level III

Note/s: Level III subject offerings are being altered for 1999. Consult the School of Chemistry. All session 2 subjects are available only if there is sufficient demand.

CHEM3011

Physical Chemistry

Staff Contact: Dr G Moran

CP15 S1 HPW6

Prerequisites: PHYS1002, CHEM2011, CHEM2031, CHEM2041

Electronic, vibrational and rotational spectroscopy. Quantum mechanics of spectroscopic transitions.

Statistical thermodynamics as the link between molecular and macroscopic properties. Molecular kinetics: transition state theory, potential energy surfaces, molecular dynamics, ultra fast kinetics. Structure and properties of solids.

CHEM3021

Organic Chemistry

Staff Contact: Dr G Moran

CP15 S1 HPW6

Prerequisite: CHEM2021

Synthesis and reactions of the principal types of aromatic heterocyclic systems. Stereochemistry. Synthesis and reactions of carbocyclic systems. Application of spectroscopic methods, eg nuclear magnetic resonance, mass spectrometry, to determination of organic structures.

CHEM3031

Inorganic Chemistry

Staff Contact: Dr G Moran

CP15 S1 HPW6

Prerequisite: CHEM2031

Descriptive chemistry and bonding, stereochemistry, magnetic and spectroscopic properties, stabilities of complexes of normal and inner transition series elements. Stabilisation of oxidation states. Aspects of the chemistry of p-block elements including the inert pair effect.

CHEM3041

Analytical Chemistry

Staff Contact: Dr G Moran

CP15 S1 or S2* HPW6

Prerequisite: CHEM2041

Note/s: * S2 availability subject to demand

Instrument design, theory and operating principles for the following instrumental areas: electrochemical, atomic and molecular spectroscopy, chromatography, mass spectrometry, automated analysis.

CHEM3111

Surface Chemistry: Principles and Applications

Staff Contact: Dr G Moran

CP15 S2 HPW6

Prerequisite: CHEM3011

Structure of solid surfaces. Energetics and kinetics of adsorption. Characterisation of surfaces and adsorbed molecules. Liquid - gas, liquid - solid and solid - solid interfaces. Principles of heterogeneous catalysis; elementary steps in catalytic reactions. Examples of catalytic processes. Applications of surface chemistry.

CHEM3121

Synthetic Organic Chemistry

Staff Contact: Dr G Moran

CP15 S2 HPW6

Prerequisite: CHEM3021

Modern functional group transformations with particular reference to positional and stereochemical control. Pericyclic reactions and photochemistry, Woodward-

Hoffman rules. Principles of planning organic synthesis; disconnection approach.

CHEM3131

Advanced Inorganic Chemistry

Staff Contact: Dr G Moran

CP15 S2 HPW6

Prerequisite: CHEM3031

Inorganic reactions and reactivity, reactions of co-ordinated ligands and activation of small molecules. Group theory and spectroscopy. Bio-inorganic chemistry; the occurrence and co-ordination of metals in biology, common metal containing enzymes. Heavy metals, detoxification mechanisms and inorganic aspects of environmental chemistry. Inorganic compounds and materials with significant electronic and magnetic properties.

CHEM3141

Advanced Analytical Chemistry

Staff Contact: Dr G Moran

CP15 S2 HPW6

Prerequisite: CHEM3041

Advanced approaches to problem solving in analytical science using modern instrumental techniques and microcomputers for the analysis of complex organic, biological, inorganic and environmental materials. Selection and optimisation of instrumental parameters; theory of separation strategies for identification and quantitative determinations. Networking of computer-controlled workstations for laboratory automation and management.

CHEM3221

Biological Organic Chemistry

Staff Contact: Dr G Moran

CP15 S2 HPW6

Prerequisite: CHEM3021

Interdisciplinary aspects of selected classes of organic compounds of biological significance. Properties of proteins, poly-saccharides. Structural and synthetic aspects of selected drugs; metabolism and analysis. Herbicides, fungicides, pesticides; synthesis, degradation, mode of action.

CHEM3231

Nuclear and Radiation Chemistry

Staff Contact: Dr G Moran

CP15 S1* or S2 HPW6

Prerequisites: CHEM2011 or CHEM2021 or CHEM2031 or CHEM2041

Note/s: Not offered in S1 1998.

Origin and properties of nuclear radiations, their interaction with matter and their detection and measurement. Effect of radiation on living cells, contamination and radiation hazards. Factors affecting radiotoxicity. Applications of isotopes as tracers and radiation sources.

CHEM3311**Environmental Chemistry***Staff Contact: Dr G Moran*

CP15 S2 HPW6

Prerequisites: CHEM2011, CHEM2041

Physical chemistry of the environment. The chemistry of water in the environment; rivers, estuaries and oceans. The chemistry of the atmosphere: photolysis, primary and secondary pollutants. The distribution of elements in ecosystems. Analysis of naturally occurring species and pollutants.

CHEM3321**Applied Organic Chemistry***Staff Contact: Dr G Moran*

CP15 S1 HPW6

Corequisite: CHEM3021

Polymerisation processes and synthetic polymers; initiators, chain transfer agents, retarders. Pigments and dyestuffs; Basis of colour in organic compounds. Oxidation and reduction processes; theory and industrial importance.

CHEM3510**Quantum Chemistry and Symmetry***Staff Contact: Dr G Moran*

CP7.5 S2 HPW3

Prerequisite: CHEM2031

Principles of quantum mechanics. Approximate methods for quantum mechanical problems. Molecular orbital theories for molecules (eg Huckel, ab initio, SCF) and the calculation of molecular properties. Group theory and Symmetry operations applied to molecules. Correlation diagrams for chemical reactions and bonding. Applications to vibrational spectroscopy.

CHEM3530**Molecular Structure Determination***Staff Contact: Dr G Moran*

CP7.5 S2 HPW3

Prerequisites: CHEM2031, CHEM2041

Techniques for the determination of molecular structure, with emphasis on multinuclear NMR and X-ray diffraction. Experimental requirements and procedures, instruments. Interpretation of results, applications in current research problems. Databases and computing; computer graphics and molecular modelling.

CHEM3630**Organometallic Chemistry***Staff Contact: Dr G Moran*

CP7.5 S2 HPW3

Prerequisites: CHEM2021, CHEM2031

Preparation, structure and reactions of transition metal and main group organometallic compounds. Structure and bonding of ligands; ligand stabilisation and activation; novel effects of ligand bulk and geometry. Catalytic applications of organometallic compounds.

CHEM3640**Computers in Chemistry***Staff Contact: Dr G Moran*

CP7.5 S2 HPW3

Prerequisites: CHEM2011, CHEM2041

Computing techniques introduced through specific chemical applications; simple and complex equilibria, rate equations, analysis of multicomponent mixtures, instrumental calibration curves. Treatment of transient signals. Specific case studies selected from spectroscopy, chromatography, and electrochemistry. Chemical databases and the literature, spectroscopic databases.

CHEM3901**Environmental Toxicology***Staff Contact: Dr G Moran*

CP15 S1 HPW6

Prerequisites: CHEM1002 or CHEM1101 and CHEM1201

Note/s: This course is only available in the Advanced Science Environmental Science Program.

Classification and properties of toxic substances. Biological properties of important classes of chemical compounds. Fate of xenobiotics in the human body, including detoxification and bioactivation. Chemical transformations of pollutants in the environment; air, water and soil pollution. Analysis of environmental pollutants at trace levels.

Chemistry Level IV**CHEM4003/CHEM4004****Chemistry 4 (Honours)***Staff Contact: Dr G Edwards*

CP120 F

Prerequisites: Completion of Program 0200 or 0205 including 120 Credit points at Level III of which 60 CP's must be Level III Chemistry subjects.

Consists of selected series of lectures on advanced topics in Chemistry and a research project.

The Category C General Education requirements are met within the Honours Program by seminars, discussion and a safety training program.

Students intending to seek admission to this program should consult the School re selection of subjects in the earlier years and apply to the Head of the School for consideration for admission at the end of Stage 3 (or completion of requirements for the award of the pass degree).

Servicing Subjects

These are subjects taught within courses offered by other faculties or schools.

For further information regarding the following subjects see the Faculty of Engineering Handbook.

CHEM1800**Chemistry 1EP***Staff Contact: Dr P Chia*

CP7.5 S I HPW3

Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 60-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100 and 2 unit Science (Physics) 57-100, or 2 unit Science (Chemistry) 60-100, or 3 unit Science 90-150, or 4 unit Science 1-50

Note/s: Restricted Course 3985 Program 0176

Atomic and molecular structure and bonding. States of matter. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electrochemistry and corrosion. Colloids and clays. Colligative properties of solutions. Applications of chemical principles to engineering.

CHEM1806**Chemistry 1EE***Staff Contact: Dr P Chia*

CP7.5 S I HPW3

Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 60-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100 and 2 unit Science (Physics) 57-100, or 2 unit Science (Chemistry) 60-100, or 3 unit Science 90-150, or 4 unit Science 1-50

Note/s: Restricted to Courses 3640, 3725 and 3727

Atomic and molecular structure and bonding. States of matter. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electrochemistry and corrosion. Colloids and clays. Colligative properties of solutions. Applications of chemical principles to engineering.

CHEM1807**Chemistry 1ME***Staff Contact: Dr P Chia*

CP10 S2 HPW4

Note/s: excluded CHEM1101, CHEM1201, CHEM1002
Restricted to Course 3610, 3663, 3680, 3685 and 3700

Stoichiometry. Atomic and molecular structure. States of Matter. Equilibrium. Oxidation and reduction, electrochemistry and corrosion of metals. Introduction to organic chemistry, structure and properties of polymers, fuels and lubricants.

CHEM1808**Chemistry ICE***Staff Contact: Dr P Chia*

CP12.5 HPW5

Note/s: Excluded CHEM1101, CHEM1201, CHEM1002
Restricted to course 3730, 3620, 3146 and 4775

Stoichiometry. Atomic and molecular structure and bonding. States of Matter. Colligative properties of solutions. Thermochemistry. Chemical equilibrium; Ionic equilibria. Rates of reactions Electrochemistry and corrosion. Colloids and clays. Applications of chemical principles to engineering.

CHEM1809**Biological Chemistry for Optometry Students***Staff Contact: Dr P Chia*

CP30 F HPW6

Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 60-100, or 3 unit Mathematics 1-50 or 4 unit Mathematics 1- 100 and 2 unit Chemistry 65- 100, or 3 unit Science 90- 150, or 4 unit Science 1-200

Note/s: Restricted to course 3950

Stoichiometry and solution stoichiometry. Atomic and molecular structure. Gases, liquids and solutions. Thermodynamics. Kinetics. Equilibrium constants, acid/base and solubility. Oxidation and reduction. Organic chemistry including stereoisomerism. Amino acids, proteins, carbohydrates, nucleic acids and lipids. Enzymology. Bioenergetics. Carbohydrate metabolism, oxidative phosphorylation. Metabolism and hormone function.

CHEM2808**Organic and Inorganic Chemistry for Materials Science and Engineering***Staff Contact: Dr N Duffy*

CP10 S1 HPW4

Prerequisites: CHEM1101 and CHEM1201

Discussion of selected types of organic reactions to provide a broad cover of the chemistry of aliphatic and aromatic compounds. Survey of the structures, energetics, bonding, reactions and physical properties, and applications, of selected compounds of main group elements and of lanthanide and d block transition elements.

CHEM2818**Physical Chemistry for Materials Science and Engineering***Staff Contact: Prof RF Howe*

CP15 S1 HPW5

Prerequisites: CHEM1101, CHEM1201, MATH1231 or MATH1241 or MATH1021

Note/s: Excluded CHEM2011

Thermodynamics: first, second and third laws, applications to materials science. Chemical equilibria. Electrochemistry, electrochemical cells. Surface, interface and colloid chemistry. Chemical kinetics

CHEM2819**Physical Chemistry for Food and Fibre Science and Technology***Staff Contact: Prof RF Howe*

CP15 S2 HPW6

Prerequisites: CHEM1101, CHEM1201, MATH1231 or MATH1241 or MATH1021

Note/s: Excluded CHEM2011

Thermodynamics: first, second and third laws. Chemical and phase equilibria. Thermodynamics and transport properties of ionic solutions. Electrochemistry. Macromolecules, colloids and surfaces: principles and applications. Chemical kinetics: factors influencing reaction rates, rate equations, reaction mechanisms.

CHEM2828**Organic and Inorganic Chemistry for Chemical Engineers***Staff Contact: Dr N Duffy*

CP10 S1 HPW4

Prerequisites: CHEM1101, CHEM1201

Discussion of selected types of organic reactions to provide a broad cover of the chemistry of aliphatic and aromatic compounds. Survey of the structures, energetics, bonding, reactions and physical properties, and applications, of selected compounds of main group elements and of lanthanide and d block transition elements.

CHEM2829**Organic Chemistry for Food Science and Technology***Staff Contact: Prof D Black*

CP15 S1 HPW6

Prerequisites: CHEM1101, CHEM1201

Discussions of the major types of organic reaction mechanisms in the context of important functional groups. Introduction to the application of spectroscopic methods to structure determination of organic compounds.

CHEM2839**Inorganic Chemistry***Staff Contact: Prof IG Dance*

CP15 S2 HPW 6

Prerequisites: CHEM1101, CHEM1201

Electronic structure of atoms and molecules structure, energetics and banding in the solid state. Principles of coordination chemistry. Occurrence, preparation, properties and reactions of selected compounds of transition and main group elements.

CHEM2849**Analytical Chemistry***Staff Contact: Prof DB Hibbert*

CP15 S2 HPW6

Prerequisites: CHEM1101, CHEM1201 and MATH1231 or MATH1241 or MATH1021

General procedures in analytical science, accuracy, propagation of errors, precision. Analytical equilibrium chemistry, titrimetric and gravimetric analysis. Solvent extraction. Electroanalytical methods. Chromatography. Optical spectroscopy, instrumental aspects of all major spectroscopic methods.

CHEM3829**Organic Chemistry***Staff Contact: Prof D Black*

The spectroscopic identification of organic compounds, free radical chemistry and electroorganic processes, various aspects of the organic industrial processes such as industrial synthesis based on petrochemicals, and organometallic reactions of industrial interest. Selected topics from the dyestuff, pharmaceutical and agricultural industries.

CHEM3926**Instrumental Methods of Food Analysis***Staff Contact: A/Prof N Cheetham*

Treatment of theory and practice of modern instrumental methods of analysis, with strong emphasis on the analysis of food constituents. Variety of spectroscopic and chromatographic techniques.

CHEM3929**Food Chemistry***Staff Contact: A/Prof N Cheetham*

Treatment of the chemistry of important food constituents. Topics include: proteins, carbohydrates fats and oils, vitamins, natural and synthetic pigments essential oils and flavours, importance of water in foods.

Computer Science and Engineering

Computer Science and Engineering Level I

COMP1001**Introduction to Computing***Staff Contact: Dr G Mann*

CP15 S1 or S2 HPW6

Prerequisites: none**Note/s:** Excluded COMP1811.

Components of a computer system: hardware, software, users. Computer applications: spreadsheets, databases, word processing, communications. Software solutions to selected problems: document and data processing; WWW authoring and use of internet resources; introduction to application programming using a visual programming language.

COMP1011**Computing 1A***Staff Contact: Dr R Buckland*

CP15 S1 or S2 L3 T3

Prerequisites: COMP1001 or HSC TER of 85 or equivalent*Corequisite:* MATH1131 or MATH1141**Note/s:** Excluded COMP1811.

Defining problems. Reasoning about and solving problems using Logic, Abstraction, Specification, Algorithms and Data Structures. Exposure to a functional programming language (Miranda) for practical experience with these concepts. Introduction to software engineering and professional ethics. *Lab:* programming assignments.

COMP1021**Computing 1B***Staff Contact: Dr Jayasooriah*

CP15 S1 or S2 L3 T3

*Prerequisite: COMP1011***Note/s:** Excluded COMP1821, COMP2811.

Introduction to procedural programming. *Control structures:* selection, recursion and iteration. *Abstract data types:* Lists, stacks, queues, trees. Implementation in a procedural language (currently C) using linked structures. Searching and sorting. The layered model of a computer, instruction set, execution cycle, data storage, assembly language programming. *Lab:* programming assignments.

Computer Science and Engineering Level II**COMP2011****Data Organisation***Staff Contact: Dr G Whale*

CP15 S1 or S2 L3 T2

Prerequisite: COMP1021 or COMP1821 or COMP2811

Data types and data structures: abstractions and representations; dictionaries, priority queues and graphs; AVL trees, splay trees, B-trees, Heaps. *File Structures:* storage device characteristics, keys, indexes, hashing. Memory management. *Lab:* programming assignments including group project.

COMP2021**Digital System Structures***Staff Contact: Dr R Nagalla*

CP15 S1 or S2 L3 T2

*Prerequisite: COMP1021 or COMP1821 or COMP2811***Note/s:** Excluded ELEC2012.

Digital systems: switches and gates, boolean algebra, minimisation techniques, combinational and sequential design, timing analysis, finite state machines; analysis, design and realisation of modest digital subsystems, understanding major subsystems in a model computer. *Assembly language programming:* translation of higher level programming abstractions and data structures to a real computer using an assembler as a target; study of the relationships between the programming model and the hardware model of a computer; understanding of instruction execution. *Lab:* take-home kits; programming assignments.

COMP2031**Concurrent Computing***Staff Contact: Dr A Sowmya*

CP15 S2 L3 T2

Prerequisite: COMP1021 or COMP1821 or COMP2811

The process model: sequential versus parallel computation. *Interprocess communications and synchronisation mechanisms:* coroutines, message passing, buffers, pipes, remote procedure calls, semaphores, monitors. Resource sharing, exclusion, deadlock, livelock, scheduling. *Distributed algorithms:* detection of deadlock, detection of termination. Protocols for data transfer. *Lab:* programming assignments.

COMP2811**Computing B***Staff Contact: Dr Jayasooriah*

CP15 S1 or S2 L3 T3

*Prerequisite: COMP1011 or COMP1811***Note/s:** Excluded COMP1021, COMP1821.

Introduction to procedural programming. *Control structures:* selection, recursion and iteration. *Abstract data types:* Lists, stacks, queues, trees. Implementation in a procedural language (currently C) using linked structures. Searching and sorting. The layered model of a computer, instruction set, execution cycle, data storage, assembly language programming. *Lab:* programming assignments.

Computer Science and Engineering Level III**COMP3111****Software Engineering***Staff Contact: Mr K Robinson*

CP15 S1 or S2 L3 T2

*Prerequisite: COMP2011***Note/s:** Excluded COMP9008.

Informal specification: Data flow diagram methodology, analysis, design, testing, management and documentation of software. *Formal specification:* set theory, logic, schema calculus, case studies. The Z specification notation. Managing the project lifecycle. CASE tools. A major group project is undertaken.

COMP3121**Algorithms and Programming Techniques***Staff Contact: School Office*

CP15 S1 L3 T2

*Prerequisite: COMP2011***Note/s:** Excluded COMP9101.

Correctness and efficiency of algorithms. *Computational complexity:* time and space bounds. Techniques for best-case, worst-case and average-case time and space analysis. Designing algorithms using induction, divide-and-conquer and greedy strategies. Algorithms: sorting and order statistics, trees, graphs, matrices. Intractability: classes P, NP, and NP-completeness, approximation algorithms.

COMP3131**Parsing and Translation***Staff Contact: Mr K Robinson*

CP15 S2 L3 T2

*Prerequisite: COMP2011***Note/s:** Excluded COMP9102.

Grammars: formal description, Chomsky hierarchy, EBNF, attributed-grammars. *Top-down parsing:* LL(k) grammars, construction of recursive-descent parsers. *Bottom-up parsing:* LR(k) grammars, construction of LR sets, LR-parser generators. *Lexical analysis:* regular expressions, finite automata, linear grammars. *Compilation:* introduction to code generation and optimisation. *Lab:* compiling techniques using functional models and translator generators.

COMP3211**Computer Organisation and Design***Staff Contact: School Office*

CP15 S1 L3 T2

Prerequisite: COMP2021 or ELEC2021**Note/s:** Excluded COMP9211.

Combinational and sequential circuit design; synchronisation, communication and arbitration; register transfer specification (modal). *Arithmetic design strategies.* *Memory Organisation:* physical and virtual address space; operating system and compiler support; memory mapping and caching. *Communications Organisation:* shared memory, memory mapping; network systems. *Processor design:* the instruction pipeline; hardwired and micro-programmed control; instruction sets; RISC and object-based processor organisation. Error Detection/ Correction and Fault Tolerance; coding theory. *Lab:* major design project.

COMP3221**Microprocessors and Interfacing***Staff Contact: Dr S Matheson*

CP15 S2 L3 T2

Prerequisite: COMP2021**Note/s:** Excluded ELEC2041, COMP9221, ELEC3020.

The concept of a microprocessor system, busses, address spaces, memory devices, bus timing, bus standards, the VME bus, I/O device interfacing, polling, interrupts, DMA interfaces, the 68000 processor family, the C programming language, device drivers, the device driver software environment, other microprocessors, advanced topics. Laboratory work involves interfacing to and programming MC68000-series microprocessor-based systems. *Lab:* experimental work involving hardware and software.

COMP3231**Operating Systems***Staff Contact: Dr G Heiser*

CP15 S1 or S2 L3 T2

Prerequisite: COMP2011, COMP2021**Note/s:** Excluded COMP9201.

Operating system organisation and services. *Process management:* scheduling, synchronisation and communication. *Memory management:* virtual memory, paging and segmentation. Storage management: disk scheduling, file systems. Protection and security. Distributed operating systems and file systems. Case studies drawn from: UNIX, MS-DOS and Mach. *Lab:* programming assignments.

COMP3311**Database Systems***Staff Contact: Dr A Ngu*

CP15 S2 L3 T2

Prerequisite: COMP2011**Note/s:** Excluded COMP9311.

The relational database model, object-orientated databases, 4GL query languages, optimization, database design principles are realised through a major project involving both design and implementation of a database application using a sophisticated DBMS system. *Lab:* programming assignments.

COMP3331**Computer Networks and Applications***Staff Contact: Dr J Zic*

CP15 SS L3 T2

Prerequisite: COMP2011**Note/s:** Excluded COMP9331.

Networking technology and protocol overview. *Local Area Networks:* architecture; media; generalised Medium Access Control methods. IEEE802 LAN standards. *Datalink layer:* design principles and protocols such as stop and wait, sliding windows, and Automatic Repeat Request schemes. *Network Layer:* design principles; addressing; message routing; congestion and traffic control. *Internetworking:* issues; bridges and routers. The Internet Protocol (IP) and the Internet. Internet Routing via exterior and interior router level protocols such as EGP, RIP, OSPF and HELLO. Internet Transport Control Protocol (TCP). RCP and Session control. Network management using SNMP. The Domain Name System (DNS). Mail Systems. File transfer protocols. Encryption and Security. A view to the future of networking.

COMP3411**Artificial Intelligence***Staff Contact: Dr C Sammut*

CP15 S1 L3 T2

Prerequisite: COMP2011**Note/s:** Excluded COMP9414.

Machine intelligence. *Principles:* knowledge representation, automated reasoning, machine learning. *Tools:* AI programming languages, control methods, search strategies, pattern matching. *Applications:* computer vision, speech recognition, natural language processing, expert systems, game playing, computer-aided learning. Philosophical and psychological issues. *Lab:* logic programming assignments.

COMP3421**Computer Graphics***Staff Contact: Dr T Lambert*

CP15 SS L3 T2

Prerequisite: COMP2011**Note/s:** Excluded COMP9415.

Graphics hardware: scan conversion of lines and polygons. *2D transformations:* windowing, clipping, viewports. User interfaces. *3D transformations:* perspective transformation, 3D clipping, hidden surface removal, lighting and texture maps. Hierarchical modelling of objects, modelling curves and surfaces with splines and fractals. Graphics standards. *Lab:* programming assignments.

COMP3511**Human Computer Interaction***Staff Contact: Dr C Quinn*

CP15 S1 L3 T2

Prerequisite: COMP2011**Note/s:** Excluded COMP9511.

Introduces analysis and design of user-system interactions. A cognitive approach focuses on user goals and enabling technologies, progressing from principles to process. *Topics:* human information processing system, interaction devices and components, communication models, the

design cycle, and evaluation. *Lab:* User interface design; group project.

Computer Science and Engineering Level IV

COMP4914/COMP4913

Computer Science 4

Staff Contact: Dr T Lambert or Dr A Sowmya
CP120 F

Prerequisite: Completion of program 0600 including Level III subjects totalling 90 Credit Points.

The Honours year consists of advanced coursework electives and a thesis. General Education requirements are satisfied by the completion of the subject COMP9015 Issues in Computing which is taken as part of the Honours subject.

Economics

Economics Level I

ECON1101

Microeconomics 1

Staff Contact: Dr G Otto
CP15 S1 or S2 HPW3

Prerequisites: HSC minimum mark required: Contemporary English 60, 2 unit English (General) 60, or 2 unit English 53, or 3 unit English 1

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810.

Economics as a social science; scarcity, resource allocation and opportunity cost. Introductory analysis of consumer behaviour. Economics of firms and markets: production and costs; the classification and analysis of markets. Efficiency concepts and market failure. Gains from international trade and the impact of trade restrictions. Economic growth and structural change.

ECON1102

Macroeconomics 1

Staff Contact: Dr M Monadjemi
CP15 S1 or S2 HPW3

Prerequisite: ECON1101

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810.

Introduction to the analysis of aggregate output, employment and economic growth and their relationship to the policy issues of unemployment, inflation and the balance of payments. Social accounting and aggregate income and expenditure analysis. Introduction to macroeconomic models of income determination; consumption and investment functions. Role of money and financial institutions; interactions between goods and money markets in equilibrium and disequilibrium situations. Analysis of recent Australian macroeconomic experience.

ECON1301

Australia in the International Economy in the 20th Century

Staff Contact: A/Prof DMeredith
CP15 S1 HPW3

Prerequisites: HSC minimum mark required:

Contemporary English 60, 2 unit English (General) 60, or 2 unit English 53, or 3 unit English 1

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 6810.

The international economy at the end of the 19th century: trade, factor flows, and payments arrangements. Problems of the international economy between the wars. The impact of World War II and the international economy in the postwar era. Australian economic development and its relationship with the international economy; economic fluctuations; problems of the interwar period; growth of manufacturing; government policy and action; the importance of the mining industry; economic development and the distribution of income and wealth.

Economics Level II

ECON2103

Business and Governemnt

Staff Contact: A/Prof R Conlon
CP15 S2 HPW3

Prerequisite: ECON1101 or ECON1103

Note/s: Restricted 0600, 1000, 1006, 1060, 1066, 1400, 6810.

This subject examines how government affects the business environment at the microeconomic level. The case for intervention and the benefits of deregulation and privatisation are analysed, with reference to particular industries. The effects on business of government instruments such as the Productivity Commission and the Australian Consumer and Competition Commission are examined. Issues relating to microeconomic reform, economic rationalism, market failure and government business enterprises are explored.

ECON2104

Macroeconomic Policy

Staff Contact: A/Prof G Kingston
CP15 S1 HPW3

Prerequisite: ECON1102 or ECON1104

Note/s: Restricted 0600, 1000, 1006, 1400, 6810.

This subject examines economic growth and fluctuations and the effect this has on the business environment and the community. Explains the main macroeconomic tools and techniques used by governments and the central bank to implement fiscal, monetary and income policies. The implications for inflation, unemployment, interest rates and exchange rates, and foreign debt are discussed.

Electrical Engineering

Electrical Engineering Level I

ELEC1011

Electrical Engineering 1

Staff Contact: Dr EH Fooks, Dr R Ramer

CP15 S1 or S2 L3 T3

Corequisite: PHYS1969 or equivalent

Passive electrical components. Electric circuit concepts and relationship to field theory. Kirchoff's laws. Node and mesh analysis of resistive networks. Network theorems. Controlled sources. Transient conditions. Sources of periodic signals. Average and r.m.s. values. Circuit models of diodes and transistors. Combinational logic principles and circuits.

Electrical Engineering Level II

ELEC2030

Circuit Theory

Staff Contact: Dr KC Daly

CP9 S1 L2 T1.5

Prerequisites: ELEC1011, MATH1032 or MATH1231

Corequisite: MATH2620 or MATH2520

Note/s: Excluded ELEC2010. Restricted to Program 0600.

Dynamic response of linear circuits: 1st and 2nd order circuits with DC sources, introduction to higher order circuits. Sinusoidal steady state operation: phasors, impedance and admittance; dynamic response of circuits driven by sinusoidal sources; linearity, network theorems; resonance, bandwidth, and quality factor. Two-port network: parameters, circuits as filters. Power in steady-state circuits; average and reactive power, power factor, power factor correction. Operational amplifiers and ideal transformers. The use of a computer aided circuit analysis package. Laboratory Technique.

ELEC2011

Systems Theory

Note/s: Restricted to program 0176.

For details see Engineering Handbook

ELEC3004

Signal Processing 1

Note/s: Restricted to program 0176.

For details see Engineering Handbook

ELEC3013

Communication Systems 1

Note/s: Restricted to program 0176.

For details see Engineering Handbook

ELEC3016

Electronics 3

Note/s: Restricted to program 0176.

For details see Engineering Handbook

ELEC4010

Introduction to Management for Electrical Engineers

Note/s: Restricted to program 0176.

For details see Engineering Handbook

ELEC2033

Electronics 1

Staff Contact: A/Prof SR Wenham

CP10 S2 L2 T2

Prerequisites: ELEC2030

Note/s: Excluded ELEC2020. Restricted to Program 0600.

Operating principles and terminal characteristics of PN diodes, solar cells, bipolar and field effect transistors and thyristors. Analysis and design of low frequency single stage and multistage class A amplifiers, including choice of biasing method. Consideration is given to stability, feedback, impedance matching, gain, frequency response, output voltage swing and the various accompanying tradeoffs. The operation of differential and operational amplifiers is studied, with circuits based on the use of operational amplifiers used to study feedback and amplification.

Environmental Science

Environmental Science Level I

ENVS1011

Environmental Science 1

Staff Contact: Prof B Fox

CP15 S1 HPW6

Note/s: Restricted to the Environmental Science Programs (6861-6869).

An overview of some of the many problems encountered by Environmental Scientists: climactic change, disturbance events (such as logging, fire and mining), management and conservation of marine and terrestrial resources, water management and pollution are considered. These problems are placed in perspective with regional case studies to highlight specific issues using seminars, workshops, field excursions and group projects. Special emphasis is placed on the political aspects and values inherent in environmental issues.

Environmental Science Level II

ENVS2010

Population Analysis and Environment

Staff Contact: Prof B Fox or A/Prof I Burnley

CP7.5 S2 HPW3

Prerequisite: ENVS1011

The impact of human population growth on all aspects of resource management in the environment. Limiting resources, time lags, survivorship and the relation to their effects on demographic processes in human populations. The impact of the world population on global-scale environmental problems in terms of different cultures and developmental levels is compared to the Australian situation.

ENVS2020

The Urban Environment

Staff Contact: Prof B Fox

CP7.5 S2 HPW3

Prerequisite: ENVS1011

Consideration of the special impacts which urbanisation has on the environment and of the urban public as a component of the environment. The impacts of industrial and residential activities, conflicts between these, and government regulatory mechanisms.

ENVS2801

Aspects of Environmental Policy and Law

Staff Contact: Prof B Fox

CP15 S2 HPW4

Prerequisite: ENVS1011

This subject examines the legal issues likely to be encountered by an environmental scientist and addresses the question: Is the adversary system the most appropriate method of dealing with conflict in determining the appropriate method of dealing with conflict in determining the appropriate use of resources? The difficulties encountered with the multiplicity of authorities and interactions between local government regulations, state and federal laws and international law are considered. Case studies examined at each of these levels are used to provide a brief overview of current environmental law in Australia and the World, with examples.

Environmental Science Level IV

Three types of honours projects (A, B or C) may be taken in stage 4 of the Environmental Science Course 3976. These are set out for each of the streams:

ENVS4104

Environmental Science 4 Biology B (Honours)

ENVS4204

Environmental Science 4 Marine B (Honours)

ENVS4304

Environmental Science 4 Microbiology B (Honours)

ENVS4404

Environmental Science 4 Chemistry B (Honours)

ENVS4504

Environmental Science 4 Geography B (Honours)

ENVS4604

Environmental Science 4 Geology B (Honours)

ENVS4704

Environmental Science 4 Mathematics B (Honours)

Staff Contact: Prof B Fox

CP60 S1, S2, or S3

Prerequisite: Completion of 360CP (with credit average) of appropriate program (6861 to 6869).

Half year research project and thesis.

ENVS4108/(ENVS4109 if P/T)

Environmental Science 4 Biology A (Honours)

ENVS4208/(ENVS4209 if P/T)

Environmental Science 4 Marine A (Honours)

ENVS4308/(ENVS4309 if P/T)

Environmental Science 4 Microbiology A (Honours)

ENVS4408/(ENVS4409 if P/T)

Environmental Science 4 Chemistry A (Honours)

ENVS4508/(ENVS4509 if P/T)

Environmental Science 4 Geography A (Honours)

ENVS4608/(ENVS4609 if P/T)

Environmental Science 4 Geology A (Honours)

Staff Contact: Prof B Fox

CP120 F (or 60CPP/T)

Prerequisite: Superior performance in 360CP of appropriate program (6861 to 6868), including all core requirements except for honours project.

Full year research project and thesis.

ENVS4118

Environmental Science 4 Biology C (Honours)

ENVS4218

Environmental Science 4 Marine C (Honours)

ENVS4318

Environmental Science 4 Microbiology C (Honours)

ENVS4418

Environmental Science 4 Chemistry C (Honours)

ENVS4518

Environmental Science 4 Geography C (Honours)

ENVS4618

Environmental Science 4 Geology C (Honours)

Staff Contact: Prof B Fox

CP120 F

Prerequisite: Completion of 360CP (with credit average) of appropriate program (6861 to 6868).

Combination of research project and thesis with course work approved by Program Adviser.

Food Science and Technology

FOOD1100

Food in Society

Staff Contact: Dr JE Paton

CP5 S2 L2

Note/s: Excluded GENA6201. Interactive discussion sessions held during lectures. Restricted to courses 3060, 3065 and 3070

Introduction to principles of food production and consumption. Food in history, society, economics and politics. Development of the food industry into one of the largest industry sectors in Australia; nutritional, physiological and psychological roles of food; role of microbiology, biotechnology and technology in safe, nutritious, innovative food processing. Topical issues discussed include: food irradiation risk or benefit?; genetic engineering and biotechnology 'new' food sources; food additives necessity or evil?; environmental impact of food processing; food choices and prejudices and food marketing and education who should the consumer believe?

FOOD1210

An Introduction to Sensory Analysis

Staff Contact: Dr M Filadelfi-Keszi

CP5 S2 L2

Note/s: Restricted to courses 3060, 3065 and 3070

An introduction to the principles and methodologies of sensory analysis of foods. Practical application of difference, descriptive and consumer testing. Analysis and interpretation of data using statistical software.

FOOD1310

Food Preservation

Staff Contact: Prof KA Buckle

CP15 S1 L3 T3

Prerequisites: BIOC2101 or BIOC2181, BIOC2201 or BIOC2291, CHEM2021, CHEM2041, CHEM2819, FOOD3210, FOOD4210, MICR2218

Note/s: Restricted to courses 3060, 3065 and 3070

Introduction to food preservation; spoilage control by traditional and modern techniques. Technology of food preservation by heating, chilling and freezing, sun drying and dehydration. Use of salt, sugar, acid, chemical preservatives, ionising radiations, modified atmospheres in food preservation. Chemical and microbial stability of foods. Packaging requirements for preserved foods. Water relations of foods. An integrated program of laboratory and pilot plant exercises designed to illustrate the principles and procedures presented in the lecture course.

FOOD1320

Plant Food Science

Staff Contact: Dr JE Paton

CP5 S1 L2

Prerequisites: BIOC2101 or BIOC2181, BIOC2201 or BIOC2291, CHEM2021, CHEM2041, CHEM2819,

FOOD3210, FOOD4210, MICR2218

Note/s: Restricted to courses 3060, 3065 and 3070

Cereals: Structure, composition, properties and uses of cereal grains with emphasis on wheat; processing and technology of wheat and rice. *Sugars:* Sources, types, properties of sugars in foods; sugar milling and refining. *Fruit and vegetables:* Nutrient composition; principles of post-harvest physiology, storage and handling. *Lipids:* Sources and composition of fats and oils, methods of extraction and processing. *Non-microbial hazards in foods:* Minerals, proteins, acids, goitrogens, cyanogens, carcinogens; spices and flavours. *Plant protein:* Sources, composition, extraction and uses in foods with emphasis on soybean. *Tea, cocoa and coffee:* Production, composition and processing.

FOOD1330

Animal Food Science

Staff Contact: Dr JE Paton

CP7.5 S1 L3

Prerequisites: BIOC2101 or BIOC2181, BIOC2201 or BIOC2291, CHEM2021, CHEM2041, CHEM2819, FOOD3210, MICR2218

Note/s: Restricted to courses 3060, 3065 and 3070

Nature and distribution of world animal food resources. *Meat:* Muscle structure, function, slaughter, conversion of muscle to meat; chemical, biochemical factors in postmortem glycolysis; meat microbiology; chilling, freezing, curing, processing of meat and meat-derived products; processing equipment; meat marketing systems; nutritional and sensory properties of meats. *Milk and dairy products:* Chemical, physical properties, microbiology of milk; technology of milk-derived products including cheese, fermented products, butter; frozen, chilled and dried milk-derived foods. *Marine products:* Nature and distribution of world fishery resources; teleostean and elasmobranch species, spoilage mechanisms, quality assessment; preservation by chilling, freezing, salting, drying, smoking, marinating and fermentation; fish meal and fish protein concentrate. *Egg products:* Structure and composition of the avian egg; changes during storage of whole eggs; egg quality assessment; functional properties of egg components; preservation of the intact egg; pulping, freezing and drying of whole egg pulp, yolk and albumen.

FOOD1340

Quality Evaluation and Control

Staff Contact: Dr M Filadelfi-Keszi

CP5 S2 L1 T1

Prerequisites: MATH2819

Note/s: Restricted to courses 3060, 3065 and 3070

An introduction to food quality, its nature, assessment and control during handling, processing and storage; the use of objective and sensory methods of assessment; an introduction to HACCP, TTT and PPP concepts.

FOOD1350**Food Technology Laboratory***Staff Contact: Dr JE Paton*

CP15 S2 T6

Prerequisites: FOOD1310, FOOD1320, FOOD1330, FOOD2310**Note/s:** Restricted to courses 3060, 3065 and 3070

A program of exercises integrating elements of the chemical, physical, sensory and microbiological analysis of foods and the impact of processing on these factors. The program is designed to demonstrate the application of laboratory methods to food systems. Ability to carry out test methods and to interpret results will be a major component in student assessment.

FOOD1400**Project***Staff Contact: A/Prof M Wootton*

CP40 F T8

Prerequisite: Completion of Year 3 subjects**Note/s:** Restricted to course 3060

The student undertakes an individual project involving a literature survey, an experimental investigation, the preparation of a detailed report on a selected topic in food science and technology, and presentation of seminars on a literature review and experimental results.

FOOD1410**Field Excursions***Staff Contact: Prof KA Buckle*

CP7.5 S1 T3

Prerequisite: Completion of Year 3 subjects**Note/s:** Restricted to course 3060

Inspection of food processing plants, growing areas and research stations in the Sydney metropolitan area, New South Wales and interstate.

FOOD1420**Food Legislation***Staff Contact: Prof KA Buckle*

CP5 S1 L2

Prerequisite: Completion of Year 3 subjects**Note/s:** Restricted to course 3060 and 3065

An overview of Federal and State regulations affecting the production, marketing, advertising and sale of foods. Food imports and exports. Mechanisms for development of food standards. Principles of approval and usage of food additives; toxicological evaluation of food additives. Codex standards. Implementation of food regulations. Regulatory aspects of new food biotechnologies.

FOOD1430**Food Industry Management***Staff Contact: Dr M Filadelfi-Keszi*

CP5 S1 L2

Prerequisite: Completion of Year 3 subjects**Note/s:** Restricted to course 3060 and 3065

An introduction to food industry management, accounting, finance, marketing, industrial relations and communication skills.

FOOD1440**Food Quality and Product Development***Staff Contact: Dr M Filadelfi-Keszi*

CP15 S1 L2 T4

Prerequisite: Completion of Year 3 subjects**Note/s:** Restricted to course 3060 and 3065

The steps involved in new product development; role of market research and advertising. Costing procedures, new product failure, case studies. Practical exercises in new food product development.

FOOD1450**Food Processing Wastes***Staff Contact: Prof KA Buckle*

CP7.5 S2 L2 T1

Prerequisite: FOOD1350 or equivalent**Note/s:** Restricted to course 3060 and 3065

Effects of waste discharges into the environment. Treatment of water for domestic and industrial applications; water reuse; process modifications for effluent reduction. Origin, composition, treatment, disposal and utilisation of wastes from food processing operations. Legal and economic aspects of waste disposal. Inspections of water and waste treatment plants.

FOOD1460**Cereal Technology***Staff Contact: A/Prof M Wootton*

CP15 S2 L2 T4

Prerequisite: FOOD1350**Note/s:** Restricted to course 3060 and 3065

A treatment in greater depth of the following topics dealt with in FOOD1320. Production, storage, marketing and quality of cereal grains; current trends in these areas. Technology of bread, biscuit, noodle and cake manufacture. Chemical, physical and biochemical interactions in wheat flour doughs; flour milling and assessment of flour quality. Cereal protein analysis, properties and behaviour. Wheat variety identification. Meat/cereal combinations. Cereal enzymes. Non-food uses of cereals. Preparation and uses of cereal protein, starches and lipids.

FOOD1470**Postharvest Technology of Foods***Staff Contact: Dr JE Paton*

CP15 S1 L2 T4

Prerequisite: FOOD1350**Note/s:** Restricted to course 3060 and 3065

Pre-harvest considerations. Postharvest physiology and biochemistry. Postharvest factors affecting quality. Methods of storage and handling. Marketing strategies for selected food commodities.

FOOD2310**Food Microbiology***Staff Contact: Prof GH Fleet*

CP10 S1 L2 T2

Prerequisite: MICR2218**Note/s:** Restricted to course 3060, 3065 and 3070

A lecture and laboratory program on the ecology, biochemistry, isolation, enumeration and identification of bacteria, yeasts, fungi and viruses associated with foods and beverages. *Food spoilage*: specific food microorganism associations; taxonomy and biochemistry of major spoilage species; chemical and physical changes to food properties; control; spoilage of specific commodities. *Foodborne microbial disease*: foods as vectors of disease and food poisoning; statistics and epidemiology; ecology and taxonomy of food-borne pathogenic microorganisms; control and prevention by hygiene, microbiological standards and legislation. *Food fermentation*: microbial ecology and biochemistry of fermentations; fermentations of alcoholic beverages, bakery products, dairy products, meats, vegetables, cocoa beans, soy sauce; production of food ingredients and processing aids by fermentation. *Microbiological examination of foods*: sample preparation and sampling plans; sub-lethal injury; standard methods for determination of total plate counts, indicator organisms, food-borne pathogenic species, principal spoilage species. *Microbiological quality assurance*: specifications and standards; decision criteria; hazard analysis and critical control point (HACCP) concept; cleaning and sanitation.

FOOD2410

Advanced Food Microbiology

Staff Contact: Prof GH Fleet

CP15 S2 L2 T4

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

An advanced theoretical and practical treatment of the ecology, taxonomy, biochemistry and analytical technology of bacteria, yeasts, fungi and viruses associated with food spoilage, food-borne disease and food fermentations. Emphasis on: new developments in food microbiology; economic consequences of microorganisms in foods; exploitation of microorganisms in novel processes for the production of food ingredients and processing aids; new technologies for the detection of microorganisms in foods, including enzyme immunoassay, DNA probes, bioluminescence, impedance, epifluorescent filtration methods; practical problems associated with the microbiological analysis of foods and interpretation of data.

FOOD2420

Yeast Technology

Staff Contact: Prof GH Fleet

CP7.5 S1 L2 T1

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

The ecological, taxonomic and biochemical fundamentals of yeasts. The role of yeasts in alcoholic fermentations: beer, wine, cider, distilled spirits. Baker's yeast production and the role of yeasts in baking. Yeast fermented foods. The spoilage of foods by yeasts. Yeasts and yeast extracts as food for animals and humans. Yeast enzymes in the food industry.

FOOD2430

Quality Assurance in Food Microbiology

Staff Contact: Dr JM Cox

CP5 S1 L1 T1

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

Theoretical concepts in, and application of traditional and modern approaches to microbiological quality assurance. HACCP. Cleaning and sanitation. Microbiological criteria and sampling plans. Local, national and international approaches to obtaining safe food. Management and quality assurance in the microbiology laboratory. Quality assurance of microbiological media.

FOOD2440

Microbial Food Spoilage

Staff Contact: Dr JM Cox

CP2.5 S2 L1

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

Detailed consideration of selected microbial groups responsible for spoilage yeasts, moulds, psychrotrophs. Spoilage of specific commodities – dairy products, fruits and vegetables, meat and fish. Impact of new processing and preservation technologies on prevention or modification of food spoilage. Biochemical basis of spoilage. Microbial taints. Predicting shelf-life and spoilage.

FOOD2450

Foodborne Microorganisms of Public Health Significance

Staff Contact: Dr JM Cox

CP5 S2 L2

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

Methods for investigating food poisoning outbreaks. Costs of foodborne disease. In-depth consideration of the ecology, epidemiology, pathogenicity, and topical issues involving bacterial, viral, parasitical and fungal foodborne pathogens.

FOOD2460

Food and Beverage Fermentations

Staff Contact: Prof GH Fleet

CP5 S2 L2

Prerequisite: FOOD2310

Note/s: Restricted to course 3060 and 3065

A detailed treatment of the microbial ecology, biochemistry, processing technology and quality parameters of fermented foods and beverages; cheese, yoghurt, novel dairy products; meat sausages; bread, biscuit/cracker doughs; soybean products, soy sauce, tempe; traditional fermented products of Asia and Africa; vegetables; cocoa beans; alcoholic beverages, beer, wine champagne, distilled spirit.

FOOD2470**Microorganisms as Food Processing Aids and Ingredients***Staff Contact: Prof GH Fleet*

CP2.5 S2 L1

Prerequisite: FOOD2310**Note/s:** Restricted to course 3060 and 3065

This subject interfaces with biotechnology and considers the use of microorganisms as primary sources of processing aids and ingredients for food processing. The microbial production of vitamins, flavouring agents, amino acids, enzymes, pigments, thickening agents, fats and oils, modified proteins, organic acids. Use of microbial species as biocontrol agents to extend shelf-life, as agents to improve the nutritive and therapeutic value of foods, immobilised cell and cell reactor technologies for conducting food beverage bioconversions.

FOOD3210**Introductory Nutrition***Staff Contact: A/Prof H Greenfield*

CP5 S1 L2

Note/s: Restricted to courses 3060, 3065 and 3070

Structure, properties and sources of nutrients. Role of nutrients in human structure and function. Effects of food processing and preparation on nutrients in foods. Introduction to food groups, tables of food composition, food labels, dietary recommendations. Food guides. Exercises in uses of food and nutrient composition data and dietary recommendations and guides.

FOOD3310**Nutrition***Staff Contact: A/Prof H Greenfield*

CP7.5 S2 L2 T1

Prerequisites: BIOC2101, BIOC2201, FOOD3210**Note/s:** Restricted to courses 3060, 3065 and 3070

Nutritional needs of vulnerable groups: infants, pregnant and lactating women, the aged. Dietary intolerance, disorders related to the affluent diet including coronary heart disease, dental caries, diabetes, hypertension and cancer. Problems of under-nutrition including protein, energy, mineral and vitamin deficiencies. Physiological and nutritional aspects of dietary fibre, alcohol and food intolerance. Measurement of nutrient intake using computer systems, on individual and group bases.

FOOD3410**Nutrient Analysis of Foods***Staff Contact: Dr J Arcot*

CP15 S1 L2 T4

Prerequisite: FOOD3310 or equivalent**Note/s:** Restricted to course 3060 and 3065

Principles of nutrient analysis of foods by chemical and biospecific procedures. Sampling, quality assurance of analytical results, data scrutiny and compilation. Practical exercises in nutrient analysis of foods using bench, instrumental and biospecific techniques.

FOOD3420**Population and Applied Nutrition***Staff Contact: A/Prof H Greenfield*

CP5 S2 L2

Prerequisite: FOOD3310 or equivalent**Note/s:** Restricted to course 3060 and 3065

Structure of the population. Food supplies, food consumption, food and nutrition policy, nutritional epidemiology. Population dietary references such as food balance sheets, nutrition monitoring and surveillance, dietary reference values. Food programs such as food fortification, supplementary feeding schemes, nutritional rehabilitation, nutritionally modified foods, nutritional regulations and standards, nutrition education, dietary and other nutrition interventions (ORT, family planning, infection control, growth monitoring). Principles and practice of applied nutrition programs. Evaluation of applied nutrition programs.

FOOD3430**Special Dietary Foods and Ingredients***Staff Contact: Dr J Arcot*

CP2.5 S2 L1

Note/s: Restricted to course 3060 and 3065

Special dietary and nutritionally modified foods. Modified viscosity foods, low allergen foods. Infant formulas, processed weaning foods, parenteral feeds, invalid foods, sports beverages. Intense sweeteners, fibrous ingredients, amino acids, micronutrients, fat replacers. Functional foods. Regulations and processes for nutritionally-modified foods.

FOOD4210**Introductory Food Engineering***Staff Contact: Dr JL Paterson*

CP7.5 S1 L2 T1

Prerequisites: PHYS1002 or PHYS1022 and MATH1141 and MATH1241 or MATH1131 and MATH1231 or MATH1042 or MATH1011 and MATH1021**Note/s:** Restricted to courses 3060, 3065 and 3070

Units and dimensions. System conversions. Material, momentum and energy balances. Steady state and transient heat transfer; insulation; heat exchangers. Solid and fluid rheology; viscosity; pumps; mixing.

FOOD4220**Computer Applications***Staff Contact: Dr RH Driscoll*

CP5 S1 L1 T1

Note/s: Restricted to courses 3060, 3065 and 3070

Introduction to operating systems, word processing, databases, spreadsheets, networks and process control as used in the food industry.

FOOD4310**Food Process Engineering***Staff Contact: Dr RH Driscoll*

CP10 S2 L2 T2

Prerequisite: FOOD4210**Note/s:** Restricted to courses 3060, 3065 and 3070

Refrigeration, freezing, chilling and thawing. Evaporation; dehydration. Extraction. Distillation. Extrusion. Comminution. Filtration and separation. Process control. Packaging.

FOOD4320

Computer Applications

Staff Contact: Dr RH Driscoll

CP5 S2 L1 T1

Prerequisite: MATH2819

Note/s: Restricted to courses 3060, 3065 and 3070

Introduction to the DOS operating system and WINDOWS. The use of statistical, graphics and other program packages to solve problems in food science and technology.

FOOD4420

Food Packaging

Staff Contact: Dr JL Paterson

CP7.5 S1 L2 T1

Pre or Corequisite: FOOD1310

Note/s: Restricted to course 3060 and 3065

Chemical and physical properties of packaging materials. Interaction between package and food, selection and evaluation of packaging materials and systems, design, printing, computers, modified atmosphere, smart films.

FOOD4430

Advanced Food Engineering A

Staff Contact: Dr RH Driscoll

CP7.5 S1 L2 T1

Prerequisites: FOOD4210, FOOD4310

Note/s: Restricted to course 3060 and 3065

Extrusion of food products, membrane technology, refrigeration, chilling, freezing, thawing, tempering, cold room design, process control.

FOOD4440

Advanced Food Engineering B

Staff Contact: Dr RH Driscoll

CP7.5 S2 L2 T1

Prerequisites: FOOD4210, FOOD4310

Note/s: Restricted to course 3060 and 3065

Mechanical and chemical separation, evaporation, distillation, psychrometry, drying, dryers, mass/energy balances, calculation of drying time, commercial equipment, current drying research.

FOOD9410

Honours Research Project

Staff Contact: Dr JM Cox

CP100 S3

Note/s: Restricted to course 3065

An extensive research project on some aspects of food science and technology, including preparation of a literature review, conduct of laboratory-based research, presentation of two seminars, and submission of a thesis based on the results of the research project. Candidates will undertake corequisite formal coursework as approved by the Head of Department.

Geography

Geography Level I

GEOG1601

Global Development, Economy and Environment in Australia

Staff Contact: A/Prof I Burnley, Mr K Dunn, Dr B Parolin,

Dr M Sant, Ms B Scott

CP15 S1 L3 T3

Note/s: Excluded GEOG1621, GEOG1062, GEOG1064

The geography of contemporary Australian economy and society. Patterns and consequences of economic and cultural diffusion and change. Urbanisation and the evolution of Sydney as a world city. Emergence of global transport and telecommunications networks. Landscapes of production and consumption. Transformations of gender roles and influences of the women's movement. Changing patterns and impacts of migration. Re-assessments of national identity, multiculturalism. The global diffusion of popular culture and the reaction in Australia. Planning for socially and environmentally sustainable cities. Impacts of globalisation on environment and health. Workshops and skills development for understanding contemporary urbanisation.

GEOG1701

Environmental Systems and Analysis

Staff Contact: Mr D Edwards, Dr W. Erskine,

A/Prof M Melville, Dr S Mooney

CP15 S2 L3 T3

Note/s: Excluded GEOG1721, GEOG1031, GEOG1073

An introduction to the role of environmental processes in shaping the patterns of the physical environment. The operation of global environmental systems. Emphasis on the interaction of humans with their environment and the causes of environmental crises. Topics include water resources, circulation of the atmosphere and oceans, weather and climate, the formation of the Earth, fluvial and coastal landforms, land degradation, the biosphere and ecosystems, Australian biotic patterns, human impact on natural systems. Instruction is given on methods used to analyse climatic patterns and climate change, soils and landform relationships, vegetation patterns, land degradation, and human impacts on the environment.

GEOG1801

Spatial Information Technologies

Staff Contact: Mr A Evans, Prof B Garner, Mr S Filan

CP15 S2 L3 T3

Introduction to spatial data presentation, exploration, analysis and understanding in Geography. Mapping skills and imaging tools for the communication of information. Computer-based tools for imaging and analysing social and environmental data, principles of geographical information systems (GIS), data visualisation, remote sensing and airphoto interpretation. Introduction to the MapInfo, Excel, ARCVIEW software packages.

Geography Level II

GEOG2001

Field Techniques

Staff Contact: Mr K Dunn, Mr D Edwards

CP15 S2 F

Prerequisite: 30 Level 1 CP of Geography

Note/s: Subject only available to BSc Applied Geography (3010) students. Excluded GEOG2000, GEOG2052.

An introduction to the field techniques used in geography. Usually composed of a five day field trip in the mid-year recess. Field methods and skills in both physical and human geography. Workshops in report writing, critical analysis, and research practice.

GEOG2101

Geographical Data Analysis, I

Staff Contact: Mr S Filan

CP15 S1 L2 T2

Prerequisite: 30 Level 1 CP of Geography

Note/s: Excluded GEOG2013

The exploration, description, understanding and presentation of data used within the sub-fields of geography. Subject matter is taught in a contextual and applied manner, with a specific focus on problem solving. Introduction to hypothesis testing and sampling in geography. Computing literacy for human and physical geographers. Includes the use of the SPSS and Excel software packages.

GEOG2611

The Australian City

Staff Contact: A/Prof I Burnley, Mr K Dunn

CP15 S1 L2 T2

Prerequisites: GEOG1601 or GEOG1621 or GEOG1062 or GEOG1064

Note/s: Excluded GEOG2092

Explanations for social and economic change in Australia's cities. Issues of planning and social policy in cities like Sydney. Outlines both traditional and contemporary perspectives on the city. A comparison of theories of urbanisation, urban-based conflict and social well-being in the city. Examines the origin of contemporary urban social theory.

GEOG2621

Regions, Resources and Spatial Systems

Staff Contact: Dr M Sant

CP15 S2 L2 T2

Prerequisites: GEOG1601 or GEOG1621 or GEOG1062 or GEOG1064

Note/s: Excluded GEOG2061 and GEOG3192

This subject introduces students to basic concepts and theories in economic geography. These will include theories of location and regional development, spatial interaction, uneven development, and structural change. Subject will focus on economic and regional problems in Australia. Computer-based workshops will be used to develop practical skills in regional and spatial analysis.

GEOG2711

Australian Climate and Vegetation

Staff Contact: A/Prof M Fox, Dr S Mooney

CP15 S2 L2 T2

Prerequisites: GEOG1701 or GEOG1721 or GEOG1031 or GEOG1073

Note/s: Excluded GEOG2025 and GEOG3062

Characteristics of the Australian climatic region. The nature of climate change with particular emphasis on the Quaternary. The development of a distinct Australian biogeography. Patterns and processes in the distribution of Australian vegetation types. Classification, ordination and mapping of vegetation.

GEOG2721

Soils and Landforms

Staff Contact: Dr W Erskine, A/Prof M Melville

CP15 S1 L2 T2

Prerequisites: GEOG1701 or GEOG1721 or GEOG1031 or GEOG1073

Note/s: Excluded GEOG2051, GEOG3011 and GEOG3025

The physical and chemical properties of soil, and the processes and factors of soil formation. Soil classification schemes. The relationship between soils and the landforms on which they form. The evolution of landforms in fluvial, arid and coastal environments. Emphasising current processes and Quaternary history.

GEOG2811

Introduction to Remote Sensing

Staff Contact: Mr A Evans

CP15 S2 L2 T2

Note/s: Excluded GEOG2021

Principles of remote sensing for environmental sciences. Different types of image-based remote sensing are covered with a focus on earth-resource imagery used for environmental and urban mapping. Topics include photography, photogrammetry, image interpretation, satellite-based sensors, digital imagery, thermal imaging and radar.

GEOG2821

Introduction to Geographic Information Systems

Staff Contact: Prof B Garner

CP15 S2 L2 T2

Note/s: Excluded GEOG3122, GEOG3123 and GEOG3142. Offered in S2 in 1998, S1 in 1999.

An introduction to Geographic Information Systems (GIS). Emphasis on raster-based GIS for resource mapping and case study evaluation. Topics include cartographic output and mapping, spatial statistics and various raster analysis techniques such as overlay analysis.

Geography Level III

GEOG3000

Field Project 3

Staff Contact: A/Prof M Melville (Physical), Prof B Garner (Economic)

CP15 F T1.5

Prerequisites: One of GEOG2025, GEOG2711, GEOG2721, GEOG3011, GEOG3025, GEOG3711. This prerequisite does not apply to students registered in course 3010.

A five days field project normally undertaken during a recess, designed to support teaching in Year 3 Level 111 subjects in physical and economic geography and to demonstrate the application of field methods in problem solving and research projects. Students will incur some personal expenses in connection with this subject, which is a compulsory part of the course.

GEOG3025

Geomorphology

Staff Contact: Mr J Sammut

CP15 S2 L2 T2

Prerequisites: GEOG2051 or GEOG2721

Drainage basin processes including: weathering, the production of run-off and sediment, sediment tracing, sediment budgets and denudation histories. The processes of river channel changes including sediment transport, hydraulics, hydrology, hydraulic geometry and channel patterns. There will be an emphasis on the application of geomorphic principles to land management.

GEOG3032

Remote Sensing Applications

Staff Contact: Mr A. Evans

CP15 S1 L2 T2

Prerequisites: GEOG2021 or GEOG2811

Spectral characteristics of natural phenomena and image formation. Ground truthing, collection and calibration. Introduction to computer classification procedures. Multitemporal sampling procedures, image to image registration and map to image registration. Major applications of remote sensing in the investigation of renewable and nonrenewable resources to include: soils, geology, hydrology, vegetation, agriculture, rangelands, urban analysis, regional planning, transportation and route location and hazard monitoring.

GEOG3041

Mathematical Methods for Spatial Analysis

Staff Contact: Mr S Filan

CP 15 S1 L2 T2

Prerequisites: MATH1021 or MATH1231 or MATH1241 and GEOG1043 or FIBR2201

Selected mathematical methods for the analysis of spatial problems, including applications of calculus in constrained and unconstrained optimisation; mathematical programming methods; network models; input-output analysis; facility locations and allocation problems.

GEOG3122

Geographic Information Systems

Staff Contact: Prof B Garner, Mr S Filan

CP15 S2 L2 T2

Prerequisite: Successful completion of at least one year of program 0600 Computer Science or program 1400 Information Systems, or by permission from the Head of School.

Note/s: Enrolments in this subject are constrained by availability of laboratory facilities. All enrolments must be approved by the Head, School of Geography, or representative.

An introduction to geographic information systems with special reference to computer-based systems for resource evaluation. Case study evaluation, application of the MAP and other GIS software.

GEOG3192

Urban and Regional Development

Staff Contact: Dr M Sant

CP15 S2 L2 T2

Prerequisite: GEOG2092 or GEOG2611

Focus is on the growing importance of recreation and tourism in urban and regional systems. Emphasis is on problems of land use and resource allocation and implications for planning in Australia. Theoretical and practical studies of leisure environments, open space provision, recreational demand, methods of forecasting, management of supply, resort development, economic and environmental impact assessment.

GEOG3411

Special Topic

Staff Contact: A/Prof M Fox

CP15 F T2

Note/s: Excluded GEOG3333

Admission by permission to suitable students with good passes in at least four subjects at Upper Level. Individually supervised reading and assignments as an approved topic in Geography not otherwise offered.

GEOG3421

Special Research Methods

Staff Contact: A/Prof I Burnley

CP15 F T2

Prerequisite: A graded pass average in at least four upper level geography subjects.

Note/s: Excluded GEOG3333, GEOG3334

A course of individually supervised readings leading toward an advanced understanding of theoretical and analytical developments in one area of geography.

GEOG3611

Surveys and Interviewing in Geography

Staff Contact: A/Prof I Burnley, Mr K Dunn

CP15 S1 L2 T2

Prerequisites: GEOG1062 or GEOG1064 or GEOG1601 or GEOG1621

Note/s: Excluded GEOG3101

An introduction to sample surveys and interview techniques. Construction of questionnaires and interview guides. Census data collection. The collection, assembly, analysis (NUD.IST) and presentation of qualitative data.

GEOG3621

Place and the Politics of Identity

Staff Contact: Mr K Dunn

CP15 S2 L2 T2

Prerequisites: GEOG2092 or GEOG2611 or SOCC2703

Note/s: Excluded GEOG3166

Issues of place, identity, territory and representation. Case studies cover a range of axes of difference including religion, place, gender, sexuality, nationalism and popular culture. Key theories of identity. Creative and official representations of places and of peoples. The deployment and representation of cultural difference.

GEOG3631

Population Geography

Staff Contact: A/Prof I Burnley

CP15 S1 L2 T2

Prerequisite: GEOG1062 or GEOG1064 or GEOG1601 or GEOG1621

Note/s: Excluded GEOG3172, ENVS2010

The geographical aspects of population change in an economic, social and environmental context. Contemporary and future trends in World population growth and population trends in Australia. Attention to fertility, mortality, migration, ageing and inequalities in well being. Reference to investigations at different scales.

GEOG3671

Transport and Land Use

Staff Contact: Dr B Parolin

CP15 S1 L2 T2

Prerequisites: GEOG2092 or GEOG2621 or GEOG2611 or PLAN1011

Note/s: Excluded GEOG2071, GEOG3181, ENVS2020

Introduction to the complex interactions between transport, land use, and the environment in urban areas. Special focus on the long term environmental consequences of transport decisions. Introduction to the various methods used to analyse and predict the consequences of policy changes. Australian cities as case studies.

GEOG3711

Biogeography

Staff Contact: A/Prof M Fox, Dr S Mooney

CP15 S2 L2 T2

Prerequisites: GEOG2711, or two of BIOS1101, BIOS1201, BIOS1301

Note/s: Excluded GEOG2025

Floras of the Southern Hemisphere with particular reference to Australia. Distribution of taxa in space and time. Methods for the reconstruction of past vegetation. Human biogeography, prehistoric human impacts and European expansionism. Ecology of selected Australian vegetation types with emphasis on Mediterranean landscapes. Management of biodiversity.

GEOG3721

Pedology

Staff Contact: A/Prof M Melville

CP15 S1 L2 T2

Prerequisites: GEOG2721, or both BIOS1101 & BIOS1201, or both GEOL1101 & GEOL1201

Note/s: Excluded GEOG3011

Soil physical and chemical properties and their interrelationships. Clay mineral structure and behaviour, soil solution chemistry, soil water movement. Soil properties in natural, rural, urban landscapes. Assessment of soil fertility, swelling, dispersibility, erodibility and aggregate stability. Laboratory analysis with emphasis on properties associated with land capability assessment.

GEOG3761

Environmental Change

Staff Contact: Dr S Mooney

CP15 S1 L2 T2

Prerequisite: Successful completion of a Year 2 Program in Applied Science, Science, or Arts and Social Sciences or equivalent as approved by the Head of School

Note/s: Excluded GEOG3062

The nature of environmental change on the land, oceans, biosphere and atmosphere. Evolution of the continents, oceans, life and atmosphere. Techniques for environmental reconstruction and chronology building. Quaternary climatic change and modelling. Human impact on the atmosphere and climatic consequences.

GEOG3821

Geographic Information Systems Applications

Staff Contact: Mr A Evans

CP15 S2 L2 T2

Prerequisites: GEOG2821 or GEOG2021 or GEOG3122 or GEOG3123

Note/s: Excluded GEOG3142

Emphasis on vector-based GIS for resource and environmental management and urban and regional analysis. Topics include spatial data bases, data attributes, networks, spatial data analysis and modelling and data visualisation with application-orientated laboratories.

GEOG3861

Computer Mapping

Staff Contact: Prof B Garner

CP15 S1 L2 T2

Prerequisite: GEOG1801 or GEOG2811 or GEOG2822 or GEOG3123 or successful completion of a Year 2 Program in Arts and Social Science or Science.

Introduction to theoretical and practical problems in displaying data graphically and constructing thematic maps by computer using the MapInfo desktop mapping package. The emphasis is on developing skills in automated cartography through hands-on experience culminating in the preparation of a folio of maps of selected census data. No previous computing expertise is required.

GEOG3911**Environmental Impact Assessment***Staff Contact: Mr J Sammut*

CP15 S1 L2 T2

Prerequisites: 30 credit points of Level II Geography or by permission of Head of School.**Note/s:** Excluded GEOG3042

History and legislative framework. State and Commonwealth guidelines for environmental impact assessment (EIA). Impact evaluation in terms of environmental and socio-economic criteria. Case studies of environmental impact studies (EIS). Procedures, techniques and issues. Future directions in EIA.

Geography Level IV**GEOG4010****Field Project 4***Staff Contact: Dr W Erskine, Dr M Sant*

CP20 S2 T6

Note/s: Subject only available to BSc Applied Geography (3010) students.

Develop skills in problem formulation and team-based field work. Preparation and presentation of professional quality reports of applied geographical analysis. Define problem, plan strategy for appropriate investigation. Conduct field studies, and report results of investigation. Field work of five days is compulsory. Students will incur some personal expenses in connection with this subject.

GEOG4031**Project***Staff Contact: Dr B Parolin*

CP40 F T8

Prerequisite: GEOG3082**Note/s:** Subject only available to BSc Applied Geography (3010) students.**Note/s:** The deadline for submission of project reports is the end of Week 7 of Session 2.

Implementation of the research proposal in Applied Geography prepared for GEOG3082 Project Design and Formulation under the direction of a supervisor; preparation of a project report.

GEOG4042**Practical Applications in Geography***Staff Contact: A/Prof M Melville, Prof B Garner*

CP10 S2 T4

Note/s: Subject only available to BSc Applied Geography (3010) students.

Seminars with practitioners in the fields of urban and regional analysis and environmental studies including environmental impact statements; research proposals, report writing, the roles of government agencies and consultants; and budgeting for research projects; applying for positions and personal skills development.

GEOG4052**Advanced Spatial Analysis***Staff Contact: Dr B Parolin*

CP15 S1 L2 T2

Note/s: Subject only available to BSc Applied Geography (3010) students.

Selected topics in economic and physical geography chosen to illustrate developments at the frontiers of research in spatial analysis.

GEOG4062**Advanced Environmental Analysis***Staff Contact: A/Prof M Melville*

CP15 S1 L2 T2

Note/s: Subject only available to BSc Applied Geography (3010) students.

Selected topics in the study of human and physical environments, chosen to illustrate contemporary frontiers of research and development in environmental studies.

GEOG4310**River Management***Staff Contact: Dr W Erskine*

CP15 S2 L2 T2

Prerequisite: Completion of stage 3 of a four year degree program.**Note/s:** Contact hours include some fieldwork which forms a compulsory part of this subject. Students will incur some personal costs for fieldwork.

The principles of river management including total or integrated catchment management, environmental impact assessment, in-stream uses and hydrogeomorphic behaviour. Issues covered include regulated rivers, inter-basin diversion, extractive industries, urbanisation, river engineering, legislative controls and institutional responsibilities. The course develops an understanding of how and why rivers respond to human activities and ways of ameliorating negative impacts. Field work is an essential part of the subject and the Nepean River will be used as a case study of management problems.

GEOG4320**Soil Degradation and Conservation***Staff Contact: A/Prof M Melville and Dr W Erskine*

CP15 S2 L2 T2

Prerequisite: Completion of Stage 3 of a four-year degree program.**Note/s:** Contact hour include some fieldwork which forms a compulsory part of this subject. Students will incur some personal costs for fieldwork.

Identification, assessment and analysis of the main process of soil degradation, including the role of climate, vegetation, geomorphology and pedology in controlling the processes. Discussions of appropriate management strategies for reducing degradation for reclaiming degraded landscapes. Topics include: surface wash, gully erosion, wind erosion, soil acidification soil structure decline, salinisation, accumulation of toxins and desertification.

GEOG4414/GEOG4418**Honours Geography***Staff Contact: Dr B Parolin*

CP60/120

Prerequisites: Science students have completed program 2527, 2700 or 6851, including Level III subjects totalling 120 Credit Points and must have completed either GEOG2013 or GEOG2101. A minimum cumulative average at Credit level is required for all Upper Level subjects taken.

Note/s: Excluded GEOG4050 and GEOG4100

Students are required: 1. To undertake an original piece of work extending throughout the year and to submit a thesis based upon it. 2. To participate in seminars and fieldwork as notified by the School of Geography. Seminars include workshops on professional practice in geography and ethical issues in research.

GEOG4911**Vegetation Management***Staff Contact: A/Prof M Fox*

CP15 S2 L2 T2

Prerequisites: GEOG3901 and GEOG2711

Note/s: Offered in S2 in 1998, S1 in 1999.

Theory and practice in vegetation management. Description and measurement of vegetation. Vegetation dynamics and response to perturbation and human impacts. Modelling vegetation change. Case studies in forest management and urban bushland.

Applied Geology

Field tutorials are an essential part of some of these subjects, and are held during weekends and/or recesses. Dates and costs are available during the first week of the subject. Attendance is compulsory.

Applied Geology Level I**GEOL1111****Earth Systems and Dynamics***Staff Contact: Dr MD Buck*

CP15 S1 L3 T3

Note/s: Excluded GEOL1101. Two days of fieldwork is a compulsory part of this subject and students will incur personal costs. Details will be provided in the first week of the subject.

A holistic view of the Earth. Origin of the Universe and the Solar System. Origin of the Earth, its structure and forces within. Plate dynamics and processes; including mountain building, seismicity, volcanism, and the movement of continents. The rock forming minerals. Igneous, sedimentary and metamorphic rocks in hand specimen. Weathering and soils. Geological hazards; volcanoes, earthquakes, landslides and tsunamis. The geological time scale and dating methods. Elementary structural geology;

faults, faults and joints. Origin and circulation of the Earth's atmosphere and oceans.

GEOL1211**Earth Environments and Resources***Staff Contact: Dr MD Buck*

CP15 S2 L3 T3

Note/s: Excluded GEOL1201. Three days of fieldwork is a compulsory part of this subject and students will incur personal costs. Details will be provided during the first week of the subject.

A study of aspects of the Earth relevant to man's continued existence on Earth. The evolution of life and extinctions. The major fossil groups; bryozoan, graptolites, molluscs, corals, trilobites, dinosaurs, mammals and man, and the preservation of fossils. Stratigraphic principles and their application. The geology of NSW, and Australia. Surficial processes; groundwater, alluvial, colluvial, aeolian and glacial. Climates and geological processes of the Quaternary in Australia. Geological mapping and air photograph analysis. An assessment of energy resources and economic minerals. Environmental geology; pollutants, contaminants, greenhouse effect, and ozone depletion. The coastal environment.

Applied Geology Level II**GEOL2100****Field Studies: Sedimentology and Palaeoecology***Staff Contact: A/Prof CR Ward*

CP7.5 S1 T3

Prerequisites: GEOL1101/1111 or GEOL1201/1211

Note/s: Excluded GEOL2031. Geological fieldwork up to four days in total is an essential part of this subject. Students may incur personal costs.

Geological studies of present-day sediments, fossils and sedimentary rock strata in selected coastal and inland locations, with supporting on-campus tutorials, to illustrate features imparted by different depositional environments; introduction to geological data gathering and field measurement techniques applicable to sedimentary successions, and to regional integration of such data in palaeogeographic interpretations.

GEOL 2110**Mineralogy***Staff Contact: A/Prof BJ Hensen*

CP7.5 S1 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211

Note/s: Excluded GEOL2011, GEOL7223

Principles of optical crystallography and the use of the polarising microscope to identify minerals and rocks. Rock-forming minerals: physical properties in hand specimen and under the microscope, crystal chemistry, stability and occurrence.

GEOL2120**Sedimentary Environments and Processes***Staff Contact: Dr MD Buck*

CP7.5 S1 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211**Note/s:** Excluded GEOL2031, GEOL7233, GEOL7321, GEOL8220

Mechanisms of sediment transport and deposition; nature and origin of depositional structures. Analysis of depositional environments including: fluvial deposits; deltaic and estuarine deposits, marine sediments including shoreline, shelf and deep sea, carbonate and reef deposits; lacustrine deposits; glacial and desert sediments; and volcanoclastic sediments. Sedimentary facies and facies successions; introduction to sequence stratigraphy. Practicals in sediment analysis, drill core studies, sedimentary strata interpretation, and stratigraphic techniques.

GEOL2131**Geomapping 1***Staff contacts Mr GH McNally, A/Prof AD Albani, Dr DR Cohen, Mr D Palmer, A/Prof GR Taylor*

CP15 S1 L2 T3

Note/s: Excluded GEOL2062, GEOL8380. Fieldwork of up to 2 days is a compulsory part of this subject for which students may incur personal costs. Details are provided during the first week of the subject.

Principles of remote sensing. The use of air photos for geological mapping and geomorphic evaluation. Relationships between geology, structure, soil, drainage, vegetation and air photo signatures. Map projections: the Australian Map Grid; projection transformations. Global positioning and field surveying techniques. Introduction to the use of various computer platforms and software packages. Use of spreadsheets and introduction to the Internet. Fundamentals of applied statistics. Introduction to image processing of remotely sensed and geophysical data.

GEOL2170**Earth Structures 1***Staff Contact: Dr PG Lennox*

CP7.5 S1 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211**Note/s:** Excluded GEOL2022

Interpretation of geological structures observed at outcrop scale within the context of the geological history of an area. Understanding brittle and some ductile structures using stereographic projection techniques, including use of computer methods. Application of the techniques in practical field situations.

GEOL 2180**Introduction to Igneous and Metamorphic Rocks***Staff Contact: A/Prof BJ Hensen*

CP7.5 S1 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211*Corequisite:* GEOL2110**Note/s:** Excluded GEOL2011, GEOL2022, GEOL8201

Occurrence, classification and origin of igneous and metamorphic rocks.

Igneous differentiation, fractional crystallisation and geochemical evolution of magmas. Magma types and their plate tectonic settings. Prograde and retrograde metamorphism. Types of metamorphic reactions. Isochemical metamorphism and hydrothermal alteration (metasomatism). Thermal and deformation histories of metamorphic belts. Practical: Macroscopic and microscopic examination of rocks of igneous and metamorphic origin in hand specimen and thin section.

GEOL2200**Field studies: Petrology, Structure and Field mapping***Staff Contact: A/Prof BJ Hensen*

CP7.5 S2 T3

Prerequisites: GEOL1101/1111 or GEOL1201/1211

Volcanic rocks, I-type and S-type granitic batholiths of the Lachlan Fold Belt. Contact and regional metamorphism. Mapping exercises in igneous and metamorphic environments. Structural analysis of folded rocks.

GEOL2220**Sedimentary Rocks and Clay Minerals***Staff Contact: A/Prof CR Ward*

CP7.5 S2 L2 T1

Prerequisite: GEOL2110**Note/s:** Excluded GEOL2022, GEOL7223

Sedimentary Petrology: Textures and composition of sandstones, limestones, tuffs, phosphorites, cherts, evaporites and other sedimentary rocks; chemical, physical and biological processes, before, during and after sediment deposition; microscopic and other studies of sedimentary materials. Clay Mineralogy: Crystal structure, composition and properties of the clay minerals; X-ray diffraction and other methods of clay analysis; clay-water systems, ion exchange, flocculation and dispersion; role of chemical weathering, transport and diagenesis in the formation and distribution of clay minerals; economic uses of clays and related materials.

Applied Geology Level II/III**GEOL2231****Environmental Geophysics***Staff Contact: Mr D Palmer*

CP15 S2 L2 T4

Prerequisite: none

Note/s: Excluded GEOL2051, GEOL6221. Fieldwork up to 5 days is a compulsory part of this subject, and it is usually carried out on and near the UNSW campus. Students may incur personal costs. Details are provided in the first week of the subject.

An introduction to the theory of geophysical methods with an emphasis on the near surface applications to environmental and urban studies, as well as the related areas of groundwater and geotechnical investigations. The methods covered include gravity, magnetics, electrical, seismic and radar. The course content and presentation are also designed to accommodate those students with

interests in environmental subjects but not necessarily with strong backgrounds in mathematics or physics.

GEOL2250

Surficial and Coastal Geology

Staff Contacts: Mr GH McNally, A/Prof AD Albani

CP7.5 S2 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211 or ENV51101

Note/s: Excluded GEOL2072, GEOL6311

Properties of coastal sediments, sampling practice, analysis of measured data and implications. Introduction to palaeoecology. Coastal environmental assessment. Shoreline processes and evolution of the inner continental shelf. Quaternary and Tertiary non-marine geology of Australasia. Distribution properties and environmental implications of alluvial, colluvial, residual, glacial and aeolian deposits. Land degradation and engineering geomorphology.

GEOL2260

Geomapping 2

Staff Contact: A/Prof GR Taylor, A/Prof AD Albani, Mr D Palmer, Dr DR Cohen

CP7.5 S2 L1 T2

Prerequisite: GEOL2131 or equivalent as approved by the Subject Authority.

Production of geological maps with desktop mapping technologies. Remote sensing techniques for geological materials. Geographic Information Systems for spatial geological data integration. Characteristics of geological sample populations, matrix algebra, regression analysis in geology, analysis of sequential geological data.

GEOL2290

Groundwater Hydrology

Staff Contact: Dr J Jankowski

CP7.5 S2 L2 T1

Note/s: Excluded GEOL2072. Fieldwork of 1 day is a compulsory part of this subject for which students may incur personal costs. Details are provided during the first week of the session.

The hydrologic cycle; saturated and unsaturated zones; porosity and permeability; water table; flow; unconfined and confined aquifers; geological activity of groundwater; thermal springs and geysers; alteration of groundwater systems; drilling methods; well design and completion; coastal aquifers; karst and carbonate terrain; saline environments; sedimentary, fractured, multilayered and crystalline aquifers; groundwater chemistry – chemical reactions and processes; contamination and water quality; types and sources of contamination; geotechnical problems; flow system a microbial population; resources – development, exploration and management; modelling; groundwater and economic mineralisation; groundwater in Australia – principal hydrogeological divisions; environmental problems and resources.

GEOL6231

Coastal Monitoring Techniques

Staff Contact : A/Prof AD Albani

CP15 S1 L1 T2

Note/s: Field work of up to 4 days is a compulsory part of this subject. Students will incur personal costs.

General principles of surveying. Optical and electronic methods of distance and elevation measuring. Coastal position fixing. Coordinate systems and their application to coastal mapping. Map projections. Long and short term monitoring of coastal changes. Tides, their measurement.

Applied Geology Level III

GEOL3101

Ore Deposits

Staff Contact: Dr AC Dunlop

CP15 S1 L3 T2

Prerequisite: GEOL2180 or alternative as approved by Subject Authority

Geological setting, characteristics and genesis of the major categories of metallic and non-metallic ore deposits. Laboratory study of hand specimens, thin sections and polished sections from these deposit types.

GEOL3110

Igneous and Metamorphic Processes

Staff Contact: A/Prof BJ Hensen

CP7.5 S1 L2 T1

Prerequisites: GEOL2180 or GEOL2022

Note/s: Excluded GEOL2031

The genesis of silicate melts : partial melting in the crust and upper mantle of the earth. The use of major and trace elements, and radiogenic and stable isotopes, in the study of fractionation processes of magmas. The chemical evolution of the crust and upper mantle through geological time. Stability relations of mineral assemblages as a function of pressure, temperature and fluid activity. Geobarometry and thermometry. Static and dynamic metamorphism during orogenic processes. The role of fluids and deformation in metamorphic reactions. Practical: Case studies of igneous and metamorphic provinces.

GEOL3120

Stratigraphy and Palaeontology

Staff contacts: A/Prof CR Ward

CP7.5 S1 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211

Note/s: Excluded GEOL3031

Classification of sedimentary basins; depositional systems; role of tectonics, sea-level and other changes in development of basin sequences; application of lithostratigraphic, biostratigraphic, chronostratigraphic and magneto-stratigraphic principles; introduction to sequence stratigraphy; provenance studies in sedimentary basins; morphology, evolution and use of key invertebrate fossil groups; geological development of Australian sedimentary basins and fold-belt sequences.

GEOL3131**Field Studies: Stratigraphy, Structure and Geological Mapping***Staff Contact: Dr AC Dunlop*

CP15 S1 T6

Prerequisites: GEOL1101/1111 or GEOL1201/1211**Note/s:** Geological fieldwork of up to eight days duration is a compulsory part of this subject. Students may incur personal costs.

Field mapping in a selected area of mildly deformed sedimentary and volcanic rocks; practical use of geological mapping techniques; integration of stratigraphic, lithological, structural and palaeontological concepts.

GEOL3170**Earth Structures 2***Staff Contact: Dr PG Lennox*

CP7.5 S1 L1 T2

Prerequisites: GEOL2170 or GEOL2022 or GEOL8121**Note/s:** Excluded GEOL3082

Use of ductile and to a lesser extent brittle structures at outcrop scale to understand the geological history of simply to multiply deformed areas. Development of conceptual links between outcrop structures and terranes, blocks and tectonics.

GEOL3201**Field Studies: Ore Deposits, Structural and Metamorphic Geology***Staff Contact: Dr AC Dunlop*

CP15 S2 T6

Prerequisite: GEOL3101 or alternative as approved by the Subject Authority**Note/s:** Geological fieldwork of up to nine days duration is a compulsory part of this subject. Students will incur personal costs.

Geologic setting of different ore deposit types in central-west and far western New South Wales; application of geological techniques and principles to mineral exploration and mining; use of geological mapping techniques in a structurally-complex high-grade metamorphic terrane (Broken Hill Block); Quaternary processes and environmental geology in the arid zone.

GEOL3231**Exploration Geophysics***Staff Contact: Mr D Palmer*

CP15 S2 L2 T4

Prerequisites: GEOL2051 or GEOL2231 or GEOL 6221**Note/s:** Excluded GEOL3052; GEOL6330. Fieldwork up to 3 days is a compulsory part of this subject. Students may incur personal costs. Details are provided in the first week of the subject.

An intermediate course on geophysical methods with an emphasis on applications to mineral, petroleum and coal exploration. The subjects covered include data processing, gravity, magnetics, electrical, seismic reflection, DC electrical resistivity, induced polarisation, electromagnetics and geophysical well logging. Each method is described in terms of the fundamental principles, field techniques,

processing and presentation of results and quantitative interpretation. Assignments include the use of industry standard software.

GEOL3241**Sedimentary Basin Resources***Staff Contact: A/Prof CR Ward*

CP15 S2 L4 T2

Prerequisites: GEOL1101/1111 or GEOL1201/1211 or alternative as approved by Subject Authority.**Note/s:** Excluded GEOL3102. Fieldwork of up to 2 days is a compulsory part of this subject for which students will incur personal costs. Details are provided during the first week of the subject.

Coal Geology: Nature and properties of coal, including introduction to coal petrography; origin of coal seams and coal-bearing sequences; coalfield exploration and coal mining geology; geological factors in coal preparation and use. Petroleum Geology: Nature and properties of petroleum; petroleum generation, migration, entrapment and degradation processes; sedimentology of reservoir sequences; primary and secondary porosity; structural and stratigraphic traps, including diapirs and fractured-rock reservoirs; coal-bed methane, oil-shale and other non-conventional petroleum sources; exploration and evaluation of petroleum deposits. Basin Analysis: Data gathering from outcrop and subsurface; geological assessment of cores and cuttings; introduction to petrophysical well-logging; lithofacies and palaeocurrent analysis; palaeogeographic synthesis.

GEOL3250**Engineering and Environmental Geology***Staff Contact: Mr GH McNally, Dr J Jankowski*

CP7.5 S2 L2 T1

Prerequisites: GEOL1101/1111 or GEOL1201/1211 or ENV51101**Note/s:** Excluded GEOL3072

Rocks and soils as engineering materials. Discontinuities and properties of rock masses. Engineering consequences of weathering. Site investigation techniques for dams, tunnels, highways etc. Soil and rock construction materials. Environmental impacts of extractive industries. Geohazards: subsidence, earthquakes and landslides. Land salinisation processes. Groundwater pollution and remediation.

GEOL3280**Exploration and Environmental Geochemistry***Staff Contact: Dr AC Dunlop*

CP7.5 S2 L2 T1

Note/s: Excluded GEOL3092. Geological fieldwork of up to one day duration is a compulsory part of this subject. Students may incur personal costs.

Distribution of metals in natural and urban environments. Primary and secondary dispersion of elements. Weathering and regolith development. Principles and techniques of vapour, water, soil, drainage sediments, rock and vegetation geochemistry as applied to mineral exploration and environmental assessments. Introduction to sampling,

analytical techniques and design of exploration and environmental surveys. Principles of aqueous geochemistry and modelling. Contaminant dispersion. Case studies.

GEOL6321

Coastal Environmental Assessment

Staff Contact: A/Prof AD Albani

CP15 S2 L1 T2

Note/s: Field work of up to 3 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

The interaction of water masses, bottom sediments and benthic organisms. Sampling techniques, analytical methodology and statistical data evaluation. Environmental assessment of Australia and overseas areas. An important aspect of this course is its practical approach: from data gathering, data evaluation and environmental assessment report writing. Practical work in the course involves each student as an active member of a project team.

Applied Geology Level IV

GEOL4100

Geological Communications

Staff Contact: Mr GH McNally

CP7.5 S1 L1 T1

Construction and preparation of reports, theses and scientific papers; library and database search techniques; critical reviewing of literature; citation of references; editing of report drafts and development of abstracts and conclusions; use of tables, figures and photographs; drafting and illustration techniques; verbal presentation of geological material to a large audience; computer graphics and desktop publishing techniques; preparation of resumes; meeting procedures, minutes and chairmanship.

GEOL4102

Special Topics in Applied Geology

Staff Contact: Dr PG Lennox

CP30 S1 L/T10

Note/s: Some fieldwork may be involved; students may need to meet personal costs.

Instruction by lectures, tutorials and assignments in advanced aspects of geological science and its applications. Individual students will select four modules from a list prepared for each year by the Department. These modules will cover a number of specialised fields including mineral exploration, mine geology, sedimentary basin studies, geophysics, engineering and environmental geology, as well as fundamental geology topics. Some modules may be delivered at other universities through the Sydney Universities Consortium of Geology and Geophysics.

GEOL4130

Interpretation of Geological Data

Staff Contact: Dr DR Cohen

CP7.5 S1 L1 T1

Prerequisite: GEOL2131 or alternative as approved by Subject Authority

Population characterization and exploratory data assessment. Anomaly definition and detection in geochemical and geophysical data. Multiple regression analysis. Multivariate techniques including principal components and factor analysis, discriminant and cluster analysis with applications in earth sciences. Closure in petrological and geochemical data. Non-parametric methods. Selected case studies and laboratory exercises employing a variety of statistical and graphical packages.

GEOL4140

Project Management

Staff Contact: Dr AC Dunlop

CP7.5 S1 L1 T1

Organisation and costing of geological field programs; land tenure, exploration and mining titles, drilling programs, ore core logging; use of geological database and modelling systems; estimation of resources and reserves; liability and ethics in geological practice.

GEOL4180

Analysis of Natural Materials

Staff Contact: Dr DR Cohen

CP7.5 S1 L1 T1

Sampling strategies and methods in soil, rock and water analysis. Mineral separations and physical characterization. Techniques for total and selective extractions of metals and organics. Theory and practice of modern analytical methods for water, vegetation, soil, rocks and minerals, including AAS, ICP, XRF, XRD, INAA, GC-MS and electron microprobe. Analytical quality control. Formulation and use of reference materials.

GEOL4204

Field Project

Staff Contact: Dr PG Lennox

CP60 S2 T20

Note/s: Geological fieldwork of up to six weeks duration may be required. Students may incur personal costs.

A major field and laboratory project, which may include geological mapping and interpretation of other geological data (possibly including satellite imagery, geophysical datasets, geochemical or geohydrological information). The project may involve aspects of resource development, engineering or environmental geology, regional geology and groundwater studies.

GEOL4203

Field Project (P/T)

Staff Contact: Dr PG Lennox

CP60 S2 T10 (Year 1); S2 T10 (Year 2)

Note/s: Geological fieldwork of up to six weeks duration may be required. Students may incur personal costs.

A major field and laboratory project spread over two sessions for part-time study, which may include geological mapping and interpretation of other geological data (possibly including satellite imagery, geophysical datasets, geochemical or geohydrological information). The project may involve aspects of resource development, engineering

or environmental geology, regional geology and groundwater studies.

GEOL4303

Geology Honours

Staff Contact: Dr PG Lennox

CP120 F

Prerequisite: Completion of program 2500, 2503 or 2504, including Level III subjects totalling 120 Credit Points.

Note/s: An extensive field project is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Students with a double major in geology will follow the program set for Year 4 students in Course 3000 Applied Geology. Students with a single major will follow a course of advanced study that includes geological topics subject to approval of the Head of Department.

GEOL4313

Earth and Environmental Science (Honours)

Staff Contact: A/Prof AD Albani

CP120 F

Prerequisite: Completion of program 2527 including Level III subjects totalling 120 Credit Points

Note/s: An extensive field project is a compulsory part of this subject. Students will incur personal costs.

GEOL4333

Earth and Environmental Science Honours P/T

Staff Contact: Applied Geology Office

CP60 F

Prerequisite: Completion of Program 2527 including Level III subjects totalling 120 Credit Points.

Note/s: Extensive field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Students will follow a course of advanced study which extends over 4 sessions and includes geological subjects that are approved by the Head of Department.

GEOL4343

Geology Honours P/T

Staff Contact: Applied Geology Office

CP60

Prerequisite: Completion of Programs 2500 or 2503 including Level III subjects totalling 120 Credit Points.

Note/s: Extensive field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Students with a double major in geology will follow the program set for Year 4 students in Course 3000 Applied Geology but over 4 sessions in a prescribed sequence. Students with a single major in geology will follow a course of advanced study which extends over 4 sessions and includes geological subjects that are approved by the Head of Department.

GEOL7401

Earth Environments Honours by research

Staff Contact: A/Prof AD Albani

CP120 F

Prerequisite: Completion of three years of Program 6866 including Level III subjects totalling 90 Credit Points.

Note/s: Field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Students will undertake a project, that is approved by the Program advisor. It extends over 2 sessions and includes both geological subjects and a project that involves the writing of a thesis.

GEOL7402

Earth Environments Honours by research (P/T)

Staff Contact: A/Prof AD Albani

CP60 F

Prerequisite: Completion of three years of Program 6866 including Level III subjects totalling 90 Credit Points.

Note/s: Field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Students will undertake a project, that is approved by the Program advisor. It extends over 4 sessions and involves the writing of a thesis.

GEOL7403

Earth Environments Honours

Staff Contact: A/Prof AD Albani

CP120 F

Prerequisite: Completion of three years of Program 6866 including Level III subjects totalling 90 Credit Points.

Note/s: Field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Students will follow a course of advanced study that has to be approved by the Program advisor. It extends over 2 sessions and includes both geological subjects and a project that involves the writing of a thesis.

GEOL7404

Earth and Environments Thesis

Staff Contact: A/Prof AD Albani

CP60 S1 or S2

Prerequisite: Completion of three years of Program 6866 including Level III subjects totalling 90 Credit Points.

Note/s: Field work is a compulsory part of this subject and students will incur personal expenses. Details will be provided in the first week of the subject.

Subject to the approval by the Program advisor, students will undertake a project that involves the writing of a thesis.

Industrial Relations and Organisational Behaviour

IROB2721

Managing People

Staff Contact: School Office

CP7.5 S1 HPW4

Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject focuses on managing in a rapidly changing environment. Topics include: leadership, decision-making and innovation; power, legitimacy, and the socialisation process; the structure and design of organisations, organisation and domination, the evolution of ethical awareness; intergroup conflict and conflict resolution; skills of managing – communication, negotiation, coaching and objectives setting; organisational culture and transformation.

Information Systems

Information Systems Level II

INFS1602

Computer Information Systems 1

Staff Contact: School Office

CP15 S1 or S2 L2 T1

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810 and Course 3971.

An understanding of the content of Information Systems, the types of Information Systems and the position of Information Systems in Society; Information Systems at an organisational level, typical commercial applications, the systems lifecycle, design concepts, data analysis and models and an introduction to data communications.

INFS1603

Business Data Management

Staff Contact: School Office

CP15 S1 or S2 L2 T1

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810 and Course 3971.

Provides students with the required knowledge and practical skills to model data including the use of entity/relationship models and object models. Students will be able to design simple databases in an organisational environment and understand the role of data in business and the quality assurance issues in collecting, storing and using data.

INFS2603

Systems Analysis and Design

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisites: INFS1602 and INFS1603

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810 and Course 3971.

This subject examines system analysis and design: requirements analysis and specification, logical and physical design of business systems; students compare design methodologies such as structures and object oriented.

INFS2607

Business Data Networks

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: INFS1602

Note/s: Excluded INFS3607 and INFS2617. Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810 and Course 3971.

Data communication concepts, computer networks, reference to international standards and common industry communications software packages; local/metropolitan/wide area networks; network management; telecom services and other options; data security.

INFS2609

Commercial Programming

Staff Contact: School Office

CP15 S1 L2 T1

Prerequisites: INFS1602, INFS1603

Note/s: Restricted to programs 0600, 1000, 1006, 1060, 1061, 1066, 1067, 1400, 6810, and Course 3971.

Programming in the business context with a commercial programming language. Defining problems and designing structured programs to solve problems. Use of data types, selection, iteration, functions, arrays and data structures in procedural programs. A practical introduction to commercial programming.

Information Systems Level II/III

INFS2691

Industrial Training 1

Staff Contact: School Office

CP15 S1 HPW1

Prerequisites: INFS1602, INFS1603

Note/s: Available only to BIT students. Restricted to Course 3971.

A practical treatment of the characteristics of commercial information systems. Topics include analysis of an existing information system; development of overview documentation of the system; evaluation of the interface design; consideration of the role of security and control mechanisms.

Information Systems Level III

INFS3603

Executive Support Systems

Staff Contact: A Gardiner

CP15 S1 L2 Lab1

Prerequisites: INFS1602, INFS1603

The process of decision making and work group activity by professional and managerial people; the tools and techniques available in information technology to support these processes; the cultural and organisational issues involved in formalising support; management issues related to support.

INFS3604

Information Function Management

Staff Contact: School Office

CP15 S2 L2 Lab 1

Prerequisites: INFS2603

Introduces the strategic and operational management issues involving information systems and software. Considers both qualitative and quantitative management techniques, including practical applications of tools and concepts for software project management, as well as material on software metrics and software quality. Covers techniques for strategic planning of information systems and ensuring business contribution.

INFS3605

Software Engineering

Staff Contact: School Office

CP15 S1 L1 T2

Prerequisite: INFS2609

Note/s: Restricted to programs 0600, 1400, 6810 and Course 3971.

Students are supervised implementing an information systems project in a commercial programming language. Topics include: advanced program design and structured techniques, computer aided software engineering techniques, interface with systems software at application implementation level, the comparison of a range of programming languages, test data specification, implementation procedures.

INFS3606

Advanced Data Networks

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: INFS2607

Note/s: Excluded INFS3618

Strategic issues in telecommunications in business. Current and emerging technologies for data networking. Specifications of corporate networks including local and wide area networks.

INFS3608

Advanced Database Systems

Staff Contact: School Office

CP15 S1 L2 T1

Prerequisites: INFS1602, INFS1603

Note/s: Restricted to programs 0600, 1400, 6810 and Course 3971.

Advanced data analysis and modelling techniques; database management system architectures including hierarchical, network, relational and object-oriented approaches; database reliability, security and integrity issues; data description and manipulation languages; a case involving the design and implementation of a commercial system.

INFS3611

Advanced Analysis and Design

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: INFS2603

Note/s: Restricted to programs 0600, 6810, 1400 and Course 3971. Students in Course 3971 undertake this subject in session 1.

Consists of a real-life systems development project, augmented by lectures and project team management. It provides practical experience in application of object oriented methods for the specification and design of commercial business systems. Requirements definitions, systems specifications and logical designs are developed to professional standard (using automated tools), with an emphasis on requirements engineering and user interface analysis.

INFS3616

Commercial Programming Principles

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: INFS3605

Corequisite: INFS3692

Note/s: Available only to BIT students. Restricted to Course 3971.

An advanced treatment of the practice of implementing commercial systems. Topics include: the use of library code, program design for performance, project control and reporting practice, programming standards, human machine interface, software testing, CASE tools, documentation, security and control, maintenance.

INFS3692

Industrial Training 2

Staff Contact: School Office

CP15 S2 HPW1

Prerequisite: INFS2609 or INFS3605

Corequisite: INFS3616

Note/s: Available only to BIT students. Restricted to Course 3971.

An in-depth practical exposure to information systems development. Topics include the structure and management of the implementation teams; the roles of users and

information staff in implementation; scheduling and control during implementation.

INFS4693

Industrial Training 3

Staff Contact: School Office

CP15 S1 HPW1

Corequisite: INFS3611

Note/s: Available only to BIT students. Restricted to programs Course 3971.

In depth practical work in information systems analysis and design. Topics include the structure and management of analysis and design teams; the roles of users and Information Systems staff in analysis and design; scheduling and control during analysis and design.

Information Systems Level IV

INFS4003/INFS4004

Information Systems (Honours) Thesis

Staff Contact: School Office

CP120 F

Prerequisite: Completion of program 1400 including Level III subjects totalling 90 Credit Points.

INFS4774

Information Systems Security

Staff Contact: School Office

CP15 S1 L3

Prerequisites: INFS1603, INFS2607, and admission to BCom course at honours level majoring in Information Systems plus approval of Head of School of Information Systems.

Reviews concepts, theory, methodologies and techniques discussed in IS security literature and practice. Includes: information systems security management, risk analysis and management, physical and logical security, database and telecommunications security, continuity planning, computer abuse, internet and electronic commerce, legal and social issues. Case studies will provide students with an understanding of computerised security techniques in practice.

INFS4794

Thesis (Information Systems)

Staff Contact: School Office

Note/s: Available only to Year 4 (Honours) students.

INFS4805

Information Systems Auditing

Staff Contact: School Office

S2 L3

Prerequisite: INFS1602 and admission to BCom course at honours level majoring in Information Systems plus approval of the Head of School of Information Systems

Note/s: Available only to Year 4 (Honours) students. Not offered in 1998.

Management of information systems audit and the evaluation of IT management. Analysis and review of

internal controls in contemporary computer installations and applications. Use of basic and advanced information systems audit techniques and methodologies, including audit software, integrated test facility, and concurrent auditing techniques. Technology audit reviews of the audit requirements for such technologies as LANs, EDI, and expert systems. Legal and professional requirements, and computer abuse/fraud auditing. Review of future IS audit techniques, methodologies, research and social implications.

INFS4810

Advanced Data Management

Staff Contact: School Office

CP15 S1 L3

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

The principle and practice of data administration in a large organisation. Design, redesign and tuning of database. Distributed databases and database management systems. Reliability, security and integrity of the database.

INFS4811

Knowledge Based Information Systems

Staff Contact: School Office

CP15 S2 L3

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

Reviews concepts, theory, methodologies and techniques discussed in KBS literature and reviews current practice. Topics include an historical perspective of AI, expert systems and knowledge based systems, KBS tools and techniques, Knowledge acquisition and representation, development methods, and evaluation, as well as considering KBS applications and the organisation. Students design and develop a knowledge based system and present their design to the class.

INFS4812

Software Engineering Management

Staff Contact: School Office

CP15 S1 L2 T1

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

Software engineering management and measurement of complex systems, software development maturity, project planning and management, estimation models and techniques, project scheduling, software quality, reliability, assurance, software productivity models.

INFS4825

Object Oriented Information Systems

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: INFS3605, and admission to BCom course at honours level majoring in Information Systems plus approval of Head of School of Information Systems.

Systems development methodologies based on the object-oriented approach. Techniques of analysis and design (concepts and notation). Information systems implementation using at least one specific object-oriented language; and including concepts of objects, classes, abstract data types, inheritance, polymorphism, dynamic binding and software reusability.

INFS4848

Information Systems Project Management

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

An introduction to the central concepts and issues of project management and the practical benefits of project planning and management together with resource management. Practical sessions in project planning and the use of a computer based management tool. Additional topics include customer focus, lifecycle customization, work packages, progress monitoring, risk evaluation, quality management, vision and change control, people skills, and training.

INFS4853

Information Systems Management

Staff Contact: School Office

CP15 S2 L3

Prerequisites: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

This course aims to assist students to develop their knowledge and understanding of important issues involved in the management of information systems in organisations and their ability to critically analyse these issues. Management of information systems will be considered at strategic, tactical and operational levels. Particular emphasis will be given to the management of enterprise-wide and inter-organisational systems and planning for their strategic use. Students without knowledge of and experience in management or the use of IS in organisations may wish to take the subject INFS4848.

INFS4857

Information and Decision Technology

Staff Contact: School Office

CP15 S1 L3

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

The role of information and models in managerial decision making and prediction. The role of information systems in decision making. Assessing the value of information systems and the contribution of information in decision making under uncertainty. The role of information in managerial prediction and forecasting. The development of computer based models to support tactical management. An understanding of the way in which people make decisions, with and without computer support.

INFS4886

Research Topics in Information Systems 1

Staff Contact: School Office

S1 L3

Prerequisite: Admission to BCom course at honours level majoring in Information Systems

The development of science. Alternative social science research methodologies-case study, normative, laboratory, field studies and field tests. The research process. Judgement in research. Statistical analysis of research data and interpretation of results. Writing the research report.

INFS4887

Research Topics in Information Systems 2

Staff Contact: School Office

S2 L3

Prerequisite: Admission to BCom course at honours level majoring in Information Systems

The objective of this subject is to enable the students of information systems research to carry out data analysis using statistical tools for empirical research. It examines both the theoretical aspects of scientific data and statistical analysis and introduces the student to a statistical data analysis package.

INFS4891

Decision Support Systems

Staff Contact: School Office

S1 L2 LAB1

Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

Information used for decision making and the application of information technology to assist or support the decision making process. Topics include decision making models, the impact of different management styles, the use of decision tools and the development of decision support systems including issues of model management and interface design. Practical examples of decision support systems are examined as are executive information systems and computer mediated communications within an organisation.

INFS4893

Special Topic in Information Systems

Staff Contact: School Office

S1 or S2 L3

Prerequisites: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

A specially assigned project, program or set of readings relating to information systems research.

INFS4898

Project Seminar

Staff Contact: School Office

Japanese and Korean Studies

In addition to its core language program, the School of Asian Business and Language Studies offers a range of Japanese and Korean language and non-language area studies as elective subjects to students studying in the Faculty of Arts and Social Sciences, including courses in Japanese and Korean cultural studies, business and management and technical language.

Subjects in Japanese and Korean languages are offered both for students without prior knowledge of the languages and for those with HSC or other Japanese and Korean language studies. Students enrolling in Japanese or Korean with no previous knowledge of the languages should enrol in JAPN1000 Japanese Communication 1A and JAPN1001 Japanese Communication 1B or KORE1000 Korean Communication 1A and KORE1001 Korean Communication 1B. For students with HSC or other Japanese and Korean language studies, a multipoint entry system operates and, subject to an individual placement test, students will be allocated to the most suitable subject level.

Note: For students admitted in their first year of studies to JAPN2000 or KORE2000 or higher on the grounds of ability and/or previous study, such subjects will be counted as Level I subjects in terms of degree regulations. No student will be permitted to enrol in subjects carrying more than 12 upper level credit points in any School/area of studies under this provision.

All Japanese subjects are restricted to Programs 0600, 1400, and Courses 3971, 3978, 3979 and Advanced Science students in Mathematics Programs.

JAPN1000

Japanese Communication 1A

Staff Contact: Mr K Teruya

CP15 S1 HPW5

Prerequisite: Nil

Introduction to modern Japanese interactive skills, ie. listening, speaking, reading, writing, rules of communication, and socio-cultural knowledge of present-day Japan and local Japanese community, essential to basic survival interaction with Japanese. Emphasis on conversational skills. *Hiragana*, *Katakana* and approximately 50 *Kanji* are introduced.

JAPN1001

Japanese Communication 1B

Staff Contact: Mr K Teruya

CP15 S2 HPW5

Prerequisite: JAPN1000

Further acquisition of interactive skills in basic Japanese, regarding everyday non-technical topics. Introduction of approximately 100 new *Kanji*.

JAPN2000

Japanese Communication 2A

Staff Contact: Dr Y Sasaki

CP15 S1 HPW5

Prerequisite: JAPN1001

Further development of beginner's Japanese interactive skills. Prepares students to become competent in anticipated Australia-Japan contact situations and basic survival situations in Japan. Continued emphasis on oral-aural skill acquisition. Approximately 100 new *Kanji* are introduced.

JAPN2001

Japanese Communication 2B

Staff Contact: Dr Y Sasaki

CP15 S2 HPW5

Prerequisite: JAPN2000

Consolidation of oral-aural skills up to intermediate level. Development of reading and writing skills, with another 150 *Kanji* introduced.

IBUS2103

Japanese Business

Staff Contact: A/Prof W Purcell

CP15 S2 HPW3

Prerequisite: JAPN1001 or ECON1101

Study of Japanese business and management practice, including corporate structure and enterprise groupings; '*shitauke*' subcontracting system; '*kanban*' just-in-time industry system; '*kaizen*' best workplace practice; '*ringi*' decision-making; negotiating strategies and techniques; Japanese multinational operations; and government-business relations.

JAPN2500

Japanese Studies

Staff Contact: A/Prof W Purcell

CP15 S1 HPW3

Prerequisite: JAPN1001

An introduction to Japanese society, history, culture, politics and economy. Topics include social stratification, the role of women, demographic change, the education system, electoral politics, interest-group representation, Japan's economic growth, agriculture and industrial development, the role of the state, Japan's underworld *Yakuza* and traditional *Kabuki* theatre.

JAPN2600

Hospitality Japanese

Staff Contact: Ms Fusako Osho

CP15 S2 HPW3

Prerequisite: JAPN2000

Note/s: Excluded JAPN4000 or above

This subject aims to develop interactive competence in spoken Japanese for the hospitality industry, particularly in professional situations relating to tourism and leisure. Includes finance and banking, hotel advertising, restaurant and other work situations. Emphasises comparative cultural aspects, covering honorifics and etiquette as well as non-

linguistic aspects of interaction between hospitality personnel and tourists.

JAPN3000

Japanese Communication 3A

Staff Contact: Dr C Kinoshita Thomson

CP15 S1 HPW5

Prerequisite: JAPN2001

Equips students with solid linguistic skills at intermediate level, with increasing emphasis on reading and writing. Introduction to a variety of local Australia-Japan contact situations and expanding practical usage of students' interactive skills. Approximately 150 new *kanji* are introduced.

JAPN3001

Japanese Communication 3B

Staff Contact: Dr C Kinoshita Thomson

CP15 S2 HPW5

Prerequisite: JAPN3000

Further development of communicative skills and competence attained in JAPN3000. Students use Japanese in a wider context, thereby increasing vocabulary and knowledge of grammatical structures. Another 150 *Kanji* are introduced.

JAPN3500

Business Japanese

Staff Contact: Ms K Okamoto

CP15 S2 HPW3

Prerequisite: JAPN3000

Note/s: Excluded JAPN4100 or above

Concentrates on interactive skills for business situations, including reading and writing. Introduction to technical language of accounting, finance, economics and marketing and develops skills needed in typical formal and informal business contact situations, such as business introductions and meetings, business conversation, written channels of communication and business etiquette.

JAPN4000

Japanese Communication 4A

Staff Contact: Ms H Masumi-So

CP15 S1 HPW5

Prerequisite: JAPN3001

Concentrates on acquisition of late-intermediate to early-advanced interactive skills in Japanese with continued emphasis on reading and writing. Introduction to basic linguistic features of advanced level Japanese and provides opportunities to practise skills needed in typical formal and informal Australia-Japan contact situations. Approximately 150 *Kanji* are introduced.

JAPN4001

Japanese Communication 4B

Staff Contact: Ms H Masumi-So

CP15 S2 HPW5

Prerequisite: JAPN4000

Prepares students in acquisition of well-rounded linguistic and communicative competence necessary for advanced

learners. Further extension and systematic practice of interactive skills. Another 150 *Kanji* are introduced.

JAPN4100

Japanese Communication 5A

Staff Contact: Ms S Iida

CP15 S1 HPW5

Prerequisite: JAPN4001

Focuses on mid-advanced Japanese interactive skills. Increasing emphasis is placed upon further development of reading and writing abilities. Autonomous learning is encouraged and assisted in acquisition of more advanced interactive skills. Students are given opportunities to improve on competence in professional and business settings. Approximately 250 new *Kanji* are introduced.

JAPN4101

Japanese Communication 5B

Staff Contact: Ms S Iida

CP15 S2 HPW5

Prerequisite: JAPN4100

Honing of reading and writing skills attained in JAPN4100. Continued instruction in more advanced conversational and grammatical structures and useful vocabulary for the purpose of business and related areas of communication. A further 250 *Kanji* are introduced.

JAPN4200

Japanese Communication 6A

Staff Contact: Dr C Kinoshita Thomson

CP15 S1 HPW5

Prerequisite: JAPN4101

Concentrates on further acquisition of interactive skills required in a wider variety of Australia-Japan contact situations. Continued emphasis on autonomous learning and self-monitoring of problem areas in interactive skills. Approximately 250 new *Kanji* are introduced.

JAPN4201

Japanese Communication 6B

Staff Contact: Dr C Kinoshita Thomson

CP15 S2 HPW5

Prerequisite: JAPN4200

Refining of linguistic and communicative skills acquired in JAPN4200. Another 250 *Kanji* are introduced, ie. the remaining *JooYoo Kanji*.

JAPN4300

Advanced Reading in Japanese

Staff Contact: Dr C Kinoshita Thomson

CP15 S1 HPW5

Prerequisite: JAPN4201 or permission from Head of School

Provides opportunity for advanced learners of Japanese with intensive and extensive reading in the language on the selected topic(s). Accumulation of *Kanji*, vocabulary and idiomatic expressions is emphasised.

JAPN4301**Advanced Reading in Japanese B***Staff Contact: Dr C Kinoshita Thomson*

CP15 S2 HPW5

Prerequisite: JAPN4300 or permission from Head of School

Learners are required to continue reading on the selected topic(s) from JAPN4300, prepare a paper and give a formal oral presentation to a group of native Japanese speakers.

JAPN4400**Special Topics in Advanced Japanese***Staff Contact: Ms H Masumi-So*

CP15 S2 HPW3

Prerequisite: JAPN4000

Provides students with a framework for analysing problems in the field of Japanese Studies, including a theoretical framework and types and sources of problems. Where possible, students carry out empirical data collection and are guided through the analysis of and search for possible solutions to these problems.

Korean Studies

Korean subjects are restricted to Programs 0600, 1400, and Course 3971 and Advanced Science students in Mathematics Programs.

KORE1000**Korean Communication 1A***Staff Contact: Mr S-C Shin*

CP15 S1 HPW5

Prerequisite: Nil

Designed to provide beginners with practical language skills for effective communication. Emphasis is on use of the language in basic survival situations. Communicative methods are used to develop in students the four language skills: listening, speaking, reading and writing, within a cultural context. The Korean script, *Han-gul*, is taught progressively.

KORE1001**Korean Communication 1B***Staff Contact: Mr S-C Shin*

CP15 S2 HPW5

Prerequisite: KORE1000 or equivalent

Further development of communicative skills in introductory Korean, with emphasis on a variety of 'real life' situations. New communicative functions, vocabulary and grammatical structures are progressively added to knowledge and skills acquired in KORE1000.

KORE2000**Korean Communication 2A***Staff Contact: Mr S-C Shin*

CP15 S1 HPW5

Prerequisite: KORE1001 or equivalent

Further development of communicative skills on the groundwork covered in introductory-level Korean. Allows

students to build upon their spoken and written language skills, enabling them to interact in a wider range of communicative situations.

KORE2001**Korean Communication 2B***Staff Contact: Mr S-C Shin*

CP15 S2 HPW5

Prerequisite: KORE2000 or equivalent

Consolidates and further expands on knowledge and skills developed in the previous subjects as well as laying the foundation for students who wish to proceed to a third year program. A number of selected *Hanja*, Sino-Korean, characters, is introduced to further enhance the students' skills to read and comprehend modern Korean mixed script.

IBUS2104**Korean Business***Staff Contact: Mr S-C Shin*

C15 S2 HPW3

Prerequisite: 90 Arts credit points or the equivalent in the Faculties of Law or Commerce and Economics

An introduction to Korean economy and business practice. Topics include Korea's economic development and growth, economic policies, government-business relations, corporate structure and enterprise groupings, *Chaebol*, industry system, workplace practices, decision making procedures, business negotiations and socio-cultural elements in business and management.

KORE3000**Korean Communication 3A***Staff Contact: Mr S-C Shin*

C15 S1 HPW5

Prerequisite: KORE2001 or equivalent

Consolidation of students' communicative skills in both spoken and written Korean at intermediate level, with increasing emphasis on reading and writing. It introduces a wider range of communicative topics, vocabulary and grammatical structures and further expands practical usage of students' knowledge and interactive skills. Approximately 100 new *Hanja* are also introduced.

KORE3001**Korean Communication 3B***Staff Contact: Mr S-C Shin*

C15 S2 HPW5

Prerequisite: KORE3000 or equivalent

Further development of communicative skills attained in KORE3000 and a new orientation to specific needs in everyday business situations. It equips students with a variety of practical language skills and background information necessary not only for everyday conversation but also for Korean-Australian business situation. Includes systematic practice of communicative skills in the classroom and some field work at the 'real-life' situations in the Sydney Korean business community. Another 150 *Hanja* are introduced.

Business Law and Taxation

Business Law and Taxation Level I

LEGT7711

Legal Environment of Commerce

Staff Contact: School Office

CP15 S1 or S2 L2 T1

Prerequisites: HSC minimum mark required –

Contemporary English 60, or 2 unit English (General) 60 or 2 unit English 53 or 3 unit English 1

Note/s: Restricted to programs 1400, 6810 and Courses 3971 and 3979.

The entire fabric of commerce is woven from a complex legal regime, judicial and statutory, which regulates all commercial activity. This subject deals with the Australian legal system; Commonwealth/State relations; Parliament and statute law; the court and case law; the executive and administrative law; the legal process and its alternatives. This subject also introduces areas of substantive law relevant to commerce with particular reference to property law (with particular reference to intellectual property), torts law (with particular reference to negligence), contract law, criminal law, commercial entities and transactions, competition and consumer protection.

LEGT7731

Marketing and Distribution Law

Staff Contact: School Office

CP15 S1 L2 T1

Note/s: Restricted to program 1400 and Courses 3971 and 3979.

The marketing and distribution of goods and services operates within a comprehensive regulatory framework. This subject examines that framework. Topics include restrictive trade practices implications of distribution with special reference to collusive activity, exclusive dealing, resale price maintenance and abuse of market power; consumer protection and fair trading implications of sales promotion with particular reference to misleading or deceptive conduct and other unfair practices; advertising self regulation; product liability; protection of intellectual property; franchising, licensing and character merchandising.

LEGT7761

Law of Finance and Securities

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: Nil

This subject examines the legal environment of banking and relevant financial institutions with particular reference to the law regulating business transactions and structures. Topics include legal concepts underlying the Bank-Customer relationship; legal regulation of financial instruments; laws relating to various types of securities; bankruptcy and alternative arrangements; company

insolvency; legal regulation of banking and financial institutions.

Business Law and Taxation Level II

LEGT7721

Business Transactions

Staff Contact: School Office

CP15 S1 or S2 L2 T1

Prerequisite: LEGT7711

Note/s: Restricted to program 1400 and Courses 3971 and 3979.

Contract law forms the basis of all important commercial transactions and is essential to a proper understanding of more specialised areas of commercial law. This subject examines the general principles of contract law and how they are developed and expanded in relation to specialised commercial transactions including agency, contracts for the sales of goods, guarantees, bankruptcy, negotiable instruments, securities and insurance law. Relevant areas of consumer protection and competition law are also discussed. The common contractual themes in which these areas are grounded will be highlighted, along with the different requirements attaching to the rights and obligations of parties to transaction in such areas.

LEGT7771

Information Technology Law

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: LEGT7711 or INFS1602

Note/s: Restricted to program 1400 and Courses 3971 and 3979.

The laws governing information technology. The topics examined include intellectual property law – patents, copyright and confidential information; licensing; technology contracts; tortious liability; product liability; computer crimes; data protection and privacy issues; and current issues.

Business Law and Taxation Level III

LEGT7741

Business Entities

Staff Contact: School Office

CP15 S2 L2 T1

Prerequisite: LEGT7711 and LEGT7721

Note/s: Restricted to programs 1400 and Courses 3971 and 3979.

The law relating to the legal structures available for business including partnerships, joint ventures, trusts and companies. The primary focus is on the modern company and its operation under the *Corporations Law*. Topics include the nature of the corporate entity; establishing the company and fundraising; shares and dividends; the rights and duties of directors; the position of management; shareholders' rights and remedies for their enforcement; insolvency and liquidation.

LEGT7751**Business Taxation***Staff Contact: School Office*

CP15 S1 L3 T1

Prerequisite: LEGT7711 and LEGT7721**Note/s:** Restricted to program 1400 and Courses 3971 and 3979.

The complexity and comprehensiveness of the Australian taxation system mean that tax considerations must be taken into account in most business decisions. An understanding of the structure of the Australian taxation system and of the policy factors that guide legislators is essential to professional business advisors. This subject concentrates on income taxation in Australia. Topics include: concepts of income; allowable deductions; tax accounting; taxation of partnerships, trusts and corporations; anti-avoidance provisions; tax administration; capital gains tax; and fringe benefits.

Marine Science

Note: Some subjects that appear in this section may be restricted to students for whom the subject comprises a compulsory part of their program.

Marine Science Level II**MSCI2001****Introductory Marine Science***Staff Contact: Dr P Dixon*

CP15 S1 or S2 HPW4

Note/s: Fieldwork in Mid year Recess.

Ocean basins, sediments, properties of seawater, ocean circulation, coasts and coastal processes. Marine biology and ecology, primary and secondary productivity.

Personal expenses will be incurred.

MSCI2051**Coral Reefs: Environment and Ecology***Staff Contact: Dr P Dixon*

Basic oceanographic processes and how these apply in the Great Barrier Reef, the characteristics of the waters of the Great Barrier Reef; the types and development of reefs, corals and reef communities, environmental damage to corals and exploitation of the reef, management by Great Barrier Reef Marine Park Authority. Laboratory classes include a study of the reef flat, its inhabitants, their distributions and interactions, the reef environment and its measurement.

Personal expenses will be incurred.

Marine Science Level III**MSCI3001****Physical Oceanography***Staff Contact: Dr P Dixon*

CP15 S2 HPW4

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Laboratory and fieldwork.

The physical properties and motions of the oceans, and their measurement, oceanographic instrumentation. The design of small and large scale ocean experiments.

Marine Science Level IV**MSCI4003/MSCI4009****Marine Science 4 (Honours)***Staff Contact: Dr P Dixon*

CP120 F

Prerequisite: Completion of program 6831, 6832, 6833 or 6834 including Level III subjects totalling 90 Credit Points.

The General Education requirements are met within the Honours program by seminars, an essay and participation in discussion groups.

Mathematics

1. Many subjects in the School of Mathematics are offered at two levels. The higher level caters for students with superior mathematical ability. Where both levels are offered, the proportion of Distinction and High Distinction grades is lower in the ordinary level. The proportion is lower still in the General Mathematics subjects.

2. Students proceeding to Year 4 (Honours) in a Mathematics program in the Advanced Science Course may be required to take some of their Mathematics subjects at the higher level. However, students should not think that the higher level subjects are intended only for those in Honours programs. Any student with the ability to undertake higher subjects benefits from so doing.

3. Where a subject is mentioned at the ordinary level, the equivalent subject at the higher level (if any) may be substituted.

Mathematics Level I

Students whose course or program requires them to take Mathematics subjects in later years must take the standard first year subjects MATH1131 Mathematics 1A and MATH1231 Mathematics 1B or their higher equivalents MATH1141 Higher Mathematics 1A and MATH1241 Higher Mathematics 1B. The higher versions cover all of the material in MATH1131 and MATH1231, often at greater depth, and are intended for students who have obtained

very high marks in the 3 or 4 unit Mathematics courses of the Higher School Certificate.

Students who do not intend studying Mathematics beyond Year 1 may instead take the subjects MATH1011 General Mathematics 1B and MATH1021 General Mathematics 1C. However, students who select these subjects should weigh seriously the implications of their choice because only a limited number of further Mathematics subjects are normally available. (See also the note above on grades awarded.) The single subject MATH1011 is also available to students seeking an alternate prerequisite for MATH1131 in cases where they do not meet the normal HSC prerequisites. Students should note, however, that only one of MATH1011 and MATH1131 can be counted in their degree.

The subject MATH1081 Discrete Mathematics is an additional Level 1 subject which is compulsory for students in Computer Science and most Mathematics programs. For students in Advanced Science Mathematics programs (except programs 1010 and 6810), it is taken in Stage 1, while for Science students it is taken in one of Stages 1 or 2 depending on the mathematical background of the student.

The subjects MATH1051 Mathematics 1F, MATH1079 Mathematics for Aviation and MATH1090 Discrete Mathematics for Electrical Engineers are restricted to students in the Optometry, Aviation and Electrical Engineering courses respectively.

MATH1011

General Mathematics 1B

Staff Contact: School of Mathematics First Year Office
CP15 S1 or S2 HPW6

Prerequisites: HSC mark range required: 2 unit Mathematics (60-100) or 2 and 3 unit Mathematics (1-150) or 3 and 4 unit Mathematics (1-200) (these ranges may vary from year to year). 2 unit Mathematics in this instance refers to the 2 unit Mathematics subject which is related to the 3 unit Mathematics subject. It does not refer to the subjects Mathematics in Society or Mathematics in Practice.

Note/s: Excluded MATH1032, MATH1042, MATH1131, MATH1141, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

Functions (and their inverses), limits, asymptotes, continuity; differentiation and applications; integration, the definite integral and applications; inverse trigonometric functions; the logarithmic and exponential functions and applications; sequences and series; mathematical induction; the binomial theorem and applications; introduction to probability theory; introduction to 3-dimensional geometry; introduction to linear algebra.

MATH1021

General Mathematics 1C

Staff Contact: School of Mathematics First Year Office
CP15 S2 HPW6

Prerequisite: MATH1011 or MATH1131 or MATH1141

Note/s: Excluded MATH1032, MATH1042, MATH1231,

MATH1241, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

Techniques for integration, improper integrals; Taylor's theorem; first order differential equations and applications; introduction to multivariable calculus; conics; finite sets; probability; vectors, matrices and linear equations.

MATH1032

Mathematics 1

Note/s: No longer offered. Replaced by the two subjects MATH1131 Mathematics 1A and MATH1231 Mathematics 1B.

MATH1042

Higher Mathematics 1

Note/s: No longer offered. Replaced by the two subjects MATH1141 Higher Mathematics 1A and MATH1241 Higher Mathematics 1B.

MATH1131

Mathematics 1A

Staff Contact: School of Mathematics First Year Office
CP15 S1 or S2 HPW6

Prerequisites: HSC mark range required: 2 unit Mathematics (90-100), or 2 and 3 unit Mathematics (100-150) or 3 and 4 unit Mathematics (100-200) or MATH1011 (these ranges may vary from year to year). 2 unit Mathematics in this instance refers to the 2 unit Mathematics subject which is related to the 3 unit Mathematics subject. It does not refer to the subjects Mathematics in Society or Mathematics in Practice.

Note/s: Excluded MATH1011, MATH1032, MATH1042, MATH1141, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

Complex numbers, vectors and vector geometry, linear equations, matrices and matrix algebra, determinants. Functions, limits, continuity and differentiability, integration, polar coordinates, logarithms and exponentials, hyperbolic functions, functions of several variables. Introduction to computing and the Maple symbolic algebra package.

MATH1231

Mathematics 1B

Staff Contact: School of Mathematics First Year Office
CP15 S2 HPW6 or Summer Session HPW9

Prerequisite: MATH1131 or MATH1141

Note/s: Excluded MATH1021, MATH1032, MATH1042, MATH1241, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

Vector spaces, linear transformations, eigenvalues and eigenvectors. Probability. Integration techniques, solution of ordinary differential equations, sequences, series, applications of integration.

MATH1141

Higher Mathematics 1A

Staff Contact: School of Mathematics First Year Office
CP15 S1 HPW6

Prerequisites: HSC mark range required: 2 and 3 unit Mathematics (145-150) or 3 and 4 unit Mathematics

(186-200) (these numbers may vary from year to year).

Note/s: Excluded MATH1011, MATH1032, MATH1042, MATH1131, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

As for MATH1131 but in greater depth.

MATH1241

Higher Mathematics 1B

Staff Contact: School of Mathematics First Year Office
CP15 S2 HPW6

Prerequisite: MATH1131 or MATH1141, each with a mark of at least 65

Note/s: Excluded MATH1021, MATH1032, MATH1042, MATH1231, ECON2200, ECON2201, ECON2202, ECON1202, ECON2290, ECON2291.

As for MATH1231 but in greater depth.

MATH1051

Mathematics 1F

Staff Contact: School of Mathematics First Year Office
CP15 S1 HPW6

Prerequisite: 3 unit HSC Mathematics

Note/s: Excluded MATH1011, MATH1021, MATH1032, MATH1042, MATH1131, MATH1141, MATH1231, MATH1241. Restricted to course 3950.

Complex numbers, vectors and vector geometry, matrices and matrix algebra. Functions, continuity and differentiability, integration, introduction to differential equations, sequences and series.

MATH1061

Introductory Applied Computing

Staff Contact: School of Mathematics First Year Office
CP15 HPW6

Prerequisites: As for MATH1011

Corequisite: MATH1021 or MATH1032 or MATH1131 or MATH1042 or MATH1141

Note/s: Excluded any subject offered by the School of Computer Science and Engineering. Not currently offered.

The major components of a computer, software vs hardware. The role of computers, history, range of available hardware and software, computing issues and standards. The operating systems DOS and UNIX, files and text editors, networks and communications. An overview of spreadsheets, databases, graphics and other software packages. Structured programming in the high level language C, covering a variety of data types, efficiency, language standards, and libraries of functions and subprograms. Mathematical applications from a wide variety of areas.

MATH1079

Mathematics for Aviation

Staff Contact: School of Mathematics First Year Office
CP22.5 S1 HPW6 S2(7 WKS) HPW8

Prerequisite: as for MATH1131

Note/s: Excluded MATH1011, MATH1021, MATH1032, MATH1042, MATH1131, MATH1141, MATH1231, MATH1241. Restricted to course 3980.

Calculus strand: Functions and graphs, limits and differentiation. Properties of continuous and differentiable functions. Polar coordinates and curve sketching. Functions of several variables. Ordinary differential equations. Sequences, series and power series. Algebra strand: Introduction to Maple. Complex numbers. Vectors. Linear equations and matrices. Vector geometry. Vector spaces. Introduction to probability.

MATH1081

Discrete Mathematics

Staff Contact: School of Mathematics First Year Office
CP15 S1 or S2 HPW6

Prerequisites: As for MATH1131

Corequisite: MATH1032 or MATH1131 or MATH1042 or MATH1141

Note/s: Excluded MATH1090.

Role of proof in mathematics, logical reasoning and implication, different types of proofs. Sets, algebra of sets, operations on sets. Mathematical logic, truth tables, syntax, induction. Graphs and directed graphs, basic graph algorithms. Counting, combinatorial identities, binomial and multinomial theorems. Binary operations and their properties, groups and semigroups, ordered structures. Recursion relations. Application to network theory, assignment problems and population growth.

MATH1090

Discrete Mathematics for Electrical Engineers

Staff Contact: School of Mathematics First Year Office
CP7.5 S2 HPW3

Corequisite: MATH1032 or MATH1131 or MATH1042 or MATH1141

Note/s: Excluded MATH1081. Restricted in Science course to Combined degree course 3725.

The role of proof in mathematics, logical reasoning and implication, different types of proofs. Sets, algebra of sets, operations on sets, mathematical logic, truth tables, syntax, induction. Recursion, recursive logic, recurrence relations.

Mathematics Level II

The subjects MATH2009 Engineering Mathematics 2 and MATH2019 Engineering Mathematics 2CE are servicing subjects for some Engineering and Applied Science courses and are not available for students in the Science course. The subject MATH2079 is only available in the Aviation Course. The subject MATH2021 is available for students in the Science course who wish to take only one Level II Mathematics subject. It may be followed only by the Level III subject MATH3021 Mathematics 3.

MATH2011

Several Variable Calculus

Staff Contact: School Office
CP15 S1 HPW4

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2100, MATH2110, MATH2510, MATH2610.

Functions of several variables, limits and continuity, differentiability, gradients, surfaces, maxima and minima, Taylor series, Lagrange multipliers, chain rules, inverse function theorem, Jacobian derivatives, double and triple integrals, iterated integrals, Riemann sums, cylindrical and spherical coordinates, change of variables, centre of mass, curves in space, line integrals, parametrised surfaces, surface integrals, del, divergence and curl, Stokes' theorem, Green's theorem in the plane, applications to fluid dynamics and electrodynamics, orthogonal curvilinear coordinates, arc length and volume elements, gradient, divergence and curl in curvilinear coordinates.

MATH2009**Engineering Mathematics 2**

Staff Contact: School Office

CP20 F HPW4

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Restricted in Science course to combined degree course 3681.

Differential equations, use of Laplace transforms, solutions by series; partial differential equations and their solution for selected physical problems, use of Fourier series; introduction to numerical methods; matrices and their application to theory of linear equations, eigenvalues and their numerical evaluation; vector algebra and solid geometry; multiple integrals; introduction to vector field theory.

MATH2019**Engineering Mathematics 2CE**

Staff Contact: School Office

CP15 F HPW3

Prerequisites: MATH1032 or MATH1231 or MATH1042 or MATH1241

Notes: Excluded MATH2009. Restricted in Science Course to combined degree course 3730.

Partial differentiation and applications, vector algebra, double integrals, ordinary differential equations, introduction to vector field theory, extrema of functions of 2 variables, matrices and their applications, Laplace transforms, Fourier series, partial differential equations and their solution for selected physical problems.

MATH2021**Mathematics 2**

Staff Contact: School Office

CP15 F HPW2

Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Mathematics MATH2021 is included for students desiring to attempt only one Level II Mathematics subject. If other Level II subjects in Pure Mathematics or Applied Mathematics are taken, MATH2021 Mathematics is not counted. Taught by the Keller Plan self-paced learning method.

Differential equations, use of Laplace transforms, solutions by series; partial differential equations and their solution for selected physical problems, use of Fourier series;

multiple integrals, matrices and their application to theory of linear equations, eigenvalues; introduction to numerical methods.

MATH2079**Mathematical Methods for Aviation**

Staff Contact: School Office

CP15 S1 HPW4

Prerequisite: MATH1079

Note/s: Restricted to course 3980.

3-dimensional geometry. Introduction to multiple integrals. Fourier series and partial differential equations. Matrices and linear transformations. Eigenvalues and eigenvectors. Vector field theory.

Applied Mathematics Level II**MATH2100****Vector Calculus**

Staff Contact: School Office

CP7.5 S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2011, MATH2110.

Properties of vectors and vector fields; divergence, gradient, curl of a vector; line, surface, and volume integrals. Gauss and Stokes' theorems. Curvilinear coordinates.

MATH2110**Higher Vector Analysis**

Staff Contact: School Office

CP7.5 S1 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70

Note/s: Excluded MATH2011, MATH2100.

As for MATH2100 but in greater depth.

MATH2120**Mathematical Methods for Differential Equations**

Staff Contact: School Office

CP7.5 S1 or S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2130.

Introduction to qualitative and quantitative methods for ordinary and partial differential equations. The following topics are treated by example. Ordinary differential equations: linear with constant coefficients, first-order systems, singularities, boundary-value problems, eigenfunctions, Fourier series. Bessel's equation and Legendre's equation. Partial differential equations: characteristics, classification, wave equation, heat equation, Laplace's equation, separation of variables methods, applications of Bessel functions and Legendre polynomials.

MATH2130**Higher Mathematical Methods for Differential Equations***Staff Contact: School Office*

CP7.5 S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70**Note/s:** Excluded MATH2120.

As for MATH2120 but in greater depth.

MATH2160**Linear Programming***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241 or MATH1079*Corequisite:* MATH2501 or MATH2601.

A first course in mathematical modelling and solution techniques for linear problems. The revised simplex and dual simplex methods, theory and application of sensitivity analysis, duality theory. Networks, transportation and assignment problems. Examples, applications and computing methods are prominent features.

MATH2180**Operations Research***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2160

Modelling and solution techniques for optimization problems of interest to business and industry. Topics are selected from linear programming, integer programming, (discrete) dynamic programming, project scheduling, game theory, queueing theory, inventory theory and simulation. Software packages are used to solve realistic problems.

MATH2200**Discrete Dynamical Systems***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241*Corequisite:* MATH2501 or MATH2601

The study of dynamical systems whose states change at discrete points in time. Difference equations, general properties. Linear systems, stability, oscillations, Z-transforms. Nonlinear systems, critical points, periodic cycles, chaotic behaviour. Applications selected from engineering, biological, social and economic contexts.

MATH2220**Continuous Dynamical Systems***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

The study of continuous dynamical systems. One-dimensional systems, kinematic waves, applications include traffic flow and waves in fluids. An introduction to

the modelling of physical, biological and ecological systems, stability, oscillations and resonance.

MATH2240**Introduction to Oceanography and Meteorology***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

An introduction to mathematical models for the circulation of the atmosphere and oceans. The equations of motion are exploited so as to provide simplified models for phenomena including: waves, the effects of the Earth's rotation, the geostrophic wind, upwelling, storm surges. Feedback mechanisms are also modelled: the land/sea breeze, tornadoes, tropical cyclones. Models for large-scale phenomena including El Nino and the East Australian Current will be discussed as well as the role of the atmosphere-ocean system in climate change.

MATH2301**Mathematical Computing A***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

An introduction to mathematical computing, programming and visualization using Matlab, with a focus on mathematical modelling and simulation. Introduction to Matlab, floating point arithmetic, difference equations, nonlinear equations, numerical differentiation and integration, initial value problems.

Pure Mathematics Level II**MATH2400****Finite Mathematics***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** MATH1081 Discrete Mathematics is recommended.

Positional number systems, floating-point arithmetic, rational arithmetic, congruences. Euclid's algorithm, continued fractions, Chinese remainder theorem, Fermat's theorem, applications to computer arithmetic. Polynomial arithmetic, division algorithm, factorization, interpolation, finite field. Codes, error correcting codes, public-key cryptography.

MATH2410**Automata and Algorithms***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** MATH1081 Discrete Mathematics is recommended.

Finite automata, regular languages and Kleene's theorem. Analysis of fast algorithms for matrix, integer and polynomial manipulation, sorting etc. Discrete and Fast Fourier Transform and applications.

MATH2501

Linear Algebra

Staff Contact: School Office

CP15 S1 or S2 HPW5 or F HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2601.

Vector spaces, linear transformations, change of basis. Inner products, orthogonalization, reflections and QR factorizations. Eigenvalues and eigenvectors, diagonalization. Jordan forms and functions of matrices. Applications to linear systems of differential equations, quadratics, rotations.

MATH2510

Real Analysis

Staff Contact: School Office

CP7.5 S1 or S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2011, MATH2610.

Multiple integrals, partial differentiation. Analysis of real valued functions of one and several variables.

MATH2520

Complex Analysis

Staff Contact: School Office

CP7.5 S1 or S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2620.

Analytic functions, Taylor and Laurent series, integrals. Cauchy's theorem, residues, evaluation of certain real integrals.

MATH2601

Higher Linear Algebra

Staff Contact: School Office

CP15 S1 HPW5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70

Note/s: Excluded MATH2501.

As for MATH2501, but in greater depth, and with additional material on unitary, self-adjoint and normal transformations.

MATH2610

Higher Real Analysis

Staff Contact: School Office

CP7.5 S1 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70

Note/s: Excluded MATH2011, MATH2510.

As for MATH2510 but in greater depth.

MATH2620

Higher Complex Analysis

Staff Contact: School Office

CP7.5 S2 HPW2.5

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70

Note/s: Excluded MATH2520.

As for MATH2520 but in greater depth.

Statistics Level II

The subjects MATH2819, MATH2829, MATH2839, MATH2849, MATH2869 and MATH2889 are not available to Science students unless specified as part of a program. The subject MATH2841 Statistics SS is available for students who wish to take only one Level II Statistics subject. It can only be followed by the Level III Statistics subjects MATH3050 and MATH3060. The subject MATH2870 Applied Statistics SS is available for students who wish to take only 7.5 CP of Level II Statistics. It cannot be followed by any Level III Statistics subjects.

Note: There was a major revision of Level II Statistics subjects in 1996 followed by a major revision of Level III Statistics subjects in 1997. Any student who has taken Level II Statistics subjects before 1996 and wishes to take further Level II or III Statistics subjects should consult the Head of Department.

MATH2801

Theory of Statistics

Staff Contact: School Office

CP15 S1 HPW4

Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2819, MATH2821, MATH2921, MATH2841, MATH2870, MATH2901, BIOS2041.

Probability, random variables, standard distributions, bivariate distributions, transformations, central limit theorem, sampling distributions, point estimation, interval estimation, hypothesis testing.

MATH2810

Computing for Statistics

Staff Contact: School Office

CP7.5 S1 HPW2

Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241

Corequisite: MATH2801

Note/s: Excluded MATH2910.

Exploratory and graphical data analysis using various statistical packages; e.g. Minitab, Xlisp-stat, Splus. Visualisation of data. Dynamic graphics. Macro programming in statistical packages. Introduction to simulation of stochastic processes.

MATH2819**Statistics SA***Staff Contact: School Office*

CP10 F HPW2

Prerequisite: MATH1021 or MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Restricted in Science course to combined degree course 3950.

Probability, random variables, independence. Binomial, Poisson and normal distributions, transformations to normality, estimation of mean and variance, confidence intervals, tests of hypotheses, contingency tables, two sample tests of location, simple and multiple linear regression, analysis of variance for simple models.

MATH2829**Statistics SU***Staff Contact: School Office*

CP7.5 S1 HPW3

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Not available to Science students.

Introduction to probability theory, random variables and distribution functions, sampling distributions, including those of chi-square, t and F. Estimation procedures, including confidence interval estimation with an emphasis on least squares and surveying problems, and computer based exercises.

MATH2831**Linear Models***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisites: MATH2801, MATH2810 (except course 3996)**Note/s:** Excluded MATH2931, MATH3811, MATH3911, BIOS2041, MATH3870 (before 1997), MATH3050.

Multiple linear regression models and examples. Graphical methods for regression analysis. Multi-variate normal distribution. Quadratic forms (distributions and independence), Gauss-Markov theorem. Hypothesis testing. Model selection. Analysis of residuals. Influence diagnostics. Analysis of variance.

MATH2839**Statistics SM***Staff Contact: School Office*

CP7.5 S1 HPW3

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Excluded MATH2841, MATH2870, MATH2801, MATH2821, MATH2901, MATH2921. Restricted in Science course to combined degree courses 3611, 3664, 3681, 3685 and 3701.

Introduction to probability theory, with finite, discrete and continuous sample spaces. Random variables: the standard elementary distributions including the binomial, Poisson and normal distributions. Sampling distributions: with emphasis on those derived from the normal distribution:

chi-square, t and F. Estimation of parameters: the methods of moments and maximum likelihood and confidence interval estimation. The standard tests of statistical hypotheses, and, where appropriate, the powers of such tests. An introduction to linear regression.

MATH2840**Sample Survey Theory***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2801**Note/s:** Excluded MATH2940, MATH3820 (before 1997), MATH3920 (before 1997).

Finite population sampling theory. Simple random, systematic, stratified, cluster, and multi-stage sampling, sampling proportional to size. Estimation of means, totals, proportions and ratios. Estimation using auxiliary information. Post-stratification. Nonsampling errors including noncoverage and nonresponse.

MATH2841**Statistics SS***Staff Contact: School Office*

CP15 F HPW2

Prerequisite: MATH1021 or MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Excluded MATH2801, MATH2821, MATH2870, MATH2901, MATH2921, MATH2819, BIOS2041.

Statistics MATH2841 is included for students desiring to attempt only one Level II Statistics subject. If other Level II Statistics subjects are taken, MATH2841 is not counted.

An introduction to the theory of probability, with finite, discrete and continuous sample spaces. The standard univariate distributions: binomial, Poisson and normal, an introduction to multivariate distributions. Standard sampling distributions, including those of chi-square, t and F. Estimation by moments and maximum likelihood (including sampling variance formulae, and regression); confidence interval estimation. The standard tests of significance based on the above distributions, with a discussion of power where appropriate. An introduction to experimental design: fixed, random effect models.

MATH2849**Statistics EE***Staff Contact: School Office*

CP9 S2 HPW3

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241**Note/s:** Excluded MATH2841, MATH2870, MATH2801, MATH2901. Restricted in Science course to combined degree courses 3725 and 3726.

Probability and random variables with applications to multiple input-output systems. Markovian experiments. Random variables and their probability distributions. Multidimensional normal distributions. Linear filters driven by Gaussian noise. Linear regression and least squares methods. Inference for linear models. Applications from electrical engineering and computer science.

MATH2869**Applied Statistics SC**

Staff Contact: School Office
CP5 S1 HPW2

Prerequisite: MATH1021 or MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Restricted in Science course to combined degree course 3730.

Graphical data analysis, review of probability, random variables and their properties. The normal and binomial distributions, the central limit theorem, applications to quality control. Functions of random variables and their simulation using computers. One and two sample inference methods. Experimental designs for comparing two groups. Simple and multiple linear regression. Relevant applications from fields of engineering will be investigated in computer workshops.

MATH2870**Applied Statistics SS**

Staff Contact: School Office
CP7.5 S1 HPW2

Prerequisite: MATH1079 or MATH1021 or MATH1231 or MATH1241

Note/s: Excluded MATH2841, MATH2801, MATH2901, BIOS2041. Statistics MATH2870 is included for students desiring to attempt only 7.5CP of Level II Statistics. If other Level II Statistics subjects are taken, MATH2870 is not counted.

Analysis of data, review of probability and random variables. The normal and binomial distributions, the central limit theorem, applications to quality control. Functions of random variables and their simulation using computers. One and two sample inference methods. Experimental designs for comparing two groups. Simple and multiple linear regression. Relevant applications will be investigated in assignments and computing exercises.

MATH2889**Applied Statistics SF**

Staff Contact: School Office
CP5 S1 HPW2

Prerequisite: MATH1021 or MATH1231 or MATH1241

Note/s: Restricted to courses 3060 and 3070.

Population, sampling, normal distribution. Scientific measurement, errors, error propagation. t-test, F-test. One- and two-way analysis of variance. Replication, interaction. Linear regression, model fitting. Relevant applications will be investigated in assignments and computing exercises.

MATH2901**Higher Theory of Statistics**

Staff Contact: School Office
CP15 S1 HPW4

Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241

Note/s: Excluded MATH2819, MATH2821, MATH2921, MATH2841, MATH2870, MATH2801, BIOS2041.

As for MATH2801 but in greater depth.

MATH2910**Higher Computing for Statistics**

Staff Contact: School Office
CP7.5 S1 HPW2

Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241

Corequisite: MATH2901

Note/s: Excluded MATH2810.

As for MATH2810 but in greater depth.

MATH2931**Higher Linear Models**

Staff Contact: School Office
CP15 S2 HPW4

Prerequisites: MATH2901, MATH2910 (except course 3996)

Note/s: Excluded MATH2831, MATH3811, MATH3911, BIOS2041, MATH3870 (before 1997), MATH3050.

As for MATH2831 but in greater depth

MATH2940**Higher Sample Survey Theory**

Staff Contact: School Office
CP7.5 S2 HPW2

Prerequisite: MATH2901

Note/s: Excluded MATH2840, MATH3820 (before 1997), MATH3920 (before 1997).

As for MATH2840 but in greater depth.

Mathematics Level III

Students in Mathematics programs must include MATH3010 in their program. Normally this is done in stage 3, but may be done in stage 2 with permission of the Head of School or if specified by a program.

Students in Advanced Science proceeding to Year 4 (Honours) in one of the Mathematics programs should consult with the relevant Department before making a final choice of Level III subjects.

The subject MATH3021 Mathematics 3 is the only Level III Mathematics subject available for Science students who have previously taken MATH2021.

MATH3000**Mathematics/Statistics Project**

Staff Contact: School Office
CP7.5 S1 or S2 HPW2 or F HPW1

Prerequisite: At least 30 Credit Points of Level II Mathematics.

Note/s: Enrolment is subject to approval by the Head of School.

Under supervision of an academic staff member of the School of Mathematics a student will undertake a course in reading and/or research on a topic in mathematics or statistics or on applications of mathematics or statistics to other disciplines such as physical, biological or social sciences, economics, finance, computing, etc. The student is expected to write an essay summarizing the results of their project.

MATH3001**Mathematics/Statistics Project***Staff Contact: School Office*

CP15 S1 or S2 HPW4 or F HPW2

Prerequisite: At least 30 Credit Points of Level II

Mathematics.

Note/s: Enrolment is subject to approval by the Head of School.

Under supervision of an academic staff member of the School of Mathematics a student will undertake a course in reading and/or research on a topic in mathematics or statistics or on applications of mathematics or statistics to other disciplines such as physical, biological or social sciences, economics, finance, computing, etc. The student is expected to write an essay summarizing the results of their project.

MATH3002**Mathematics/Statistics Project***Staff Contact: School Office*

CP30 S1 or S2 HPW8 or F HPW4

Prerequisite: At least 30 Credit Points of Level II

Mathematics.

Note/s: Enrolment is subject to approval by the Head of School.

Under supervision of an academic staff member of the School of Mathematics a student will undertake a course in reading and/or research on a topic in mathematics or statistics or on applications of mathematics or statistics to other disciplines such as physical, biological or social sciences, economics, finance, computing, etc. The student is expected to write an essay of approximately 12,000 words summarizing the results of their project.

MATH3010**Professional Issues and Ethics in Mathematics***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: Completion of stage 2 of a Mathematics program or during stage 2 with permission of the Head of School**Note/s:** Compulsory for students in Mathematics programs.

Professional and ethical issues and social responsibility in mathematics. The place of mathematics in the wider sphere of knowledge. Principles and case studies in the ethics and responsible use of mathematics. Communicating mathematics effectively.

MATH3021**Mathematics 3***Staff Contact: School Office*

CP15 F HPW2

Prerequisite: MATH2021 or approved equivalent**Note/s:** Excluded any other Level III subject in Pure Mathematics or Applied Mathematics except for MATH3261. Taught by the Keller Plan self-paced learning method.

Vector calculus; special functions; convolution theorem and applications; complex variable theory; Fourier integrals; Laplace transforms with application to ordinary and partial differential equations.

MATH3030**Mathematics 3, Part 1***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2021**Note/s:** Excluded: MATH3021. This subject is the first half of MATH3021. No mark will be returned for this subject until MATH3040 is also completed. All students will receive a grade of EC (enrolment continuing) for this subject, which will eventually be replaced by a mark when MATH3040 is completed.**MATH3040****Mathematics 3, Part 2***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH3030**Note/s:** Excluded: MATH3021. This subject is the second half of MATH3021. The student must have been enrolled in MATH3030 previously and have a grade of EC in that subject. On completion of MATH3040 a grade will be returned for both MATH3030 and MATH3040.**Applied Mathematics Level III**

Before attempting any Level III Applied Mathematics subject a student must have completed at least 30 Credit Points of Level II Mathematics including the prerequisites specified below.

Skill in practical numerical computing is highly recommended for students majoring in Applied Mathematics, and hence students are encouraged to take MATH2301, or an equivalent subject, if they have not already done so.

The subject MATH3141 is not available to Science students.

Usually only one of the advanced subjects MATH3110, MATH3130, MATH3170 and MATH3250 are offered in one year.

MATH3101**Numerical Analysis***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisite: MATH2301**Note/s:** Excluded MATH3141. This subject includes a substantial computing component.

Analysis of some common numerical methods: Approximation of functions using polynomials and splines, solution of initial value problems for ordinary differential equations, solution of linear algebraic systems via LU and other factorizations, boundary value problems.

MATH3110**Advanced Numerical Analysis***Staff Contact: School Office*

CP7.5 HPW2

Prerequisite: A weighted average mark of at least 70 in 30 Credit Points of Level II Mathematics**Note/s:** It is highly recommended that MATH3101 be taken concurrently. Not offered in 1998.

Development and analysis of numerical methods for the computational solutions of mathematical problems. One or more topics selected from: computational methods for partial differential equations including finite element methods, finite difference methods, spectral methods, multi-grid methods; computational methods for matrix problems including iterative methods and preconditioners, least squares problems and singular value decomposition; orthogonality for matrix and polynomial problems, algorithms for parallel computers.

MATH3121**Mathematical Methods***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2120, MATH2520**Note/s:** Excluded MATH3141, MATH3150.

Fundamental methods for solution of problems in applied mathematics, physics and engineering. Functions of a complex variable, contour integration, asymptotic methods. Fourier and Laplace transforms, complex inversion theorems. Orthogonal polynomials and functions, Sturm-Liouville theory, eigenfunction expansions, generalised Fourier series. Applications to the solution of boundary value problems for ordinary and partial differential equations is given for all methods.

MATH3130**Advanced Mathematical Methods***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisites: A weighted average mark of at least 70 in MATH2120, MATH2520 and in a further 15 Credit Points of Level II Mathematics**Note/s:** It is highly recommended that MATH3121 be taken concurrently. Not offered in 1998

Fundamental methods for solution of problems in applied mathematics, physics and engineering. One or more topics selected from: asymptotic and perturbation techniques, singularity analysis, nonlinear waves, solitons, bifurcation theory, chaotic dynamics.

MATH3141**Mathematical Methods EE***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisites: MATH2501 and one of MATH2100 or MATH2510 or MATH2011**Note/s:** Excluded MATH2120, MATH2130, MATH3101. Restricted in Science course to combined degree courses 3725 and 3726.

Numerical methods: numerical errors, interpolation and approximation, numerical integration, ordinary differential equations, nonlinear equations, linear systems, matrix factorizations, orthogonalization, iterative methods for linear systems and eigenvalue problems, optimization. Differential equations: linear differential equations, series solution of differential equations, Bessel functions, orthogonal polynomials, eigenvalue problems, generalized Fourier series, partial differential equations and boundary value problems.

MATH3150**Transform Methods***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2520

The mathematics of signals and linear systems. General Fourier series. Fourier, Laplace and related transforms. Delta and other distributions and their transforms. Discrete Fourier and Z-transforms. Applications to spectral analysis, autocorrelation, uncertainty and sampling, linear analog and digital filters, partial differential equations.

MATH3161**Optimization Methods***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2501, and one of MATH2011 or MATH2100 or MATH2510

Development, analysis and application of methods for optimization problems. Theory of multivariable optimization; including necessary and sufficient optimality conditions, stationary points, Lagrange multipliers, Kuhn-Tucker conditions, convexity and duality. Numerical methods for one dimensional minimization, unconstrained multivariable minimization (including steepest descent, Newton, quasi-Newton and conjugate gradient methods) and constrained multi-variable minimization (including linear programming and quadratic programming).

MATH3170**Advanced Optimization***Staff Contact: School Office*

CP7.5 HPW2

Prerequisites: A weighted average mark of at least 70 in MATH2501 and in a further 15 Credit Points of Level II Mathematics including MATH2011 or MATH2100 or MATH2510**Note/s:** It is highly recommended that MATH3161 be taken concurrently.

Development, analysis and application of methods for optimization problems. One or more topics from: combinatorial optimization, network flows, complexity, convex programming, non-smooth optimization, duality, complementarity problems, minimax theory, game theory, stochastic optimization, new approaches to linear programming.

MATH3181**Optimal Control***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisite: MATH2011 or MATH2100 or MATH2510

An introduction to the optimal control of dynamical systems. Mathematical descriptions of dynamical systems. Stability, controllability, and observability. Optimal control. Calculus of variations. Dynamic programming. Examples and applications are selected from biological, economical and physical systems.

MATH3201**Dynamical Systems and Chaos***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisite: MATH2120 or MATH3540 or MATH3541

Regular and irregular behaviour of nonlinear dynamical systems. A selection from topics developing the theory of nonlinear differential and difference equations, with applications to physical, biological and ecological systems. Topics from: stability and bifurcation theory, Floquet theory, perturbation methods, Hamiltonian dynamics, resonant oscillations, chaotic systems, Lyapunov exponents, Poincaré maps, homoclinic tangles.

MATH3241**Fluid Dynamics***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2011 or MATH2100, MATH2120

The mathematical modelling and theory of problems arising in the flow of fluids. Cartesian tensors, kinematics, mass conservation, vorticity, Navier-Stokes equation. Topics from inviscid and viscous fluid flow, gas dynamics, sound waves, water waves.

MATH3250**Advanced Fluid Dynamics***Staff Contact: School Office*

CP7.5 HPW2

Prerequisites: A weighted average mark of at least 70 in MATH2011 or MATH2100, MATH2120 and total of 30 Credit Points of Level II Mathematics

Note/s: It is highly recommended that MATH3241 be taken concurrently. Not offered in 1998.

The mathematical modelling and theory of problems arising in the flow of fluids. One or more topics from atmosphere-ocean dynamics, climate modelling, hydrodynamic stability, turbulence, environmental fluid dynamics, computational methods.

MATH3261**Atmosphere-Ocean Dynamics***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisites: MATH2011 or MATH2100, MATH2120**Note/s:** Excluded MATH3270

The dynamics underlying the circulation of the atmosphere and oceans are detailed using key concepts such as

geostrophy, the deformation radius and the conservation of potential vorticity. The role of Rossby waves, shelf waves, turbulent boundary layers and stratification is discussed. The atmosphere-ocean system as a global heat engine for climate variability is examined using models for buoyant forcing, quasi-geostrophy and baroclinic instability.

MATH3270**Dynamical Meteorology***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH2011 or MATH2100, MATH2120; or MATH2079**Note/s:** Excluded MATH3261

The equations of dynamical meteorology, continuity, thermodynamics and their consequences, scale analysis, vorticity, turbulence, boundary layer processes, atmospheric wave motions, instability, major synoptic motions, numerical prediction, energy cycles.

MATH3301**Mathematical Computing B***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisites: MATH2120, MATH2301

The design and use of computer programs to solve practical mathematical problems. Introduction to Fortran90, partial differential equations, heat equation, iterative methods for linear systems, sparse matrix techniques, mathematical software libraries, code optimization and high performance computing.

Pure Mathematics Level III

Before attempting any Level III Pure Mathematics subject students must have completed at least 30 Credit Points of Level II Mathematics including the prerequisites specified below. For higher subjects the average performance in the above 30 Credit Points should be at distinction level. Subject to the approval of the Head of Department, this may be relaxed.

Students wishing to enrol in Level III Higher Pure Mathematics subjects should consult with the Pure Mathematics Department before enrolling. The subjects MATH3680, MATH3740 and MATH3780 normally are offered only in even numbered years and the subjects MATH3670, MATH3730 and MATH3770 only in odd numbered years.

Note: For each of the following pairs of subjects, although the subjects are no longer offered, students who have completed one of the subjects in the pair may be permitted to enrol in the other subject of the pair with the permission of the Head of Department: MATH3500 and MATH3510, MATH3530 and MATH3580, MATH3540 and MATH3550, MATH3640 and MATH3650. These pairs of subjects have been replaced by MATH3511, MATH3531, MATH3541, MATH3641 respectively.

MATH3400**Logic and Computability***Staff Contact: School Office*

CP7.5 S1 HPW2

The propositional calculus, its completeness and consistency; Turing machines; unsolvable problems; computability and Church's thesis; Godel's incompleteness theorems.

MATH3411**Information, Codes and Ciphers***Staff Contact: School Office*

CP15 S2 HPW4

Note/s: Excluded MATH3420.

Discrete communication channels: information theory, compression and error control coding, cryptography.

MATH3430**Symbolic Computing***Staff Contact: School Office*

CP7.5 S2 HPW2

Note/s: MATH2400 Finite Mathematics is recommended.

Principles of, uses of and algorithms underlying symbolic computing systems. Applications in pure and applied mathematics using a variety of symbolic computing systems.

MATH3500**Group Theory****Note/s:** No longer offered, see note above.**MATH3510****Geometry****Note/s:** No longer offered, see note above.**MATH3511****Transformations, Groups and Geometry***Staff Contact: School Office*

CP15 S2 HPW4

Note/s: Excluded MATH3710, MATH3780, MATH3500, MATH3510.

Euclidean geometry, geometry of triangles, transformations, groups, symmetries, projective geometry.

MATH3521**Algebraic Techniques in Number Theory***Staff Contact: School Office*

CP15 S1 HPW4

Note/s: Excluded MATH3710, MATH3740, MATH3520.

The integers, residue class arithmetic, theorems of Lagrange, Fermat and Euler, groups of units, Chinese remainder theorem, primitive roots, Gaussian integers, division algorithm and principal ideals in $\mathbb{Z}[i]$, quadratic residues, algebraic number fields, extensions, Eisenstein's test, ruler and compass constructions.

MATH3530**Combinatorial Topology****Note/s:** No longer offered, see note above.**MATH3531****Topology and Differential Geometry***Staff Contact: School Office*

CP15 S2 HPW4

Prerequisite: MATH2011 or MATH2510**Note/s:** Excluded MATH3760, MATH3530, MATH3580.

Elementary combinatorial topology of surfaces, classification of surfaces, Euler characteristic, curves and surfaces in space, Gaussian curvature, Gauss theorem, Gauss-Bonnet theorem.

MATH3540**Ordinary Differential Equations****Note/s:** No longer offered, see note above.**MATH3541****Differential Equations***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2501, MATH2520**Note/s:** Excluded MATH3540, MATH3550, MATH3640, MATH3650, MATH3641.

Initial value problems, linear systems, variation of parameters, applications to physical and biological systems, autonomous nonlinear systems, Lyapunov's method, linear approximations, plane autonomous systems, cycles and bifurcations, the Poincare-Bendixson theorem, introduction to first order PDE's, classification and normal forms for second order equations, the Cauchy-Kowalewski Theorem, Dirichlet and Neumann problems associated with the Laplace operator in two variables.

MATH3550**Partial Differential Equations****Note/s:** No longer offered, see note above.**MATH3560****History of Mathematics***Staff Contact: School Office*

CP7.5 S2 HPW2

Topics from the history of mathematics, with emphasis on the development of those ideas and techniques used in undergraduate courses. Students are expected to read widely and to present written material based on their readings.

MATH3570**Foundations of Calculus***Staff Contact: School Office*

CP7.5 S1 HPW2

Note/s: Excluded MATH3610.

Properties of the real numbers, convergence of sequences and series, properties of continuous and differentiable functions of a real variable.

MATH3580**Differential Geometry****Note/s:** No longer offered, see note above.

MATH3610**Higher Real Analysis***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2610 or MATH2011(CR) or MATH2510(CR)**Note/s:** Excluded MATH3570.

The limit processes of analysis, metric spaces, uniform convergence, Arzelà-Ascoli theorem, Stone-Weierstrass theorem, Riemann integral.

MATH3620**Higher Functional Analysis***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH3610, MATH2601 or MATH2501(CR)

Hilbert spaces, theory of compact operators, Banach spaces, closed graph theorem, Hahn-Banach theorem, Fourier series, Plancherel theorem.

MATH3630**Higher Integration and Mathematical Probability***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3610

Rings and algebras of sets, Lebesgue integration, dominated convergence theorem, L_p -spaces, Borel-Cantelli theorem, Riesz representation theorem, Fubini's theorem, stochastic processes, random variables, martingales.

MATH3640**Higher Ordinary Differential Equations****Note/s:** No longer offered, see note above.**MATH3641****Higher Differential Equations***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2501(CR) or MATH2601, MATH2520(CR) or MATH2620**Note/s:** Excluded MATH3540, MATH3550, MATH3541, MATH3640, MATH3650.

As for MATH3541 but in greater depth.

MATH3650**Higher Partial Differential Equations****Note/s:** No longer offered, see note above.**MATH3670****Higher Set Theory and Topology***Staff Contact: School Office*

CP7.5 S1 HPW2

Corequisite: MATH3610**Note/s:** This subject is offered in odd numbered years only.

Set theory, axiom of choice, ordinals and cardinals, topological spaces, compactness, quotient topologies.

MATH3680**Higher Complex Analysis***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2620 or MATH2520 (CR)**Note/s:** MATH3610 is recommended. This subject is offered in even numbered years only.

Topics in advanced complex function theory from: conformal mappings, analytic continuation, entire and meromorphic functions, elliptic functions, asymptotic methods, integral formulae, harmonic functions, Riemann surfaces.

MATH3710**Higher Algebra I***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2601 or MATH2501(CR)**Note/s:** Excluded MATH3500, MATH3511, MATH3521.

Groups, sub-groups, factor groups, matrix groups, Sylow theorems, isomorphism theorems, rings, ideals, factor rings, fields, algebraic and transcendental extensions, constructability, finite fields.

MATH3720**Higher Algebra II***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3710

Galois theory, additional group theory, representations and characters of finite groups.

MATH3730**Higher Advanced Algebra***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3710**Note/s:** This subject offered in odd numbered years only.

Topics from: rings, commutative rings, factorisation theory, modules, associative and Lie algebras, Wedderburn theory, category theory.

MATH3740**Higher Number Theory***Staff Contact: School Office*

CP7.5 S2 HPW2

Note/s: Excluded MATH3520, MATH3521. This subject offered in even numbered years only.

Topics from: elementary number theory, prime numbers, number theoretic functions, Dirichlet series, prime number theorem, continued fractions, Diophantine approximation, quadratic reciprocity, algebraic number theory, class number theorem.

MATH3760**Higher Topology and Differential Geometry of Surfaces***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisites: MATH2601 or MATH2501(CR), MATH2610 or MATH2011(CR) or MATH2510(CR)**Note/s:** Excluded MATH3530, MATH3531, MATH3580.

Classification of surfaces: homotopy, homology, Euler characteristic. Embedded surfaces: differential geometry, Gauss-Bonnet and de Rham theorems.

MATH3770**Higher Calculus on Manifolds***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3760**Note/s:** This subject offered in odd numbered years only.

Manifolds, vector fields, flows, introduction to Morse theory, differential forms, Stokes theorem, de Rham cohomology.

MATH3780**Higher Geometry***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH2601 or MATH2501(CR), MATH3710 or MATH3500(CR)**Note/s:** Excluded MATH3510, MATH3511. This subject offered in even numbered years only.

Axiomatic geometry, affine geometry, Desargues theorem, projective geometry, spherical and hyperbolic geometry.

Statistics Level III

The two subjects listed before 1997 as MATH3870 Regression Analysis and Experimental Design and MATH3880 Applied Stochastic Processes have been renumbered from 1997 as MATH3050 Regression Analysis and Experimental Design and MATH3060 Applied Stochastic Processes. They are available for students who have previously taken MATH2821 or MATH2841 and who wish to take at most 15 Credit Points of Statistics at Level III.

Note: There was a major revision of Level III Statistics subjects in 1997. Any student who has taken Level II Statistics subjects before 1996 or Level III Statistics subjects before 1997 and wishes to take Level III Statistics subjects from 1997 should consult the Head of Department.

MATH3050**Regression Analysis and Experimental Design***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2801 (from 1996) or MATH2821 or MATH2841 or approved equivalent**Note/s:** Excluded MATH2831, MATH2931, MATH3811, MATH3830, MATH3911, MATH3930, MATH3870 (before 1997).

A revision of linear regression with extension to multiple and stepwise linear regression. Analysis of block designs, Latin

squares, factorial designs, variance component and mixed model analyses. Bioassay, logit models. Contingency tables.

MATH3060**Applied Stochastic Processes***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2841 or MATH2801 or approved equivalent**Note/s:** Excluded MATH3801, MATH3901.

An introduction to processes in discrete and continuous time Markov chains and Markov processes, branching processes, time series with moving average models.

MATH3801**Stochastic Processes***Staff Contact: School Office*

CP15 S1 HPW4

Prerequisites: MATH2501, MATH2011 or MATH2510, MATH2801**Note/s:** Excluded MATH3060, MATH3880 (before 1997), MATH3901.

Probability spaces, generating functions, convolutions. Poisson process, renewal processes. Branching processes. Recurrent events, Markov chains. Birth-and-death processes, queueing models. Inference for stochastic processes.

MATH3800**Statistical Computation I***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisites: MATH2831, MATH2810**Notes:** Excluded MATH3861

Use of major statistical packages e.g. SAS, Minitab, Splus, GENSTAT, Xlisp-stat. Data organisation for package use. Extending packages using subroutine libraries. Applications to multiple regression analysis. Simulation of random variables.

MATH3810**Statistical Computation 2***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH3800**Notes:** Excluded MATH3861

Principles of simulation in statistical inference. Computationally intensive statistical methods such as resampling or the bootstrap. Nonparametric curve and density estimation methods. Optimization methods in statistics. Splus and other specialist software will be used.

MATH3820**Time Series and Spatial Analysis***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3801**Note/s:** Excluded MATH3920 (from 1997).

Stationary and nonstationary time series models, autocorrelation, linear time series modelling, forecasting. Models for spatial correlation and variability. Use of Minitab, SAS and Splus statistical packages.

MATH3830**Design and Analysis of Experiments***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH2831 or MATH3811**Note/s:** Excluded MATH3050, MATH3870 (before 1997), MATH3930.

Principles of good experimental design. Completely randomized experiments, randomized complete block designs. Latin square designs. Contrasts and multiple comparisons. Analysis of factorial experiments. Random effects models.

MATH3840**Statistical Inference***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2831 or MATH2821**Note/s:** Excluded MATH3940.

Uniformly minimum variance unbiased estimation. Cramer-Rao inequality, Lehman-Scheffe theorem. Monotone likelihood ratio distributions and uniformly most powerful unbiased tests. Generalized likelihood ratio tests, exact tests and large samples tests. Bayesian point estimation, interval estimation and hypothesis testing.

MATH3850**Nonparametric Methods***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisites: MATH2801 (from 1996) or both MATH2821 and MATH2830**Note/s:** Excluded MATH3950.

Order statistics, exact and approximate distributions. Multinomial distributions, goodness of fit, contingency tables. Statistical inference based on ranks; one-sample, two-sample and k-sample problems, blocked data, independence and association. Nonparametric regression.

MATH3860**Nonlinear Regression Modelling***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2831**Notes:** Excluded MATH3960.

Methods of estimation and optimisation. Curvature measure of nonlinearity. Transformation of covariates and response in regression analysis. Dimensional structure of predictors. Generalised linear models for binary, categorical, count and survival data. Use of Xlisp-stat and Splus statistical packages.

MATH3870**Multivariate Analysis***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2831**Notes:** Excluded MATH3970.

Multivariate normal distribution, Hotelling's T^2 , Wishart distribution. Discriminant analysis, principal component

analysis, canonical analysis and factor analysis. Use of SAS, Splus and Minitab statistical packages.

MATH3880**Theory of Probability***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2801**Note/s:** Excluded MATH3971, MATH3980.

Probability spaces, convergence of random variables, Borel-Cantelli lemma, laws of large numbers, martingales, central limit theorem, Domains of attraction, applications to large sample statistical inference and to financial modelling.

MATH3890**Special Topics in Statistics***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2801, MATH2831

New developments in statistical science theory and methods.

MATH3901**Higher Stochastic Processes***Staff Contact: School Office*

CP15 S1 HPW4.5

Prerequisites: MATH2501, MATH2011 or MATH2510, MATH2901**Note/s:** Excluded MATH3801, MATH3880 (before 1997), MATH3060.

As for MATH3801 but in greater depth.

MATH3920**Higher Time Series and Spatial Analysis***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH3901**Note/s:** Excluded MATH3820 (from 1997).

As for MATH3820 but in greater depth.

MATH3930**Higher Design and Analysis of Experiments***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisites: MATH2901 (from 1996) or MATH2921, MATH3931 or MATH3911**Note/s:** Excluded MATH3830, MATH3870 (before 1997), MATH3050.

As for MATH3830 but in greater depth.

MATH3940**Higher Statistical Inference***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2901 (from 1996) or MATH2921**Note/s:** Excluded MATH3840.

As for MATH3840 but in greater depth.

MATH3950**Higher Nonparametric Methods***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisites: MATH2901 (from 1996) or both MATH2921 and MATH2930**Note/s:** Excluded MATH3850.

As for MATH3850 but in greater depth.

MATH3960**Higher Non-linear Regression Modelling***Staff Contact: School Office*

CP7.5 S1 HPW2

Prerequisite: MATH2931**Notes:** Excluded MATH3860.

As for MATH3860 but in greater depth.

MATH3970**Higher Multivariate Analysis***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2931**Notes:** Excluded MATH3870.

As for MATH3970 but in greater depth.

MATH3980**Higher Theory of Probability***Staff Contact: School Office*

CP7.5 S2 HPW2

Prerequisite: MATH2901**Note/s:** Excluded MATH3971, MATH3880.

As for MATH3880 but in greater depth.

Mathematics Level IV

To enter Level IV Mathematics students must be in the Advanced Science course and have completed the first three years of one of the programs 0600, 1000, 1006, 1010, 1060, 1061, 1066, 1067 or 6810 with an appropriate set of Level III subjects (or the equivalent in a double degree Course) and received permission from the Head of the appropriate Department.

Normally a credit average in the Level III Mathematics subjects specified in the program is required and some evidence of the ability to undertake independent study. In special cases other subjects may be substituted for the Mathematics subjects. Students should discuss their Level III selection of subjects with the Head of the appropriate Department. For Honours Pure Mathematics some higher level Mathematics subjects should normally be included at Levels II and III.

Subjects MATH4003/MATH4004, MATH4103/MATH4104, MATH4603/MATH4604 and MATH4903/MATH4904 lead to the award of an Honours degree.

Program 1010 is a four year program in which Honours may be awarded based on a weighted average of the subjects studied over the complete program.

MATH4003/MATH4004**Mathematics and Computer Science Honours***Staff Contact: School Office*

CP120 F

Prerequisites: Completion of 3 years of Advanced Science programs 0600, 1060 or 1066 including 45 Credit Points of Level III Computer Science subjects and 45 Credit Points of Level III Mathematics subjects. Approval from the Head of School.

Note/s: See the preamble for Mathematics Level IV.

Undergraduate thesis in Applied Mathematics or Pure Mathematics together with advanced lectures on topics chosen half from MATH4103 or MATH4603, and half from Computer Science.

The General Education requirement is met by the 56 hour subject The Role of Mathematics in Society which is part of the Honours program.

MATH4103/MATH4104**Applied Mathematics 4 (Honours)**

CP120 F

Prerequisite: Completion of 3 years of any Advanced Science Mathematics program including 90 Credit Points of Level III subjects as specified in the program. Approval from the Head of Department.

Note/s: See the preamble for Mathematics Level IV.

Skill in practical numerical computing is highly recommended for students taking this subject. Those students who have not already taken a suitable computing subject may be required to take a short bridging course.

Undergraduate thesis together with advanced lectures on topics chosen from the following fields: advanced mathematical methods for applied mathematics, advanced optimization, numerical analysis, theory of linear and non linear dynamical systems, optimal control, operations research, functional analysis and applications, mathematics of economic models and of economic prediction, fluid mechanics, oceanography, micro-hydrodynamics, and analytical and numerical solution of partial differential equations. May also include advanced lectures given by other Departments or Schools.

The General Education requirement is met by the 56 hour subject The Role of Mathematics in Society which is part of the Honours program.

MATH4603/MATH4604**Pure Mathematics 4 (Honours)**

CP120 F

Prerequisite: Completion of 3 years of any Advanced Science Mathematics program including 90 Credit Points of Level III subjects as specified in the program. Approval from the Head of Department.

Note/s: See the preamble for Mathematics Level IV.

Undergraduate thesis together with advanced lectures on topics chosen from the fields of current interest in Pure Mathematics. May also include advanced lectures given by other Departments or Schools.

The General Education requirement is met by the 56 hour subject *The Role of Mathematics in Society* which is part of the Honours program.

MATH4903/MATH4904

Theory of Statistics 4 (Honours)

CP120 F

Prerequisite: Completion of 3 years of any Advanced Science Mathematics program including 90 Credit Points of Level III subjects as specified in the program including 60 Credit Points of Level III Statistics subjects including MATH3980. Approval from the Head of Department.

Note/s: See the preamble for Mathematics Level IV.

Undergraduate thesis together with advanced lectures on topics chosen from the following fields: mathematical basis, experimental design, response surfaces, stochastic processes, theories of inference, sequential analysis, non-parametric methods, multivariate analysis, mathematical programming, information theory, discrete distributions. May also include advanced lectures given by other Departments or Schools.

The General Education requirement is met by the 56 hour subject *The Role of Mathematics in Society* which is part of the Honours program.

MATH4012

Mathematics and Finance Thesis Project

Staff Contact: School Office

CP35 S1 HPW4 and S2 HPW5

Prerequisites: Completion of Stage 3 of program 1010.

Under the supervision of a member of the academic staff of the School of Mathematics a student will undertake a major project in mathematics and finance. The project could range from reading and/or research on theoretical aspects to financial engineering involving implementation of a practical model in C/C++. Research interaction with the finance industry is encouraged. The student will write a thesis summarising the result of their project and make a presentation of it.

Materials Science and Engineering

All subjects in Materials Science and Engineering are restricted to program 0400 and courses 3025, 3030, 3125, 3615 or to specific combined degrees

APSE0002

Social Issues in Science and Technology

Staff Contact: Prof CC Sorrell

CP5 S1 L/T2

The subject covers social issues arising from future technological developments and the role that a professional applied scientist can play in influencing future directions. It will be taught by a combination of group activity, case studies and projects and seminars from visiting speakers, some of whom will be from disciplines other than Science and Technology.

MATS1001

Introduction to the Materials Industry

Staff Contact: A/Prof P Munroe

CP5 S2 L1 T1

The role of materials science and engineering in industry. Engineering materials. Information retrieval. Communication skills. Plant visits. Introductory materials science. Structure and properties of main types of engineering materials with emphasis on the ways in which properties may be controlled by controlling structure.

MATS1002

Microstructural Analysis

Staff Contact: Dr P Krauklis

CP7.5 S2 L1 T2

Note/s: Restricted to Combined degree course 3681.

Specimen preparation techniques. Principles of optical microscopy. Quantitative microscopy and stereology. Electron microscopy. Microchemical analysis.

MATS1011

Introduction to Materials Engineering

Staff Contact: A/Prof A G Crosky

CP2.5 S1 L1

Metals, ceramics, polymers and composites, their structure, chemical, physical and mechanical properties, engineering applications and production with particular reference to Australian industries.

MATS1021

Introduction to Computing

Staff Contact: School Office

CP5 S2 L2

Introductory computing. Outline of computer architecture. Features of common computing languages; syntax, structure, variable typing, portability. Basic syntax. Common numerical techniques, function evaluation, Monte Carlo techniques; assignments involving application of these techniques. Word processing, spreadsheets and databases.

MATS1022

Materials Process Principles

Staff Contact: School Office

CP2.5 S2 L0.5 T0.5

Introduction to engineering calculations. Material balances. Techniques for solving problems, including selection of a basis for calculations, use of tie elements and recycle calculations. General energy balances. Unsteady-state material and energy balances. Examples are drawn from ceramic, materials and metallurgical engineering practices.

MATS1032

Materials Engineering 1A

Staff Contact: Dr V Sahajwalla

CP7.5 S1 L2 T1

Fluid flow in materials processing. Application of the principles of fluid flow in the production and application of ceramic and metallic materials. Subject examples are

drawn from ceramic, materials and metallurgical engineering practice in the broadest sense.

MATS1042

Crystallography and X-Ray Diffraction

Staff Contact: Dr V Sahajwalla

CP10 S1 L2 T1

Introduction to crystallography, crystal structure, Bravais lattices, Miller indices. Miller-Bravais indices. Production, absorption and diffraction of X-rays. Powder and single crystal X-ray methods. Stereographic projections. Applications of diffraction methods to solid solutions and solubility limit. Thermal analysis, stress measurement, X-ray fluorescence spectroscopy chemical analysis.

MATS1043

Heat, Fluid and Mass Flow in Materials Processing

Staff Contact: Dr V Sahajwalla

CP5 S1 L2

In-depth understanding of fundamental principles dictating transport phenomena in materials processing. Development of governing equations related to the transfer of fluid, energy and mass and their inter-dependence based upon fundamentals to analyse and solve problems encountered in current metallurgical operating environments. Application of the understanding developed to the emerging new technologies for metals processing such as direct reduction and smelting for iron-making, near net shape casting.

MATS1052

Materials Engineering 1B

Staff Contact: School Office

CP7.5 S2 L1 T2

Heat applications of principles of steady and unsteady heat transfer in the production and application of materials. Course examples are drawn from materials engineering practice in the broadest sense. Heat flow in materials processing involving high temperature solid, liquid and gaseous phases. Thermal properties of dense and porous materials. Heat treatment, casting, sintering, corrosion, etc. Computer programs for calculating heat flow in materials.

MATS1062

Mechanical Properties of Materials

Staff Contact: Dr P Krauklis

CP10 S1 L2 T2

Prerequisite: MECH0130

Mechanical properties of solids. Nature and significance of mechanical properties. Mechanical testing; the tension test, hardness testing and impact testing. Stress-strain-time relationships. Analysis of stress and strain, stress and strain transformation relationships, Mohr's circle, elastic stress-strain relationships, application to various types of loading and metal working processes. Failure and yielding criteria. Influence of stress state, temperature, strain rate and environment on mechanical behaviour.

MATS1072

Physics of Materials

Staff Contact: School Office

CP7.5 S1 L2 T1

Prerequisite: PHYS1002

Note/s: Restricted to Combined degree course 3681.

Interatomic bonding in solid materials. Types of interatomic bonds, metallic, covalent, ionic. Introductory quantum mechanics in one dimension, free electron theory, effects of periodic potential, density of states curves. Effect of electron to atom ratio on conductivity and crystal structure; semiconductors; intrinsic, extrinsic. Exchange energy; ferromagnetism, antiferromagnetism. Elementary perturbation theory, covalent bond; crystal structures, properties. Ionic bond, force models, properties.

MATS1082

Thermodynamics of Materials 1

Staff Contact: A/Prof O Ostrovski

CP7.5 S2 L2 T1

Fundamental principles of the thermodynamics of closed and open systems. Phase equilibria, the stability and composition of coexisting phases. Chemical potential, fugacities and activities of gases and gas mixtures. The thermodynamics of nucleation and growth of precipitates and spinodal decomposition. Order-disorder in phases. Tabular, analytical and diagrammatic representation of thermodynamic properties. Mass and energy balances. Application of thermodynamics to materials properties and preparation. Models, properties.

MATS1092

Materials and Design 1

Staff Contact: A/Prof A Crosky

CP5 S2 L1 T1

An appreciation of the relationships between the properties of materials, component design, manufacturing and product performance. Materials selection as an integral part of successful design. Long-term potential for materials improvement and substitution. Plant visits to selected materials processing plants.

MATS1093

Thermodynamics of Materials 2

Staff Contact: A/Prof O Ostrovski

CP5 S1 L2

Prerequisite: MATS1082

Thermodynamics of solutions. Partial and integral thermodynamic functions, excess functions. Thermodynamic activity and activity coefficient. Standard states for solute components. Models of solutions. Thermodynamic stability. Calculation of phase diagrams. Perfect and regular ionic solutions. Calculation of chemical equilibria in complex systems.

MATS1102**Numerical Methods***Staff Contact: School Office*

CP7.5 F L1 T5

Prerequisite: MATS1021

Finite difference and finite element techniques and their application to materials phenomena involving heat transfer, elasticity and plasticity.

MATS1112**Phase Equilibria***Staff Contact: School Office*

CP5 S1 L1 T1

Note/s: Restricted to Combined degree course 3681.

Phase rule. *Two-component systems:* free energy-composition and temperature composition diagrams, solubility limits, compound formation, invariants. *Three-component systems:* isothermal sections and liquidus projections. Solidification and crystallization; cooling curves, crystallization paths.

MATS1113**Ceramic Process Principles 1***Staff Contact: Dr OC Standard*

CP5 S1 L2

The nature of ceramics. The scope of the ceramic industry, and principal unit operations. Particle packing: two, three and multi-component systems. Forming methods used in the ceramic industry. Drying and firing of ceramics. Glass and other melt forming processes. Hot forming and miscellaneous forming methods.

MATS1163**Chemistry of the Solid State***Staff Contact: Prof CC Sorrell*

CP5 S2 L2

Crystal chemistry; nature of bonding in solids, silicate structures; and structure-composition relationships. Glass and glass-ceramics. Reaction with solids, grain boundary and interfacial effects, ceramic reactions, and polymorphic transformations (oxides, non-oxides, alumino-silicates).

MATS1164**Welding Science and Technology**

CP7.5

Unit 1 Welding Technology*Staff Contact: A/Prof A Crosky*

S1 or S2 L1

Fusion welding and allied processes. Capabilities, advantages and limitations.

Unit 2 Welding Metallurgy*Staff Contact: A/Prof A Crosky*

S1 or S2 L1 T1

Metallurgical aspects of fusion welding and allied processes. Cause of welding defects and weldability of carbon and alloy steels, stainless steels, aluminium and other common nonferrous alloys. Assessment of welds by mechanical testing and non-destructive methods.

MATS1183**Non-Ferrous Physical Metallurgy***Staff Contact: Dr P Krauklis*

CP5 S1 L1 T1

Constitution, microstructure, processing and properties of non-ferrous alloys. Cast and wrought alloys based on aluminium, copper, magnesium, lead, tin and zinc.

MATS1213**Design for Corrosion Control***Staff Contact: Prof DJ Young*

CP5 S1 L1 T1

Electrochemical corrosion, types of corrosion, influence of alloying and heat treatment, influence of stress. Corrosion prevention, cathodic protection, passivation and inhibitors, selection of materials, designing against corrosion.

MATS1414**Surface Treatment and Wear***Staff Contact: Dr P Krauklis*

CP5 S2 L1 T1

Prerequisite: MATS1283

Coatings for corrosion prevention, engineering and decorative purposes. Adhesion. Surface modification. Specifications for coating systems. Selection testing and evaluation of coating. Classification of wear modes. Mechanisms of adhesive and abrasive wear. Selection, testing and evaluation of materials for wear mitigation. Wear-resistance materials.

MATS1214**Welding and other Joining Processes***Staff Contact: A/Prof A Crosky*

CP5 S1 L1 T1

Fusion welding. Capabilities, advantages and limitations. Metallurgical aspects of fusion welding. Cause of welding defects and weldability of carbon and alloy steels, stainless steels, aluminium and other common non-ferrous alloys. Design of welded fabrications to reduce distortion and the risk of failure by fatigue, brittle fracture, etc. Soldering, brazing, adhesive bonding.

MATS1224**Materials Characterisation***Staff Contact: School Office*

CP2.5 S1 L0.5 T0.5

Materials characterisation by advanced techniques including secondary ion mass spectroscopy (SIMS), auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS) and laser Raman spectroscopy.

MATS1234**Heat Resisting Alloys***Staff Contact: Prof DJ Young*

CP2.5 S1 L1

Microstructure and properties of high temperature alloys, iron-base alloys, nickel-iron alloys, nickel-base alloys and chromium-base alloys. Strengthening mechanisms. Creep, oxidation and hot corrosion. Coatings and protection. Process metallurgy and applications of high temperature alloys.

MATS1243**Management 1**

Staff Contact: School Office
CP7.5 S1 L3

Micro-economic principles. Supply and demand analysis. Comparison of benefits and costs. Macro-economic principles. Fiscal policy. Investment and monetary policy. Inflation and unemployment. Basic accounting concepts. Interpreting financial statements. Management accounting. The legal environment of business. Contracts. Products and services liability. Industrial relations. Industrial conflict. Wage determination.

Operations management: systems, strategies and benefits. Quality assurance, and quality management systems. The elements of total quality management, TQM.

MATS1244**Management 2**

Staff Contact: Dr P Krauklis
CP10 S1 or S2 L4

The major issues, research findings and management strategies relating to the human side of enterprise. Topics include management and power, leadership and innovation, managerial decision-making, stress at work, group dynamics and inter-group conflict, organisational design, goal setting and performance appraisal, approaches to personal and organisational development. Marketing and sales; marketing research, marketing strategies, customer relations, total product package. Project management: project planning and scheduling, contract planning and control, recent developments.

MATS1254**Design Project**

Staff Contact: A/Prof A Crosky
CP10 S1 T1 S2 T3

This project will cover the design of a selected piece of processing equipment or an engineering component. It will involve selection and specification of materials and other relevant aspects covered within the undergraduate course.

MATS1264**Fibre Reinforced Plastic Composites**

Staff Contact: A/Prof A Crosky
CP2.5 S1 L1

Philosophy of a composite. Fibre and matrix materials. Design with composites. Fabrication techniques. Properties of composites. Applications..

MATS1274**Metal and Ceramic Matrix Composites**

Staff Contact: Dr S Bandyopadhyay
CP2.5 S2 L1

Metal and ceramic matrix composites their advantage and scope; various systems of MMCs and CMCs. Role of interface; fabrication techniques; effect of volume fraction; size and size distribution. Strengthening and toughening mechanisms.

MATS1283**Ferrous Physical Metallurgy 1**

Staff Contact: Dr P Krauklis
CP7.5 S2 L2 T1

Binary and ternary iron-carbon equilibria. Carbon steel, phase transformation, microstructures, heat treatment and mechanical properties. Modification of carbon steel characteristics by alloying elements. Alloy engineering steels, tool and die steels, corrosion and oxidation resistant steels, high strength low-alloy steels. Microstructure and properties of grey, white, malleable, ductile and alloy cast irons.

MATS1284**Light Alloys**

Staff Contact: A/Prof P Munroe
CP2.5 S2 L1

Production and processing of titanium alloys. Titanium alloy development. Properties of titanium alloys. Advanced aluminium alloys, rapid solidification of titanium and aluminium alloys. Powder processing of titanium and aluminium alloys. Advanced magnesium alloys.

MATS1294**Electrical Ceramics**

Staff Contact: Dr OC Standard
CP5 S1 L1 T1

Defect structure of ionic solids. Ionic conduction: zirconia solid electrolytes, beta-alumina rapid ion conductors, humidity sensors. Electronic conduction: semiconductors, varistors, thermally-sensitive resistors, superconductivity. Ceramic insulators and dielectrics. Piezoelectric, pyroelectric, and electro-optic ceramics. Magnetic ceramics.

MATS1304**Composite Materials**

Staff Contact: Dr S Bandyopadhyay
CP5 S1 L1 T1

Philosophy of a composite. Fibre and matrix materials. Role of the interface. Polymer matrix, metal matrix and ceramic matrix composites. Physico-chemical characterisation. Strengthening and toughening mechanisms. Effect of reinforcement volume fraction. Size and size distribution. Properties of composites. Fabrication techniques. Design with composites. Applications.

MATS1384**Ferrous Physical Metallurgy 2**

Staff Contact: Dr P Krauklis
CP2.5 S1 L1
Prerequisites: MATS1283

Developments in physical metallurgy of low-carbon sheet and structural steels, high-strength low-alloy steels, corrosion and heat resisting steels, tools and die steels, and selected other types of ferrous alloys.

MATS1464**Materials Seminar***Staff Contact: Prof CC Sorrell*

CP5 F T1

Demonstration of public speaking skills and techniques. Preparation of visual aids. Library usage. Preparation and standards of written material. Chairpersonship. Each student is required to make two oral presentations based on the honours project.

MATS1534**Design with Brittle Materials***Staff Contact: Dr MJ Hoffman*

CP7.5 S1 L2 T1

General design considerations. Nature and properties of ceramic materials. Effects of composition and microstructure on physical properties of ceramics. Mechanical properties of ceramics: brittleness, hardness and wear resistance, high-temperature capability, static fatigue. Manufacture of ceramic materials. Design approaches of ceramics: empirical, deterministic, probabilistic and linear elastic fracture mechanics. Design of components and selection of materials. Inspection and non-destructive testing.

MATS2123**Ceramic Process Principles 2***Staff Contact: Dr OC Standard*

CP5 S2 L2

Plasticity in a clay-water system. Linear drying shrinkage. Air-water vapour system, psychrometry and drying calculations. Effect of porosity on ceramics. Calculations involving ceramic suspensions. Glass, glaze and porcelain enamel calculations. Relationship between the composition and physical properties of glasses. Rational analysis of clay and fluxing materials. Body formulation. Flue gas analysis and combustion calculations. ceramic laboratory instrumentation. Safety aspects in ceramics.

MATS2133**Ceramic Raw Materials***Staff Contact: Dr OC Standard*

CP5 S1 L2

The geological origin of ceramic raw materials. The minerals, mineralogical composition, properties and uses of commercial clays. The sources, physical properties and uses of non-clay raw materials.

MATS2143**Ceramic Equipment***Staff Contact: Dr OC Standard*

CP5 S2 L2

The principles of operation, construction and fields of application of equipment used in the ceramic industry in the following areas: preparation of raw materials and auxiliary processing operations; forming, drying and firing of ceramic products.

MATS2153**Ceramic Processing Laboratory***Staff Contact: Dr OC Standard*

CP10 S2 T4

Laboratory program illustrating processing and engineering aspects of ceramic technology. Students are required to take part in a series of factory inspections.

MATS2183**Refractories***Staff Contact: Prof CC Sorrell*

CP5 S2 L2

Classification of refractories. Chemical and physical properties of refractories. Introduction to raw materials and manufacturing technology. A detailed study of chemical reactions occurring between refractories and solid, liquid and gas phases in ferrous and nonferrous metal industries. Review of phase equilibria.

MATS2203**Physico Chemical Ceramics Laboratory***Staff Contact: Dr OC Standard*

CP10 S1 T4

Laboratory program illustrating the physical and chemical properties associated with the processing and performance of ceramic materials. Students are required to take part in a series of factory inspections.

MATS2213**Diffusion***Staff Contact: Prof DJ Young*

CP5 S1 L1 T1

Fick's first and second laws. Solutions for short and long times by analytical and numerical methods. Boundary conditions for solid-fluid and solid-solid interfaces. Diffusion couples. Atomic level diffusion theory

MATS2223**Phase Transformations***Staff Contact: School Office*

CP7.5 S2 L2 T1

Solidification: single phase, eutectic and neareutectic, peritectic. Diffusional transformation: precipitation, ripening, cooperative transformations, TTT and CCT curves. Diffusionless transformations: crystallography, nucleation and growth modes.

MATS2254**Ceramic Engineering Design***Staff Contact: Dr OC Standard*

CP5 S2 L2

Engineering aspects of ceramic processing. Ceramic engineering design including design of dryers, kilns and glass tanks. Case studies. Pollution control equipment.

MATS2264**Sintering of Ceramics***Staff Contact: Prof CC Sorrell*

CP5 S1 L1.5 T5

Defects and phase transitions. Recrystallisation, grain growth, and nucleation. Stages of sintering. Transport mechanisms, different modes of sintering (vapour, liquid, reactive liquid, solid), additives, and hot pressing. Secondary phenomena (oxidation, decomposition, phase transformations, trapped gases, non-uniform mixing, overfiring), time-temperature effects, firing shrinkage, and warpage.

MATS2273**Chemistry of Ceramic Processes***Staff Contact: Prof CC Sorrell*

CP5 S1 L2

High-temperature reactions involving clays, silicates, oxides, and nonoxides. Processing effects of calcining, chemical reaction, and vitreous and crystalline bond formation. Chemical and physical aspects of production of whitewares, porcelain, heavy clay products, glass, cements, cermets, and advanced high-purity ceramics.

MATS2284**Thermal Properties of Ceramics***Staff Contact: Prof CC Sorrell*

CP5 S2 L2

Heat capacity, measurement of heat capacity, and factors affecting heat capacity. Thermal expansion, measurement of thermal expansion, and factors affecting thermal expansion. Thermal conductivity, thermal diffusivity, measurement of thermal conductivity and thermal diffusivity, factors affecting thermal transport, phonon and photon conductivity, and factors affecting phonon and photon conductivity. Thermal stresses and thermal shock. Influence of structure and composition of pure materials on thermal conductivity of multiphase ceramics.

MATS3443**Polymer Science and Engineering***Staff Contact: Dr S Bandyopadhyay*

CP15 S2 L4 T2

Polymer structure. Mers, bond strength, functionality. Addition and condensation polymerization. Chain branching, cross linking, crystallinity. Thermosets and thermoplastics. Copolymers, blending, plasticisers. Polymer orientation. Polymer tailoring. Melt, glass and lower transitions. Effect of chemical molecular structure on performance. Elastomers, fibres, foams, composites. Elementary polymer identification. Common families of commodity plastics, engineering plastics and elastomers.

MATS3524**Project***Staff Contact: Dr V Sahajwalla*

CP30 S1 T3 S2 T9

An experimental or technical investigation or design related to some aspects of materials engineering in the specific discipline (ceramic engineering, metallurgical engineering or materials engineering).

MATS3544**Polymer Engineering***Staff Contact: Dr S Bandyopadhyay*

CP15 S1 L3.5 T1.5

Mechanical behaviour of polymers. Critical effects of temperature variation on behaviour of thermoplastics under load. Comparison with thermosets. Factors contributing to strength and toughness. Viscoelasticity. Yielding, deformation and fracture. Elastomer performance. Effect of strain rate. Crazing. Effect of environment. Strategies to reduce stress and increase toughness. Creep, recovery and stress relaxation. Time-temperature superposition. Fatigue. Selection of commodity plastics, engineering plastics and elastomers for particular applications. Degradation. Processing of polymers.

MATS3564**Polymer Engineering 1***Staff Contact: Dr S Bandyopadhyay*

CP7.5 L2 T1

Prerequisites: MATS3443

Mechanical behaviour of polymers. Critical effects of temperature variation on behaviour of thermoplastics under load. Comparisons with thermosets. Factors contributing to strength and toughness. Viscoelasticity. Yielding, deformation and fracture. Effects of strain rates. Crazing. Effect of environment.

MATS3574**Polymer Engineering 2***Staff Contact: Dr S Bandyopadhyay*

CP7.5 L2 T1

Prerequisites: MATS3443

Strategies to reduce stress and increase toughness. Creep, recovery and stress relaxation. Time-temperature superposition, fatigue, selection of commodity plastics, engineering plastics and elastomers for particular applications. Degradation. Processing of polymers.

MATS4154**Mechanical and Thermal Processing of Metals***Staff Contact: A/Prof A Crosky*

CP2.5 S1 L1

Mechanisms of deformation. Annealing. Development of deformation and annealing textures. Superplasticity.

MATS4204**Industrial Metallurgy Project***Staff Contact: School Office*

CP15 F3

An experimental investigation of some aspect of industrial metallurgy.

MATS4333**Fracture Mechanics***Staff Contact: Mr MJ Hoffman*

CP5 S1 L1 T1

Linear elastic fracture mechanics: modes of loading, stress intensity factor concept, effect of finite boundaries, energy

release rate concept. Fracture toughness testing and evaluation; ASTM E399 and alternative specimen types. Subcritical fracture mechanics; fatigue, stress corrosion cracking. Elastic-plastic fracture mechanics; crack opening displacement, J-integral.

MATS4513

Deformation of Metals

Staff Contact: A/Prof P Munroe

CP5 S1 L2

Atomic and molecular description of deformation. Introduction to dislocation theory and its application to mechanical properties.

MATS4523

Strengthening Mechanisms in Metals

Staff Contact: School Office

CP5 S2 L1 T1

Strengthening mechanisms, creep, fracture, grain size dependence of strength. Introduction to generation of deformation and recrystallisation textures. Measurements of age-hardening, activation energy of strain ageing.

MATS4533

Metal Forming Processes

Staff Contact: A/Prof A Crosky

CP5 S1 L2

Metal forming. Introduction to metal forming operation. Factors affecting deformation and workability. Hot working, cold working and recrystallisation. Processes: forging, rolling, extrusion and wire drawing. Die materials and geometry. Deformation parameters and processing defects. Plant visits.

MATS4543

Fractographic Analysis

Staff Contact: A/Prof A Crosky

CP7.5 S2 L1 T2

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, stress corrosion, and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy.

MATS4553

Non-Destructive Testing

Staff Contact: A/Prof A Crosky

CP2.5 S2 L1

Concepts of quality assurance and quality control. Techniques of liquid penetrant, magnetic particle ultrasonic and radiographic inspection. Systems and processes, inspection and evaluation.

MATS4580

Electrometallurgy of Steel and Ferroalloys

Staff Contact: A/Prof O Ostrovski

CP2.5 S2 L1

Electric arc furnace (EAF) steelmaking. Energy, raw materials and consumables. Basic principles of EAF. Technology of EAF steelmaking. Modern EAF steelworks. Induction furnaces. Secondary steelmaking. Remelting processes. Basic principles of EAF ferroalloy making. Technology for silicon, manganese and chromium alloys production.

MATS4590

Solidification and Casting

Staff Contact: Dr V Sahajwalla

CP2.5 S2 L1

Understanding the fundamentals of solidification (cast structure development, high temperature properties) in casting processes. Emphasis on conventional and emerging near net shape casting processes. Application of the solidification fundamentals to understand mechanisms of various quality problems encountered in these processes. Process optimisation (machine design, chemistry, temperature, heat extraction) to control casting defects).

MATS5213

Metallurgical Plant Practice

Staff Contact: Dr A Yu

CP2.5 S1 or S2 T1

Up to 2 days of metallurgical plant inspections and case studies equivalent to 14 tutorial hours are associated with this subject. Ferrous and non-ferrous plant practice.

MATS5253

Metallurgical Reaction Engineering

Staff Contact: A/Prof O Ostrovski

CP5 S1 or S2 L2

Metallurgical reactor design: batch and continuous reactors. Gas-solid reactions. Limiting laws for gas-liquid reactions in steelmaking processes. Liquid-liquid reactions, design of extractive and refining operations.

MATS5263

Extractive Metallurgy

Staff Contact: A/Prof O Ostrovski

CP17.5 S1 L3 S2 L2 T2

A review of units of operations in extractive metallurgy: roasting, sintering, smelting and refining. Iron blast furnace. Alternative ironmaking, direct reduction and smelting. Oxygen steelmaking. Electric arc furnace. Ladle metallurgy. Copper, lead and zinc smelting. Aluminium production.

Application of principles of aqueous thermodynamics, electrochemistry, chemical and electrochemical kinetics to hydrometallurgical processes: leaching of mineral and concentrates, solution purification, precipitation, and other separation processes, ion-exchange and liquid-liquid extraction, electrowinning and electrorefining.

MATS5314**Kinetics and Mass Transfer in Metallurgical Processes***Staff Contact: Dr A Yu*

CP10 S1 L1 S2 L2 T1

Kinetics and mass transfer in metallurgical processes. Kinetics of interphase transfer in metallurgical systems. Single particle, fluid/solid reactions, topochemical reactions, reactions of porous solids. Application to reduction of iron oxides. Reaction between liquid metals and gases, reactions involving drops and bubbles. Reaction between liquid metals and slags, mass transfer at bubble stirred interfaces. Application to metal refining process. Vacuum degassing and refining processes.

MATS5324**Modelling of Metallurgical Processes***Staff Contact: Dr A Yu*

CP10 S2 L4

The mathematical and physical modelling of primary and secondary metals processing operations. Ladle metallurgy operations, entrainment of gases by molten metals, electromagnetically driven flows, dispersion of alloying additions, coalescence of inclusions, modelling metal flow and solidification, blast furnace drainage.

MATS5384**Air Pollution Control in the Metallurgical Industry***Staff Contact: Dr V Sahajwalla*

CP2.5 S1 or S2 L1

Air pollutants from the different metallurgical industries. Technical principles and equipment to control the emission of pollutants. Examples from the primary and secondary metallurgical industries.

MATS7132**Structure and Properties of Metallurgical Phases***Staff Contact: A/Prof O Ostrovski*

CP2.5 S1 or S2 L1

The atomistic and microscopic approach to melts in process metallurgy, liquid metals and slags. Relationships between melt structure, mechanism and reaction kinetics in smelting and refining operations.

MATS9520**Engineering Materials***Staff Contact: A/Prof A Crosky*

CP7.5 S1 L2 T1

Note/s: Restricted to Combined degree course 3681.

Microstructure and structure-property relationships of the main types of engineering materials (metals, polymers, ceramics and composites). Micromechanisms of elastic and plastic deformation. Fracture mechanisms for ductile, brittle, creep, fatigue modes of failure in service; corrosion. Metal forming by casting and wrought processes. Phase equilibria of alloys; microstructural control by thermo-mechanical processing and application to commercial engineering materials. Laboratory and tutorial work includes experiments on cast and recrystallised structures,

ferrous and non-ferrous microstructures and fracture and failure analysis.

MATS9530**Materials Engineering***Staff Contact: Prof CC Sorrell*

CP7.5 S1 or S2 L2 T1

Prerequisite: MATS9520

Materials used in Mechanical Engineering and related fields (Manufacturing Engineering Management, Aerospace Engineering, Naval Architecture) are discussed with emphasis on the dependence of properties and performance on microstructure. Aspects of materials selection during the design of engineering components which affect the service performance in applications where failure can occur by brittle fracture, corrosion, creep or fatigue, will also be discussed.

MATS9650**Pyrometallurgical Processes***Staff Contact: A/Prof O Ostrovski*

CP5 S1 L2

Principles and development of pyrometallurgical processes and a review of the unit operations, roasting, sintering, smelting and refining for the treatment of ferrous and non-ferrous minerals.

MATS9712**Materials and Techniques in Design Craft 1***Staff Contact: Prof CC Sorrell*

CP10 S1 L2 T1

An introduction to the science and technology of materials, emphasizing relationships between structure, composition and properties. Introduction to processing of metallic, ceramic and fibrous materials. Materials recognition and design possibilities are discussed.

MATS9722**Materials and Techniques in Design Craft 2B***Staff Contact: Prof CC Sorrell*

CP7.5 S2 L1.5 T1.5

Casting, working and surface finishing of metals and alloys. Soldering, brazing and welding. Joining metals to glasses, ceramics and gemstones.

MATS9732**Materials and Techniques in Design Craft 2C***Staff Contact: Prof CC Sorrell*

CP7.5 S2 L1.5 T1.5

Structures and properties of clays, non-clays, cements, porcelains, glazes, glasses and other ceramics. optical properties and colours of glasses, glazes and gemstones. Forming and firing of ceramic bodies, reactions during firing. Kilns and oxidation/reduction effects.

Mechanical and Manufacturing Engineering

Mechanical and Manufacturing Engineering Level I

AVEN1310

Basic Mechanics

Staff Contact: Dr K Zarrabi

CP7.5 S1 HPW2

The subject explains the basic concepts in statics and strength of materials including Newton's Laws, SI system of units, two-dimensional force systems, moments and couples, equilibrium in two dimensions, stress, strain, stiffness and flexibility, analysis of bars, bending stress and measurement of strain, material properties, theories of failure and composite materials.

AVEN1910

Introduction to Aircraft Engineering

Staff Contact: Mr J Page

CP7.5 S1 HPW2

An explanation of how aircraft fly and how the engineering technologies relate to the vehicle. Concepts and nomenclature relating to flight vehicles and the significance of aircraft configurations and flight systems

MANF1100

Workshop Technology

Staff Contact: Dr P Mathew

CP7.5 S1 HPW3

Note/s: Protective equipment (eg safety glasses, safety boots etc) is required in order to comply with the Occupational Health and Safety Act. Students must already possess or purchase these items before commencing the course. The price of the items is approximately \$100. Students who have done Industrial Arts for the HSC have an appropriate trade or certificate qualification, or are suitably employed, may qualify for exemption from this subject.

The implementation of design and its interaction with manufacturing equipment and processes. Manufacturing capabilities and tolerancing. Approximately 30 hours of practical training which includes welding, fitting and machining.

MANF1110

Manufacturing Technology

Staff Contact: Dr LE Farmer

CP7.5 S2 HPW3

Corequisites: MECH1100, MECH1300, MECH1400

Description of the processes classified as forming from liquid or solid, material removal, material joining. Elementary mechanics of forming and cutting processes. Machine tools operation. Relationship between product design and manufacturing processes. Elementary functional analysis of product design for manufacturing performance.

MECH1100

Mechanical Engineering Design 1

Staff Contact: Mr A Barratt

CP10 F HPW2

Corequisite: MECH1000

Introduction to engineering hardware and components; geometry, function, manufacture and reasons for various configurations. Freehand sketching and drawing techniques, orthogonal projection, sections and conventional symbols to communicate information about these components. The design process, problem identification, search for solution concepts, decision techniques, detail design and analysis, the presentation of the solution using computer graphics modelling of components and production of detail drawings.

MECH1300

Engineering Mechanics 1

Staff Contact: A/Prof RAJ Ford

CP10 S1 or S2 L2 T2

Prerequisite: HSC Mark Range Required: 2 unit Science (Physics) 53-100, or 3 unit Science 90-150, or 4 unit Science multistrand 1-50, or 2 unit Industrial Arts (Engineering Science) 53-100, or 3 unit Industrial Arts (Engineering Science) 1-50

Note/s: Excluded MECH0330. Restricted to combined degree course 3681. Students can make up for the lack of the prerequisite by work taken in Physics in the first half of Year 1.

Vectors, resultants, equilibrium. Systems of co-planar multiframe members. Mass centre, centroids, distributed forces. Friction. Applications to cables, screw threads, clutches etc. Plane particle kinematics: rectilinear, curvilinear and relative motion. Plane particle kinetics: equations of motion, work, energy, power, impulse, momentum, impact.

MECH1400

Mechanics of Solids 1

Staff Contact: A/Prof R Randall

CP7.5 S1 or S2 L2 T1

Corequisites: MECH1300 or MECH0330 or MECH0440

Note/s: Excluded MECH0430.

Resultants and equilibrium in three-dimensions; stress and strain; internal forces; stresses, deformation and strain energy due to axial loading, bending and torsion; helical springs.

MECH1500

Computing 1M

Staff Contact: Dr MJ Tordon

CP7.5 S2 HPW3

Note/s: Restricted to Combined degree course 3681.

Introduction: history, applications, hardware, software, a model of a computer system, editors, operating systems. **Program design and development:** programming objectives, data structures, algorithms, symbolic names, translation of algorithms, steps in programming, programming style, syntax charts, errors and debugging. **Data:** data types, declarations, input, output, file control. **Programming**

constructs: arithmetic expressions, assignment, relational and logical expressions, selection, iteration, intrinsic functions, statement functions, subprograms, common communication. *Applications using existing programs:* sorting, word processing, graphics and plotting, simultaneous linear algebraic equations. The computer language employed in this subject is FORTRAN.

Mechanical and Manufacturing Engineering Level II

AVEN2220

Aviation Engineering Experimentation 1

Staff Contact: Mr J Page

CP7.5 S2 HPW2

Note/s: Excluded AVEN2200

Exposure to the practical skills associated with aircraft maintenance conducted at the Aeroskills Center at Padstow TAFE. Introduction to workshop environment and practices including health and safety aspects. Development of respect for the skills of aircraft maintenance craftsmen.

AVEN2910

Aviation Technologies 1

Staff Contact: Mr Z Vulovic

CP7.5 S2 HPW2

Note/s: Excluded AVEN2200

Aviation systems – Mass transfer, power transfer and information transfer fluid systems. Electrical power generation, management and distribution. Environmental control systems, requirements and operation. Avionic – Avionics systems, classification and applications. Flight instrument and controls. Computer aided flight management.

AVEN2920

Aviation Technologies 2

Staff Contact: Dr R Casey, Mr J Page

CP7.5 S2 HPW2

Note/s: Excluded AVEN2700, AVEN2900

Aircraft propulsion – Elements of internal-combustion (piston) engines cycles, performance and operations, piston engine fuel systems, performance augmentation and engine condition monitoring, elements of propellers, basic propeller thrust equations, variable pitch propellers. Aircraft performance – Flight environment aircraft classifications, operational requirements, payload-range, economics, break even point field requirement. Accelerated and unaccelerated flight manoeuvring and gust envelope, energy height, power and wind loading.

AVEN2930

Aviation Technologies 3

Staff Contact: Dr N Ahmed, A/Prof D Kelly

CP7.5 S2 HPW2

Prerequisites: AVEN1310

Note/s: Excluded AVEN2400, AVEN2600

Aerodynamics – Introduction to basic aerodynamic of lift and drag. Dimensional analysis to relate wind tunnel results

to actual flight test. Bernoulli's equation. Indicated and corrected airspeed. Airframe Analysis and Maintenance – Aircraft structural layout, configuration of wing and fuselage structures. Bending, shear and torsional stiffness. Materials section. Elements of aeroelasticity including control reversal. Structure failure modes.

MECH2300

Engineering Mechanics 2A

Staff Contact: Prof KP Byrne

CP7.5 S1 or S2 L2 T1

Prerequisites: MATH1231 or MATH1241, MECH1300

Note/s: Excluded MECH0430. Restricted to Combined degree course 3681.

Kinetics of systems of particles; steady mass flow. Plane kinematics and kinetics of rigid bodies: moment of inertia; motion relative to translating and rotating frames of reference, equations of motion; work and energy, impulse and momentum. Virtual work for static and dynamic systems. Engineering applications.

MECH2310

Engineering Mechanics 2B

Staff Contact: Prof KP Byrne

CP5 S1 or S2 HPW2

Prerequisite: MECH2300

Note/s: Restricted to Combined degree course 3681.

Differential equations of motion. Transverse vibrations of beams. Whirling of shafts. Single degree-of-freedom systems: free, forced, undamped and damped vibrations. Transmissibility.

MECH2411

Mechanics of Solids 2A

Staff Contact: Dr HL Stark

CP7.5 S1 or S2 HPW3

Prerequisites: MATH1231 or MATH1241

Corequisite: MECH1400

Note/s: Excluded MECH2401.

Revision of Statics. The variation with orientation of stress at a point in 2D Mohr's circle. The variation with orientation of stress at a point in 3D given one principal stress. The variation with orientation of strain at a point, Mohr's circle strain gauges. The relationships between stress and strain during linear elastic deformation. The interdependence of elastic moduli. The variation with orientation of stress at a point in the general 3D case. Octahedral stresses. Strain energy stored in a linearly elastic body resulting from volume change and from distortion. Yield criteria. Fatigue, stress concentrations, miner's rule. Material properties and testing.

MECH2412

Mechanics of Solids 2B

Staff Contact: Dr HL Stark

CP7.5 S2 HPW3

Prerequisite: MECH2411

Note/s: Excluded MECH2402.

Simple bending and unsymmetrical bending of beams. Second moments of area. Bending of composite beams, reinforced concrete beams. Transverse shear stresses in

beams. Shear centre. Combined stresses in beams. Column buckling. Material properties and testing. Membrane stresses.

MECH2600

Fluid Mechanics 1

Staff Contact: Prof GL Morrison

CP10 F L1 T1

Prerequisites: MATH1131 or MATH1241, PHYS1918

Fluid properties. Fluids in static equilibrium. Buoyancy. Pressures in accelerating fluid systems. Steady flow energy equations. Flow measurement. Momentum equation. Dimensional analysis and similarity. Incompressible laminar and turbulent flow in pipes; friction factor. Laminar flow between parallel plates and in ducts. Elementary boundary layer flow; skin friction and drag. Pumps and turbines. Pump and pipe-line system characteristics.

MECH2700

Thermodynamics 1

Staff Contact: A/Prof EM Kopalinsky

CP10 F L1 T1

Prerequisites: MATH1131 or MATH1241, PHYS1918

Basic concepts and definitions: systems, property, state, path, process. Work and heat. Properties of pure substances, tables of properties, equations of state. First law of thermodynamics. Analysis of closed and open systems. Second law of thermodynamics: definitions, Carnot cycle, Clausius inequality, entropy, irreversibility, isentropic efficiencies. Air-standard cycles. Vapour cycles.

Mechanical and Manufacturing Engineering Level III

AVEN3220

Aviation Engineering Experimentation 2

Staff Contact: Dr N Ahmed

CP7.5 S1 HPW2

Note/s: Excluded AVEN3200

A selection of experiments from airframes analysis, flight mechanics, aircraft propulsion, aircraft systems and aerodynamics. Experiments will make use of the wind-tunnels, systems laboratories, engines laboratories and structural testing facilities in the Engineering Faculty.

AVEN3230

Aviation Systems and Avionics

Staff Contact: Mr Z Vulovic

CP7.5 S1 HPW2

Prerequisites: AVEN2901

Note/s: Excluded AVEN3210

Typical aircraft system operation and management. Multiplexing and system degradation. Communications, internal and external. Fly-by-wire control system. Aircraft state sensors, air data sensor and inertial sensors. Radio and Dead Reckoning navigation systems. External world sensor systems. Engine control and management system.

AVEN3410

Airframe Analysis and Maintenance

Staff Contact: A/Prof DW Kelly, Dr RA Platfoot

CP7.5 S1 HPW2

Prerequisites: AVEN2930

Note/s: Excluded AVEN3400

Analysis of the airframe. Load paths and stress concentration. Introduction to fatigue, corrosion and erosion. Nondestructive inspection and repair technologies. Crash stimulation. Development of a conditioned based maintenance program for aircraft. Preventative maintenance, condition monitoring and reliability centered maintenance.

AVEN3610

Aerodynamics, Stability and Control

Staff Contact: Dr N Ahmed, Mr J Page

CP7.5 S1 HPW2

Prerequisites: AVEN2903

Note/s: Excluded AVEN3600, AVEN3900

Drag of an aircraft. Techniques and devices to reduce drag. Airfoil characteristics at low Reynolds number. Lift and drag at high Mach number. Effect of supercooled cloud, drizzle, rain and icing on airfoil performance. Stability – longitudinal and lateral static and dynamic stability, stability and manoeuvre margins, aircraft loading strategies, reduced stability aircraft. Control-trimmed flight, aircraft response to control input, limits of controllability.

AVEN3710

Aircraft Propulsion

Staff Contact: Dr R Casey

CP7.5 S1 HPW2

Prerequisites: AVEN2902

Revision of piston engines and propellers. Propellers noise, stall, gyroscopic effects and slipstreams. Elements of gas turbine engines, gas turbine engines classification, gas turbine engine cycles, performance and operations, high altitude operating characteristics. Gas turbine engine condition monitoring, surge, engine re-starting.

AVEN3930

Aircraft Evaluation

Staff Contact: Mr J Page

CP7.5 S2 HPW2

Prerequisites: AVEN2902

Evaluation of fitness for purpose, route matching, range load graphs, environmental constraints, initial and operating costs, maintenance requirements, fleet capacity, crew requirements, safety and reliability.

Medicine

MDCN8001

Principles of Medicine for Optometry Students

Staff Contact: A/Prof L Simons (St Vincent's Hospital)
CP5 F HPW1

Note/s: Students normally take the subject in Year 4 of course 3950. Restricted to course 3950.

An overview of historical, epidemiological, pathophysiological, diagnostic, therapeutic and public health aspects of disease in man and the various clinical categories of practice.

Microbiology and Immunology

Note: Some subjects that appear in this section may be restricted to students for whom the subject comprises a compulsory part of their program.

Microbiology and Immunology Level II Subjects

MICR2201

Introductory Microbiology

Staff Contact: Dr I Couperwhite
CP15 S1 HPW6

This introduction to microbiology is offered as a single elective. However, the subject is mandatory for students wishing to major in program 4400 Microbiology and Immunology. Postgraduate students with no previous knowledge of biology can do this subject if they have received prior approval from their course supervisor.

MICR2011

Microbiology 1

Staff Contact: Dr P March
CP15 S2 HPW6

Prerequisites: BIOS1101, BIOS1201, MICR2201
Corequisites: BIOC2201 and BIOS2021

This subject is for students majoring in microbiology and who wish to enlarge their knowledge and skills in microbiology beyond those obtained in Introductory Microbiology or equivalent subjects at other institutions.

The biology, classification and function of bacteria. Comparative aspects of microbial growth. Bacterial nutrition and biosynthetic pathways. Microbial survival and global responses to environmental stimuli. Theory and practice of sterilization. Action of antimicrobial agents. Introduction to microbial ecology, medical and industrial microbiology.

Microbiology and Immunology Level III

MICR3011

Microbial Physiology: a Molecular Approach

Staff Contacts: Dr R Cavicchioli, Dr P March
CP15 S2 HPW6

Prerequisites: MICR2011, MICR3021

Exclusion: Maximum enrolment limited to 18 students. If oversubscribed, placements awarded according to achievements in Levels 1, 2 and 3 subjects

The goal of this course is to combine theory introduced in previous courses with an understanding of how modern research endeavours are approached. This goal will be achieved by linking lectures and laboratories to contemporary research in microbial physiology. Lectures will address molecular mechanisms involved in: determining microbial cell shape, cell division, sensing and responding to environmental signals, strategies for survival in extreme environments, and regulation of the synthesis of gene products. Students will be challenged to identify relevant research problems, to generate feasible solutions to these problems, and to carry out critical peer review.

MICR3021

Microbial Genetics

Staff Contact: Dr R Cavicchioli
CP15 S1 HPW6

Prerequisites: BIOS2021, BIOC2201 and MICR2011

Note/s: Excluded BIOT3031.

Essential for students majoring in microbiology. Major topics include genetics of bacteriophage, bacteria and yeasts, mutation and repair, plasmids, gene transfer, transposable genetic elements, gene cloning (genetic engineering) and two component regulatory systems.

The practical component includes a session long practical that involves *E. coli* transposon mutagenesis, gene library construction and complementation of auxotrophic mutants. Additional shorter practicals focus on bacterial and phage restriction/modification systems, UV mutagenesis and DNA repair, gene transfer between bacterial species and gene exchange and gene exchange with hyperthermophilic archaea.

MICR3031

Eucaryotic Microbiology (UTS)

Staff Contact: A/Prof S Hazell
CP15 S2 HPW6

Prerequisite: MICR2011

Exclusion: Maximum enrolment limited to 20 students. If oversubscribed, placements awarded according to achievements in Level 1, 2 and 3 subjects

This course provides an opportunity for students interested in a broad education in medical microbiology to undertake studies in the areas of parasitology and mycology. The unit is offered by agreement with the University of Technology, Sydney, and is taught at the Gore Hill Campus of UTS. The course offers students training in the principals and practices of medical laboratory parasitology and mycology. The parasitology component covers the identification of

parasitic worms, insects and protozoa. Mechanisms of disease is also covered. The mycology component examines pathogenic yeasts and fungi, their identification and mechanisms of disease. The course is supported by a comprehensive laboratory program.

MICR3041

Immunology I

Staff Contact: Dr M Cooley

CP15 S1 HPW6

Prerequisite: BIOC2101 or BIOC2181

Basic immunology and immunological techniques. Topics include innate and adaptive immunity, development of the immune system, induction and expression of the immune response, structure and function of antibodies, antigen-antibody reactions, the major histocompatibility complex, aspects of immunology in disease.

MICR3051

Immunology 2

Staff Contact: Dr A Collins

CP15 S2 HPW6

Prerequisite: MICR3041

Advanced immunology. Major topics include antigen epitope analysis, processing and presentation, lymphocyte biology, immunogenetics of the molecules of recognition, cytokines, immune regulation, the mucosal immune system, immunity to infectious diseases, vaccine development and clinical immunology.

MICR3061

Viruses and Disease

Staff Contact: Dr G Grohmann, A/Prof S Hazell

CP15 S2 HPW6

Prerequisite: MICR2011

Major topics include virus structure, classification and replication strategies, epidemiology, molecular virology and laboratory diagnosis. The pathogenesis of a number of human diseases is discussed in the context of virus-host interactions, the persistence, transfer and control of virus infections in the community. Finally, a 'consultancy brief' is undertaken by students providing the opportunity to gain experience in working in consultancy teams, producing a report and a short seminar.

MICR3071

Environmental Microbiology

Staff Contact: Prof S Kjelleberg

CP15 S2 HPW6

Prerequisite: MICR2201

Highly recommended: MICR2011, BIOC2201, BIOS2021

The course consists of three major themes in basic and applied environmental microbiology: contemporary microbial ecology, water microbiology and environmental biotechnology. The main concepts include biodiversity, structures of microbial communities and microbial interactions. Specific topics in microbial ecology include biodiversity, microbial interactions and communities, biogeochemical cycling, adaption to environmental extremes, gene transfer and evolution and phylogeny.

Specific topics in applied and environmental microbiology include waste water treatment and water quality, biofouling, biological control, bioremediation, and the use of smart molecules produced by microorganisms.

MICR3081

Bacteria and Disease

Staff Contact: A/Prof S Hazell

CP15 S1 HPW6

Prerequisite: MICR2011

Highly recommended: MICR3041

Note: Half of the compulsory practical component of this subject consists of seven practical classes run over three and one half days during the mid-session break. In-session time practical classes will be run only in weeks 1 and 2, and weeks 10 through 14.

Bacteria and Disease aims to develop a high level understanding of bacterial pathogenesis, disease control and prevention. We examine in depth a select number of pathogens that portray the diverse characteristics seen in different pathogenic bacterial species. In conjunction with the lecture program, contemporary medical laboratory training is given through a simulated diagnostic unit. Development of communication skills constitutes part of this subject.

Microbiology and Immunology Level IV

MICR4013/MICR4023

Microbiology 4 (Honours)

Staff Contact: Dr P March

CP120 F

Prerequisite: completion of program 4400 including Level III subjects totalling 120 Credit Points, 60 of which must be Microbiology and Immunology subjects

Advanced training in selected areas of Microbiology and Immunology: a formal component consisting of seminars, tutorials, introductory electron microscopy and written assignments, plus a supervised research program in a specific area of microbiology or immunology.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Medicine and Handbook.

MICR2218

Microbiology

Staff Contact: Dr I Couperwhite

Solely for students enrolled in the Food Technology courses.

MICR3228

Microbiology for Medical Students

Staff Contact: A/Prof S Hazell

Solely for students enrolled in the Faculty of Medicine.

Optometry

Optometry subjects are restricted to course 3950 and are listed in the course outline. For further information on Optometry subjects consult the School.

OPTM1201

Ocular and Visual Science 1A

Staff Contact: Mr G Dick
CP10 S2 HPW4

Objectives: An integrated lecture and practical course on the components of ocular refraction and the limits of visual resolution.

Brief Curriculum: Resolution of the eye: measurement and notation, optical and retinal limits, contrast sensitivity. Refraction at curved surfaces: cornea. Standard reduced eye. Retinal image analysis. Errors of refraction. Accommodation. Ocular aberrations. Modulation transfer function. Projection of the retina: relative size and distance magnification, entoptic field. Reflection at curved surfaces: cornea, keratometry. 3-surface schematic eye: components of refraction, phakometry, step-along vergence analysis, reduced eye derivation. Spectacle correction: effective power, spectacle accommodation, spectacle magnification, effects on convergence and accommodation.

Assessment: Tutorials (15%); 3 mid-session tests (10%); laboratory and annual written examination (75%).

OPTM1202

Clinical Optometry I

Staff Contact: Dr P Anderton
CP15 S2 HPW6

Objectives: Familiarity with basic clinical goals and techniques.

Brief Curriculum: Introduction to optometry: History and organisation, practice goals and organisation. Clinical measurement of visual function: visual acuity, colour and light perception. Basic visual neurology: measurement and interpretation of pupil responses and eye movements. Communication: theory and practice of verbal and written communication relevant to clinical practice. Biomicroscopy: instrumentation and techniques for examination of the external eye and adnexae. Dispensing: Introduction to frames, lenses and the fabrication of optical appliances. Introduction to contact lenses.

Assessment: Clinical practical assessment 20%; Final examination 80%.

OPTM1203

Physical and Geometrical Optics

Staff Contact: School Office
CP15 S2 HPW6

Physical Optics: History of optics, wave motion, the nature of light, interference, diffraction, polarisation. **Geometrical Optics:** Reflection, refraction, thin lenses, lens systems, thick lenses, optical instruments.

OPTM1204

Dispensing

Staff Contact: Mr I Robinson
CP5 S2 HPW2

Objectives: To measure and verify ophthalmic prescription. To understand the types and uses of ophthalmic lenses. To identify, verify and dispense ophthalmic lenses and appliances.

In lectures and tutorials students will be introduced to: Ophthalmic lenses and Optical appliances. Focimetry and ophthalmic optics. Transposition and prismatic calculation. Facial measurement pupillometry. Facial fitting and optical appliance adjustment. Ophthalmic lens layout and glazing. Hand edging, formerless edging and computerised glazing.

Assessment: Continuous assessment: W1 to W13 = 60%, W14 = 40%.

OPTM1211

Ocular and Visual Science 1B

Staff Contact: A/Prof DJ O'Leary
CP5 S2 HPW2

This subject addresses the significant need for information about the structure and function of the visual system in Clinical Optometry 1 and in the early stages of Clinical Optometry 2.

Objectives: To give students a basic understanding of the anatomy (structure) of the eye (particularly the anterior eye), the adnexa and visual system, the essentials of ocular physiology (function), and detailed information on some aspects of vision that form the foundation of Clinical Optometry. These subjects are studied in greater depth in later years.

By the end of the semester students should have enough information to know the basic anatomy of structures they are looking at during clinical training, and to understand the basis of psychophysical measurements of visual functions used extensively in clinical optometry.

Assessment: Four term tests (25% of the total) and an end of session written examination (75% of total).

OPTM2106

Pathology for Optometry Students

Staff Contact: Dr P Herse
CP4 S1 HPW1.5
Prerequisite: BIOS1201
Corequisite: PHPH2122

Objectives: to introduce general and systemic pathophysiology.

Topics discussed include: cell injury and adaptation, pathogenesis of cell injury, inflammation, edema, thrombosis, embolism, arteriosclerosis, neoplasia, environmental disease, diabetes, hypertension, myocardial infarction, intracranial pathology, cerebral disease

Assessment: Week 8, multiple-choice examination (25%); week 10, essay on a disease topic (10%); end of session written examination (65%).

OPTM2107**Microbiology for Optometry Students***Staff Contact: Dr P Anderton*

CP4 S1 HPW1.5

Prerequisite: BIOS1201*Corequisite:* OPTM2106

Objectives: An understanding of basic microbiology applied to optometric practice.

Students will receive systematic lectures and demonstrations dealing with: Biology, metabolism and genetics of microbes. Theory of infection and disease propagation. Antibiotics and bacteria. Immunology: Basics, T-cell types and functions, immunoglobulins, cell-mediated immunity, hypersensitivity, auto-immune disease and ocular inflammation. Outline of disease-causing bacteria. Detailed examination of common ocular pathogens. Contact lens related disease and microbiology. Non-prokaryotic pathogens.

Assessment: Mid-session tests (2) 20%; Session examination 80%.

OPTM2205**Measurement of Light and Colour***Staff Contact: A/Prof SJ Dain*

CP5 S2 HPW2

Objectives: Understanding of measurement of optical radiation for the purposes of ocular hazard assessment, colour based teaching and skills and lighting design.

Brief curriculum: Sources of optical radiation. Sunlight and daylight. Detectors. The eye as a detector. Principles and practice of photometry. Principles and practice of colour measurement and specification. Uniform colour scales. Colour rendering. Metamerism. Colour atlases and order systems.

Assessment: Open book examination.

OPTM2208**Diagnosis of Ocular Disease***Staff Contact: Dr P Herse*

CP7.5 S2 HPW3

Prerequisites: OPTM2106, OPTM2107*Corequisites:* OPTM2302, OPTM2301

Objectives: to introduce diagnosis and optometric management of anterior eye disease.

Systematic lectures will be given on: a survey of the pathophysiology, diagnostic signs and symptoms, and optometric management of diseases of the lids, conjunctiva, lacrimal system, sclera, cornea, vitreous body and crystalline lens.

Assessment: Week 6 multiple choice examination (10%); week 9, slide test (10%); week 12, slide test (10%); end of session written examination (70%)

OPTM2301**Ocular and Visual Science II***Staff Contact: Dr P Anderton*

CP15 S3 HPW S1 4 S2 2

Prerequisites: BIOS1201, CHEM1809*Corequisite:* PHPH2122

Objectives: An understanding of elements of human structure and function with specific relevance to optometric practice.

Lectures, tutorials and practical classes will present material on: Elements of the human central nervous system; Cranial and orbital structures; Structure and function of the human visual pathway; Nature of eye movements and underlying structure and function; Vestibular function, posture and vision; Autonomic function and pharmacology of the eye.

Assessment: Session 1: Mid-session tests (2) and practical work 20%; Session 2: Mid session tests (2) 20%; Session examinations 80%.

OPTM2302**Clinical Optometry II***Staff Contact: Dr B Junghans*

CP37.5 S3 HPW S1 8 S2 7

Prerequisites: OPTM1201, OPTM1202, OPTM1204, OPTM1211*Corequisites:* OPTM2301, OPTM2303

Objectives: An integrated lecture and practical course which equips the student to be professional in manner with good communication and technical skills and able to carry out a logically sequenced primary care evaluation of the health of the ocular and visual system, refractive status and binocular coordination with a view to prescribing either spectacles or contact lenses for the uncomplicated patient.

Lectures, tutorials and practical classes deal with: Interviewing skills. Ocular health: history and symptoms, introduction to diagnostic drugs, slitlamp-biomicroscopy, tonometry, direct ophthalmoscopy, external eye examination. Ametropia: aetiology and management of refractive errors, objective and subjective refraction, cycloplegic refraction prescribing lenses, tinted spectacle lenses. Binocular vision: sensory and motor aspects of binocular vision, introduction to binocular vision anomalies. Accommodation/convergence imbalances. Contact lenses: soft and rigid contact lens design and manufacture, fitting techniques and evaluation, care and maintenance of contact lenses.

Assessment: Written mid-term and end of session examinations, written assignments, practical examination.

OPTM2303**Spectacle Lens and Optical Systems***Staff Contact: Mr G Dick*

CP15 S3 HPW S1 2 S2 4

Prerequisites: OPTM1201, OPTM1203

Objectives: An understanding of ophthalmic optics applied to spectacle lenses and clinical instruments.

Brief Curriculum: Optics of subjective refraction. Estimating spectacle lens power. Ophthalmic prisms. Single vision

prescription: range of clear and blurred vision. Multifocal prescriptions. Progressive reading additions. Lens properties and forms. Prismatic effects of spectacle lenses: analysis and management. Spectacle magnification: isogonal and isekonic lenses. Effectivity of spectacle lenses. Field of view through spectacle lenses. Introduction to spectacle lens aberrations and their management. Optics of clinical ophthalmic instruments. Optics of components of the refraction, intraocular implants and corneal refractive surgery. Optics of contact lenses.

Assessment: Tutorials (10%), 8 mid-session tests (30%) and an annual written examination (60%).

OPTM3208

Diagnosis and Management of Ocular Disease

Staff Contact: Dr P Herse

CP12.5 S3 HPW S1 3 S2 2

Prerequisites: OPTM2106, OPTM2107, OPTM2208

Corequisites: OPTM3301, OPTM3302, OPTM3309

Objectives: Session I: to introduce diagnosis and optometric management of posterior eye disease. Session II: to investigate the role of optometry in the rehabilitation of people with visual impairment.

In lectures and tutorial classes will cover: a survey of the pathophysiology, diagnostic signs and symptoms, and optometric management of diseases of the uvea, retina, glaucoma, optic nerve, pupils, cranial nerves, and visual pathway. Other topics discussed include diplopia and trauma. In Session II, a series of seminars from community based speakers will focus on rehabilitation issues relevant to ocular disease.

Assessment: Session 1, week 6, multiple choice examination (10%); week 9 slide test (10%); week 12 slide test (10%); end of session written examination (60%)
Session 2, week 12; rehabilitation issues report (10%).

OPTM3301

Visual Science III

Staff Contact: Dr P Anderton

CP15 S3 HPW3

Prerequisite: OPTM2301

Objectives: An understanding of advanced issues in current visual science.

Lectures, tutorials and practicals will deal with: Glia and the development of retinal vasculature. Visual electrophysiology. Retinal neurocircuitry. Student-based literature research exercises and presentations. Lighting design. Advanced topics in colour vision and binocular vision. Theories of visual perception.

Assessment: Session 1: Practical work 20%, End of session written examination 80%; Session 2: End of session written examination.

OPTM3302

Clinical Optometry III

Staff Contact: Dr L Asper

CP65 S3 HPW13

Prerequisites: OPTM2301, OPTM2302, OPTM2303, OPTM2106, OPTM2107, OPTM2208, PSYC2116

Corequisites: OPTM3301, OPTM3208, OPTM3309

Objectives: To produce a student with professional attitude and good communications skills who has the ability to integrate scientific and clinical aspects of optometry and make well-reasoned decisions while undertaking patient care at the UNSW Optometry Clinic under supervision of a registered optometrist.

To advance student knowledge in dispensing, refraction, low vision, colour vision, ocular health assessment, binocular vision, public health, paediatric vision, contact lenses, and pharmacology.

To stimulate students' interest in optometric subspecialties such as Low Vision, Colour Vision, Binocular Vision, Public Health, Paediatric Vision care, and Contact Lenses.

Lectures, tutorials and practical classes will deal with: Refraction: practical aspects. Binocular vision: diagnosis and management of strabismus and amblyopia, aniseikonia, aetiologies of binocular anomalies. Contact lenses: complications, modifications, special applications, advanced topics. Low Vision. Paediatric Optometry: child development, behavioural optometry, perceptual dysfunction, paediatric ocular disease and low vision, contact lenses, and special needs children. Pharmacology: basic and ocular aspects. Public Health Optometry: basic principles, eye protection, vision screening, visual ergonomics. Dispensing: Practical aspects.

Clinical Assessment: binocular vision, contact lenses, gonioscopy, ophthalmoscopy, visual fields, colour vision. Examination of patient: management and treatment of ocular conditions and diseases.

In the second session, students will examine patients in the primary care optometry clinic.

Assessment: Written examinations, written assignments, practical examinations, and clinic assessment.

OPTM3309

Ocular Science III

Staff Contact: A/Prof DJ O'Leary

CP12.5 S3 HPW S1 3 S2 2

Prerequisite: OPTM2301

Objectives: To understand the major physiological processes governing the ocular fluids, the cornea and the lens. Physiological principals are applied to gain an understanding of the normal aging process and of common abnormalities. Students are encouraged to integrate their knowledge of general physiology, ocular anatomy and biochemistry, and pathology in this subject to appreciate the basis of selected disorders, and the mechanisms by which the disorders might be prevented or remedied.

Lectures and tutorials deal with: Physiology and biochemistry of the cornea. Physiology of the eyelids and

lacrimal system. The tear film. Physiology and biochemistry of the lens and cataract. Aqueous humor and the intraocular pressure: pathophysiology and pharmacology of glaucoma. Ocular Circulation. The physiology of accommodation and presbyopia

Assessment: During session 1 there will be 2 short tests at times to be arranged, and an end of session written examination. During session 2 there will be one short test, and an end of session written examination.

The final mark will be made up of 30% coursework marks and 70% examination marks. Session 1 marks are worth 65% of the final mark and session 2 marks are worth 35% of the total.

OPTM4301

Visual Science IV

Staff Contact: School Office

CP15 S3 S1 L3 T1 S2 L1 T1 HPW S1 4 S2 2

Prerequisite: OPTM3301

Physiology, anatomy and psychophysics of parallel processing of visual functions; After effects, apparent motion, illusions and constancies; Object recognition and primitives; Neural control mechanisms in accommodation, eye movements, fixation and attention; Comparative neuroscience of the visual system; Origins of visually evoked electric and magnetic fields; Visual proprioception; Visually directed activities; Visual control of eye growth; Plasticity and abnormalities of visual development.

OPTM4302

Clinical Optometry IV

Staff Contact: Mr D Pye

CP85 S3 HPW17

Prerequisites: OPTM3301, OPTM3302, OPTM3208,

OPTM3309, PSYC3506

Corequisites: OPTM4301, OPTM4310, OPTM4311, MDCN8001

Objectives: To further develop the understanding of optometry's role in public health and to develop clinical skills to competently examine patients in optometric practice and recommend appropriate management strategies.

Lectures and tutorials will deal with: Public Health Optometry, epidemiology, legal aspects, analysis of the work environment. Clinical experience; Diagnosis, management and treatment of ocular and visual conditions and diseases. Students will examine patients in the optometry clinic in the following areas; primary care, colour vision, low vision, children's vision, vision training, contact lenses and sports vision, as well as participating in patient review clinics.

Assessment: Is conducted on the basis of written assignments in various topic areas and assessments of clinical performance during patient contact experiences.

OPTM4310

Research Project

Staff Contact: Dr PHerse

CP20 S3 HPW4

Prerequisites: MATH2819, OPTM3301, OPTM3302, OPTM3309, OPTM3208

Objectives: This subject seeks to develop students' skills in searching the literature, critical analysis of publications, developing hypotheses, designing and running experiments, statistical data analysis and oral and written presentation of reports.

Students in groups of 2 to 4 carry out a small research project under the guidance of an academic staff member. In November each group makes a presentation to a symposium.

Assessment: Students are assessed by their project supervisor following guidelines which are made available to the students at the start of the project

OPTM4311

Current Issues in Optometry and Visual Science

Staff Contact: A/Prof SJ Dain

CP5 S2 HPW2

Prerequisites: OPTM3301, OPTM3302, OPTM3309

Corequisites: OPTM4301, OPTM4302

Objectives: To assist students in considering and assessing the active issues in the open issues and shades of opinion in Optometry and Visual Science.

Brief Curriculum: Student presentations on agreed topics in a variety of formats.

Assessment: Treated as one of the current issues.

OPTM4312

Optometry and the Professional Environment

Staff Contact: Mr D Pye

CP10 S3 HPW2

Objectives: To make optometry students aware of the purposes and consequences of their education, to develop an awareness of professional and ethical action in optometric practice; to ensure that the students are aware of their social responsibilities as optometrists.

In lectures and tutorials: Students will study history of optometry and optics. Optometry's role in health care. Morals and ethics. Medicare. Federal and State law. The States' acts of optometry. Consumer law. Legal expectations of the profession. Dealing with change. Macro and microeconomics. Sources of finance. Accounting and taxation. Marketing. Optometric business dynamics. Starting a practice. Modes of practice. Practice information systems.

Assessment: Essay format examination at the end of the year.

Pathology

Pathology Level III

PATH3202

Mechanisms of Human Disease

Staff Contact: Prof C Geczy

CP 30 F HPW4

Prerequisites: BIOS1101, BIOS1201, ANAT2211, ANAT2111 or PHPH2112 or BIOC2101 and BIOC2201 or BIOC2181 and BIOC2291

Lectures, tutorials and practical classes and research/casebook projects aimed at increasing understanding of the molecular basis of disease with particular emphasis on classification of disease processes, clinical outcomes and disease prevention. Comparisons between normal and abnormal cell/tissue and organ function will be made. Includes processes of cell and tissue degeneration, acute and chronic inflammation, infection, thrombosis, infarction, embolism and ischaemia. Particular examples include diseases of practical importance such as pneumonia, tuberculosis, arthritis, lung and myocardial infarction. Skin wounds and fractures will be used to illustrate healing and regeneration. Aberrations of cell growth introduces neoplasia and carcinogenesis with examples of common tumours. The impact of modern biology on understanding disease mechanisms will be demonstrated in practical classes and projects which complement the lectures.

Pathology Level IV

PATH0005/PATH0006

Pathology (Honours)

Staff Contact: Prof CR Howlett

CP120 F

Prerequisite: completion of program 7000 including Level III subjects totalling 90 Credit Points

Philosophy

Philosophy is a wide-ranging discipline, catering for a great diversity of interests, for instance, in science, reasoning, persons, and social issues, and encouraging critical and imaginative thought about the foundations of other subjects and disciplines. Apart from providing considerable choices for students majoring in Philosophy, the diversity of Upper Level subjects makes it possible for students majoring in other disciplines to select subjects complementing their main interest.

Philosophy Level I

First Enrolment in Philosophy

There are four Level I subjects:

Each of these has a 15 Credit Point value. They can be taken separately, and students can gain Upper Level status in Philosophy (qualify to enrol in Upper Level subjects) by passing in only one. However, students enrolling in one will normally enrol in two, and students wishing to major in Philosophy must complete any two of the four.

PHIL1006

Reasoning, Values and Persons

Staff Contact: Phillip Staines, Convenor

CP15 S1 HPW3

Note/s: Excluded 52.103.

A team-taught introduction to philosophical thought and issues through study of traditional and contemporary discussions of four topic areas: philosophical reasoning, ethics and political philosophy, minds, bodies and persons, logic and analysis.

PHIL1007

Ways of Knowing the Nature of Knowledge

Staff Contact: Stephen Hethrington, Convenor

CP15 S2 HPW3

Note/s: Excluded 52.104.

This subject is independent from Introductory Philosophy A, but structured in the same way. Students may enrol in both subjects or in either subject without the other. This subject is a further team-taught introduction to philosophy. The topic areas will include science and religion, knowledge and evidence, metaphysics.

PHIL1008

Ethics and Society

Staff Contact: Karen Lai, Convenor

CP15 S1 HPW3

This is political philosophy and moral philosophy at the intersection of the political with the personal. When we make decisions in important areas like euthanasia, reproductive freedom and reproductive technology, the allocations of health resources, the suppression of smoking and other drugs, censorship, the environment, penal reform and capital punishment, we must balance the rights and duties of the individual with the demands and obligations of society. In this team-taught subject, we consider current debate about the above questions in the light of philosophical theories about – what is ethics; individual morality and duties (the notion of duties to oneself and to others, the fundamental value of respect for persons); public morality and goals (judging actions, laws and policies according to their consequences); and individuals and their rights in the state (theories about rights, justice, and the limits of the state).

PHIL1009**Points of View: Science, Objectivity and Subjectivity***Staff Contact: Neil Harpley, Convenor*

CP15 S2 HPW3

Is the world the way it seems to be? Is there a real world out there or is it all 'in the mind'? This team-taught subject introduces philosophy by examining these questions in relation to science and its claim to objectivity. Does science really provide objective knowledge? Is objective knowledge the same thing as 'value free' knowledge?

Along with scientific sorts of knowledge, are there other sorts of knowledge which are more subjective, more a feature of our individual perspectives. Is there such a thing as common everyday knowledge?, as ethical knowledge?, as self-knowledge? More systematically, the subject will deal with the following questions: How do hypotheses, observations and evidence function in scientific arguments? What is induction, and what is its place in scientific method? Is there a difference between science and non-science?

Are all our observations affected by our personal backgrounds, beliefs and prejudices? If so, does that mean that observation is never objective?

What is the relationship between science and ethics? Does evolutionary science teach us what is morally right and wrong? Is the environment intrinsically valuable or should we study it merely so that we can subjugate and manipulate it to our ends?

Value of Upper Level Subjects in Philosophy

All Upper Level subjects are 15 Credit Points.

Specialisation in Philosophy

Students specialising in Philosophy must complete any two of the School's Level I subjects (30 Credit Points): PHIL1006 (Reasoning, Values and Persons), PHIL1007 (Ways of Knowing), PHIL1008 (Ethics and Society), PHIL1009 (Points of View). In addition, students must complete 6 Upper Level (II/III) subjects (90 Credit Points). Of these, subjects totalling at least 60 Credit Points must be chosen from List A, which includes subjects in Logic, Philosophy of Mind, Philosophy of Science, and areas of History of Philosophy relevant to those subject areas. Students normally two Level II/III subjects in Year 2, and four Level II/III subjects in Year 3. Subject to the approval of the School, which considers the individual subjects nominated by a student and the student's overall program in Philosophy, a student may be permitted to count subjects totalling up to 15 Credit Points offered outside the School toward specialisation in Philosophy.

List A

PHIL2106	Logic
PHIL2107	Advanced Philosophy of Science
PHIL2108	Ways of Reasoning
PHIL2116	Scientific Method
PHIL2117	Philosophical Logic
PHIL2118	Philosophy and Biology
PHIL2206	Contemporary Philosophy of Mind

PHIL2207	Issues in the Philosophy of Psychology
PHIL2217	Personal Identity
PHIL2218	Philosophical Foundations of Artificial Intelligence
PHIL2219	Topics in Philosophy of Language
PHIL2226	Twentieth Century Analytic Philosophy
PHIL2228	Themes in Seventeenth Century Philosophy
PHIL2229	Themes in Eighteenth Century Philosophy
PHIL2417	Relativism: Cognitive and Moral
PHIL2518	Greek Philosophy: Issues in Ethics and Epistemology
PHIL3106	Pre Honours Seminar

The remaining 30 Credit Points are to be chosen from other Upper Level Philosophy subjects.

Level II/III

Some Upper Level subjects deal with particular philosophical topics; others can be taken in sequence to give more sustained treatments of larger areas. Students may select freely among these, subject to stipulations regarding prerequisites. They are welcome to seek advice and further information from the School.

In certain circumstances the prerequisites specified for subjects may be waived; for example, in the case of students who have already studied similar material, or who wish to take isolated subjects relevant to another discipline. Students who feel they have a case for a concession of this kind should consult the School.

Honours Entry Requirements

Students intending to proceed to the award of an Honours degree in Philosophy must normally complete years 13 of programs 5200 (Philosophy) or 5262 (Philosophy of Science) with an average of at least 70% in their Philosophy subjects, including at least one Distinction result; plus PHIL3106 (Pre-Honours Seminar). Subject to the approval of the School, which considers the individual subjects nominated by a student and the student's overall program in Philosophy, a student may be permitted to count subjects totalling up to 15 Credit Points offered outside the School toward satisfying the Honours entry requirements. Students contemplating Honours are urged to seek advice from the School early in their course.

Philosophy Level II/III

Notes: Level II Status in Philosophy consists in being in second or later year of university study, and also having passed at least one Level I Philosophy subject. The prerequisite may be waived in certain cases by the School.

Level III Status in Philosophy consists of having an overall standard of credit or higher in Philosophy subjects totalling 120 Credit Points.

PHIL2106**Logic***Staff Contact: Stephen Hetherington*

CP15 S1 HPW3

Prerequisite: Any Level I subject**Note/s:** Excluded 52.2030 and 52.2031, 52.220, MATH3400.

This subject is about deductive logic (in particular, propositional logic and predicate logic). Aims to construct and to understand – a precise, unambiguous, formal language. Many important parts of English are translatable into it, hence many arguments of English are translated into it too. It is a language with which we can better understand the concept of deductive proof.

PHIL2107**Advanced Philosophy of Science***Staff Contact: Michaelis Michael*

CP15 HPW3

Prerequisite: Upper Level status in Philosophy, or contact School**Note/s:** Excluded 52.304. Not offered in 1998.

Explores some current issues in the philosophy of the sciences and includes discussion of the role of experiment in science; the cognitive status of theories; explanation; intertheoretical reduction; reductionism; models and metaphors; the issues of scientific realism and anti-realisms.

PHIL2108**Ways of Reasoning***Staff Contact: Bill Tarrant*

CP15 S1 HPW3

Prerequisite: Upper level status in Philosophy**Note/s:** Excluded 52.233, 52.2010.

Material for this subject is drawn from everyday sources, such as newspapers, books and advertisements, and including television. Deals with the nature of argument, fallacies, reasoning and the role of reasoning. From studying the structure of arguments students will be able to improve their critical skills and the presentation of their own arguments.

PHIL2109**Metaphysics (Realisms)***Staff Contact: Stephen Hetherington*

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

This subject examines several classic metaphysical questions some of which are as follows: Is there a real world? What is social reality? What is the nature of possibility? Is this the only possible world? Is there a God? Are there people? Is there free will?

PHIL2116**Scientific Method***Staff Contact: Michaelis Michael*

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy, or contact School**Note/s:** Excluded 52.2140.

Science has a serious claim to being the major cultural force shaping our world-view. The aim of this subject is to enable us to understand better our own view about science by tracing their historical development. Examines, in some depth, the conceptions of science to be found in the writings of Aristotle, Descartes, various Positivists, and some more recent philosophers, with a view to understanding how their conceptions of science and their conceptions of which questions philosophers should ask about science differ from each other and from our own.

PHIL2117**Philosophical Logic***Staff Contact: Michaelis Michael*

CP15 HPW3

Prerequisite: PHIL2106 or equivalent, or contact School**Note/s:** Not offered in 1998

Follows on from PHIL2106 Logic and is intended to introduce students to the ways various logics have been deployed within philosophy, with a view to illuminating such topics as linguistics meaning, content of thought, modalities, necessity and possibility, contrary-to-fact conditionals, laws of nature, action value, deducibility and fiction.

PHIL2118**Philosophy and Biology***Staff Contact: Michaelis Michael*

CP15 S1 HPW3

Prerequisite: Upper Level Status in Philosophy or 12 credit points in History and Philosophy of Science and Technology (HPST), or BIOS1101 or BIOS1201**Note/s:** Excluded HPST3012, HPST3117.

Aims to bring out some of the key theoretical and philosophical issues thrown up by modern biology. These include but are not exhausted by the nature and scientific status of evolutionary theory; the debates over classification of higher taxa; the issue of reduction of biology to more 'basic' sciences; and the ethical implications of biology. The subject is designed to be of interest to students of the humanities and to students of the biological sciences.

PHIL2206**Contemporary Philosophy of Mind***Staff Contact: Philip Cam*

CP15 HPW3

Prerequisite: Upper Level status in Philosophy**Note/s:** Excluded 52.2002, 52.250. Not offered in 1998

An introduction to some major issues in the field. There are three topics: (1) On relating the Mental to the Physical; (2) Alternative Approaches to the Psychology of Belief and Desire; and (3) The Psychology of Experience and Consciousness.

PHIL2207**Issues in the Philosophy of Psychology***Staff Contact: Philip Cam*

CP15 S2 HPW3

Prerequisite: Upper Level in Philosophy or PSYC1001 AND PSYC1011**Note/s:** Excluded 52.2003, 52.251.

Philosophical issues in theoretical psychology, drawn from philosophical and psychological writings on personal identity, consciousness and self-knowledge, perceptual illusions, processing systems, psychology and brain science.

PHIL2208

Epistemology (Scepticisms)

Staff Contact: Stephen Hetherington

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998

All of us acknowledge that there are things we do not know. But such humility can turn into perplexity when we encounter epistemological sceptics. A sceptic typically denies us either vast amounts of knowledge or justification of some select, but extremely everyday, sorts of apparent knowledge or justification. In short, sceptics argue for surprising denials of knowledge or justification. Examines some historically prominent sceptical ways of thinking, which attack knowledge of, or justified belief in, such areas as: the external world, the unobserved, linguistic meaning, everything.

PHIL2209

Epistemology (Knowledge and Justification)

Staff Contact: Stephen Hetherington

CP15 S2 HPW3

Prerequisite: Upper Level status in Philosophy

Epistemology is officially the Theory of Knowledge. One of its most important questions is therefore 'What is knowledge?' Answering this generally leads to another question: 'What is *justified* belief?' (For most epistemologists think knowledge *is* a sort of justified belief.) This subject is built around these questions. We will consider various attempts that epistemologists have made to answer them. Topics include: perception, false belief, defeated evidence, causality, reliability, cognitive responsibility, perspectives.

PHIL2215

The Struggle for Human Nature

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998.

Theories about human nature often figure as fundamental, though often implicit, assumptions in views about rationality, about knowledge bases, about equality or justice, and in fields as diverse as politics, anthropology, economics and sociobiology. Explores the work that invoking the concept of human nature does in various areas of debate. Topics include: the traditional philosophical debates about innateness, recent discussions of knowledge of language, assumptions about human nature implicit in some economic theories and sociobiological accounts of human nature.

PHIL2217

Personal Identity

Staff Contact: Neil Harpley

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.2180, 52.232.

Controversy about the nature of persons and the criteria for personal identity has usually centred on the questions of whether persons are bodies or are minds and whether the criteria for their identity are physical or psychological. Philosophers have frequently ignored the social dimensions of personhood or, at best, given it only a peripheral place in the discussion. The notion that people are socially constructed will be given due weight and an attempt made to integrate the differing approaches to what it is to be a person.

PHIL2218

Philosophical Foundations of Artificial Intelligence

Staff Contact: Phillip Staines

CP15 S2 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.2026.

Artificial Intelligence: an examination of its assumptions, history, goals, achievements and prospects.

PHIL2219

Topics in the Philosophy of Language

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998.

The subject is divided into two parts. Part I focuses on the relation between words and the world. Here the central topic is theories of truth: the coherence theory, the correspondence theory, the redundancy theory, etc. An important and related topic is theories of reference. Readings include selections from Aristotle, William James, Russell, Kripke and others. Part II focuses on the relation between language and the people that use it. The central concept here is meaning. We investigate such issues as the relation between language and thought, the nature of convention, nature of communication, what sort of knowledge is involved in knowing a language. Readings include fragments from Locke, Descartes, Grice, Austin, Wittgenstein, Lewis, Quine and others.

PHIL2226

Twentieth Century Analytic Philosophy

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998.

As well as asking how modern Anglo-American philosophy is different from its predecessors, we also look at ways in which its ideas and concerns are continuous with those of other epochs and traditions. Readings include selections from Frege, Russell, Wittgenstein, Quine, Kripke, Putnam. Themes include: the rejection of Hegelian idealism, atomism and holism, the influence of empiricism, the revival of Platonism through philosophy of mathematics, ideas about existence and ontology, the revival of Aristotelian

essentialism, the return to a sort of idealism. No prior familiarity with these writers will be assumed. Moreover, we steer clear of papers that make heavy use of formal logic.

PHIL2228

Themes in Seventeenth Century Philosophy

Staff Contact: Genevieve Lloyd

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

This subject will study a range of topics drawn from the writings of the seventeenth century philosophers John Locke, Rene Descartes, Benedict de Spinoza and Gottfried Leibniz. Topics will be selected from the following: substance, minds and bodies, freedom, contingency, possibility and necessity, time and space.

PHIL2229

Themes in Eighteenth Century Philosophy

Staff Contact: Genevieve Lloyd

CP15 S2 HPW3

Prerequisite: Upper level status in Philosophy

This subject will study a range of topics drawn from the writings of the eighteenth century philosophers George Berkeley, David Hume, Gottfried Leibniz and Jean-Jacques Rousseau. Topics will be selected from the following: causality, idealism, reason and the passions, human nature and the self.

PHIL2309

The Heritage of Hegel: The Concept of Experience

Staff Contact: Lisabeth During

CP15 S2 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.221, 52.3025 in 1988.

Hegel is one of the towering presences in contemporary philosophy. Long recognised as an influence on European philosophy from Marx to Lacan, Derrida to Kristeva, the Hegelian philosophy of identity, difference, subjectivity and desire, is essential to anyone who wants to understand current directions in critical theory.

This subject will cover a close reading of the *Phenomenology of Spirit*, together with selections from Hegel's lectures and *Logic*. The second half of the course looks at important readings of Hegel by Derrida, Habermas, Irigaray, etc.

PHIL2316

Philosophy of Religion

Staff Contact: Karyn Lai

CP15 S2 HPW3

Prerequisite: Upper Level status in Philosophy

A discussion of some main topics in the philosophy of religion (the question of God, religious language, the problem of evil, mysticism and faith) which are considered via two influential approaches: that of analytic philosophy and phenomenology/hermeneutics.

PHIL2407

Contemporary European Philosophy: Vision and Transgression

Staff Contact: Lisabeth During

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 60.014, EURO2400.

An introduction to the 'philosophy' of some influential contemporary thinkers whose relation to philosophy is contested. Readings are drawn from the work of Freud, Kristeva, Benjamin, Breston, Lyotard, Adorno, Bataille, Derrida, Artaud, and Deleuze. Discussion focuses on ideas of rationality, civilisation, experience, and violence.

PHIL2409

Speaking through the Body: Feminism, Psychoanalysis, Literature

Staff Contact: Lisabeth During

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998.

How natural is sex anyway? Do we act the parts of masculine and feminine or do they act us? The language of the body is symbolic; even sexual difference is nothing without its codes. Thus the search for a body that speaks takes us to culture. Explores the idea of sexual polarity or binarism and some influential criticisms or refusals of it. Topics discussed include: transvestitism and gender ambivalence; alternatives to heterosexuality; relations between femininity and language. Readings will be taken from the work of Freud, Virginia Woolf, Oscar Wilde, Rousseau, Deleuze and Guattari, Shakespeare, and contemporary feminism.

PHIL2416

Power, Knowledge and Freedom

Staff Contact: Rosalyn Diprose

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

Excluded: EURO2400

In Nietzsche and Foucault we find a powerful critique of philosophical conceptions of knowledge, subjectivity, morality, truth, desire and power. The Nietzschean project, seminal to Foucault, is continued by such maverick figures in contemporary philosophy as Bataille, Artaud and Deleuze, who imagine the relations between body, freedom and transgression in startling ways.

PHIL2417

Relativism: Cognitive and Moral

CP15 HPW3

Prerequisite: Upper Level status in Philosophy, or contact School

Note/s: Not offered in 1998.

Do people in alien cultures see the same world as we do? If knowledge is socially constructed can there be a sense in which world views clash? Is there a difference between what is subjective and what is relative? Could there be one true morality? Is there such a thing as reason or rationality? Even if there is, could such a thing be other

than specific to our culture? Are there other, non-rational, ways of understanding the world? These and a host of other questions introduce the notion of relativism. Aims to clarify and examine some of the various questions and issues that arise from the issue of relativism. Topics may include: moral relativism, cognitive relativism, the absolute conception of the world, truth, conceptual schemes, and semantic relativism.

PHIL2418

Ethical Issues

Staff Contact: Karyn Lai

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

An examination of a range of current ethical issues involved in topics such as abortion, surrogacy, foetal tissue research, euthanasia, AIDS.

PHIL2419

Ethics, Differences and Embodiment

Staff Contact: Rosalyn Diprose

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Not offered in 1998.

Explores an approach to ethics originating in ancient Greek thought and developed by 20th century existential phenomenologists (such as Sartre, de Beauvoir, Merleau-Ponty and Levinas). Topics covered include how an embodied 'ethos' (re. an habitual way of life) is socially constituted; what is the basis of our social relations with others; and possible applications of these ideas to analyses of the ethics of sexual difference, cultural difference and some issues in medical ethics.

PHIL2506

Classical Political Philosophy

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.203, 52.2050, 52.240. Not offered in 1998.

Examination of the work of some central figures in the history of political philosophy, with regard to the basis of political society, its various functions, and its relation to the individuals in it. Through an investigation of works by Hobbes, Locke, Rousseau, and J.S. Mill, topics include the idea of a state of nature, theory of a social contract, the establishment of political rights and obligations, and the relation of moral and political concerns within a political society.

PHIL2508

Theories in Moral Philosophy

Staff Contact: To be advised

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.523, 52.2230, 52.5232, 52.243. Not offered in 1998.

Examination of three moral theories central in the history and development of moral philosophy. David Hume, Immanuel Kant, and John Stuart Mill present different kinds

of moral theories, differing approaches to arriving at a moral theory, and specific theories which are markedly different from each other. Each moral theory is investigated in itself and in comparison with the other two.

PHIL2509

Philosophy of Law

Staff Contact: Stephen Cohen

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.105, 52.2150, 52.241. Not offered in 1998.

Selected conceptual and normative issues in the philosophy of law, centering around the broad areas of law (e.g., its nature, validity, bindingness, and relation to morality), liberty, justice, responsibility (including strict, vicarious, and collective liability), and punishment.

PHIL2517

Philosophy and Gender

Staff Contact: Rosalyn Diprose

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.216. Not offered in 1998.

Considers the nature of sexuality and ideas about the role of sexual difference in the constitution of the bodily subject. The social significance of the connection between gender and such distinctions as culture/nature, reason/passion and public/private is examined in the light of feminist critiques. Also raises questions about philosophy and feminism with respect to issues of argument, advocacy and style.

PHIL2518

Greek Philosophy

Staff Contact: Genevieve Lloyd

CP15 S1 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.2040, 52.2220, PHIL2507.

Covers themes in Plato and Aristotle which have had a continuing influence in Western philosophy. Discussion centres on concepts of virtue and knowledge in relation to ideals of wisdom and contemplation.

PHIL2519

Introduction to Chinese Philosophy

Staff Contact: Karyn Lai

CP15 S2 HPW3

Prerequisite: Upper Level Status in Philosophy

Aims to introduce the philosophical concepts and theories of traditional China and to introduce recent Western discussion on the subject of Chinese philosophy. Deals with the major philosophical debates of ancient China and with some issues from later periods. In passing, the subject also deals with the 'Chinese worldview' and attempts to clarify popular notions like 'Confucianism', 'the Tao' or 'the philosophy of the Book of Changes'. It represents Chinese philosophy as a complex discipline which has tackled similar issues to those tackled in the West, and has developed comparable means of analysis and argument.

PHIL2520**Aspects of Chinese Thought***Staff Contact: Karyn Lai*

CP15 S2 HPW3

Prerequisite: Upper Level Status - students must be in year 2 or later of University study. (students need not have Upper Level Status in Philosophy)

Note/s: Excluded PHIL2519

There are many significant concepts underlying Chinese thought which have their origin in the classical Chinese schools of thought from pre-Confucian times. This subject critically examines some of these concepts, such as the Confucian *jen* (humanity) and *li* (rules of property); and the Taoist *tao* and *wu-wei* (non-action).

PHIL2606**Aesthetics***Staff Contact: Rosalyn Diprose*

CP15 HPW3

Prerequisite: Upper Level status in Philosophy

Note/s: Excluded 52.273, 52.2260. Not offered in 1998

Emphasis is placed on the visual arts, although the subject also deals with literature and film. Topics include: realism and representation; the dialectics of tradition and innovation; the idea of aesthetic experience; the sexuality of art and the observer.

Assessment: To be decided in consultation with the class.

PHIL2608**Experiencing the Spectacle: From Plato to Virtual Reality***Staff Contact: Rosalyn Diprose*

CP15 S2 HPW3

Prerequisite: Upper Level status in Philosophy or Media and Communications

Note/s: Excluded 52.273, 52.2260, PHIL2606

Explores philosophical accounts of what is involved in a person's experience of a spectacle (eg. A painting, a piece of theatre, television or virtual reality). Some philosophers (eg. Plato) devalue the experience as irrational and different to rational contemplation of an object of knowledge. Others (eg. Kant) claim the experience can be objective and universal, where what I experience is (potentially) the same as everyone else. Against the common view that the person views the spectacle from a distance and remains unaltered by the experience, Nietzsche, Heidegger and Merleau-Ponty in different ways argue the spectacle is necessary for creatively opening the person and their world to other possibilities. Emphasis will be on how these thinkers understand the relation between the person and the spectacle with consideration of the implications of their views for understanding the impact of visually based media in our lives.

PHIL2706**Seminar A**

CP15 S1 HPW3

Note/s: Might not be offered in 1998 – Consult School.

The seminar is offered occasionally to suit particular student and staff needs and interests. Admission by

permission, based on a student's performance in Upper Level subjects. Topics vary and are influenced by student requests. Students are invited to approach any member of staff about the possibility of particular seminar topics.

PHIL2707**Seminar B**

CP15 S2 HPW3

Note/s: Might not be offered in 1998 – Consult School.

The seminar is offered occasionally to suit particular student and staff needs and interests. Admission by permission, based on a student's performance in Upper Level subjects. Topics vary and are influenced by student requests. Students are invited to approach any member of staff about the possibility of particular seminar topics.

PHIL2708**Reading Option**

CP15 S1 or S2 HPW3

Students wishing to do work in an area not covered by an existing subject or seminar may apply to the School to take a reading option. Not more than one such subject may be counted towards a degree. Approval of a program for a reading option depends on its suitability and on the availability of a member of staff to undertake supervision.

Philosophy Level III

Notes: Level III Status in Philosophy consists of having an overall standard of credit or higher in Philosophy subjects totalling at least 90 Credit Points.

PHIL3106**Pre-Honours Seminar***Staff Contact: Phillip Cam/Neil Harpley/ Rosalyn Diprose*

CP15 S2 HPW3

Prerequisite: 30 credit points in Philosophy with overall standard of Credit or higher

A team-taught subject for students who are considering proceeding to Honours in Philosophy; designed to form skills in philosophical research and writing through seminar discussion of readings illustrating a range of philosophical approaches, styles and techniques.

Philosophy Level IV**PHIL4000/PHIL4050****Philosophy Honours (Research)***Staff Contact: Michaelis Michael and Rosalyn Diprose, Coordinators*

CP120 F

Prerequisite: Completion of program 5200, 5262 or 5206 including Level II/III subjects totalling 105 Credit Points, including PHIL3106

The Honours Year consists of writing a research thesis under supervision and two seminar courses.

PHIL4050**Philosophy Honours (Research) P/T**

Staff Contact: Michaelis Michael and Rosalyn Diprose, Coordinators
CP120 F

Prerequisite: Completion of program 5200, 5262 or 5206 including Level II/III subjects totalling 105 Credit Points, including PHIL3106

PHIL4500**Combined Philosophy Honours (Research) F/T**

Staff Contact: Michaelis Michael and Rosalyn Diprose, Coordinators
CP120 F

Prerequisite: Completion of program 5200, 5262 or 5206 including Level II/III subjects totalling 105 Credit Points, including PHIL3106

PHIL4550**Combined Philosophy Honours (Research) P/T**

Staff Contact: Michaelis Michael and Rosalyn Diprose, Coordinators
CP120 F

Prerequisite: Completion of program 5200, 5262 or 5206 including Level II/III subjects totalling 105 Credit Points, including PHIL3106

Students contemplating Honours are urged to seek advice from the School on their program early in their course.

The General Education requirements will be met within the Honours Program by seminars and a statement.

Corequisite: MATH1021 or MATH1032 or MATH1131 and MATH1231.

Motion of particles under the influence of mechanical, electrical, magnetic and gravitational forces. Force, inertial mass, energy, momentum, charge, potential, fields. Conservation principles applied to problems involving charge, energy and momentum. Application of Kirchhoff's laws to AC and DC circuits. Uniform circular motion, Kepler's laws and rotational mechanics. Properties of matter: solids, liquids, gases. Application of wave theories to optical and acoustical phenomena such as interference, diffraction and polarisation.

Mid-year Start

Students who fail Session 1 of PHYS1002 are strongly advised to discontinue the subject and enrol in Session 2 in PHYS1011 Physics I (FT1). This subject covers the Session 1 material of PHYS1002 during Session 2. Then PHYS1021 covers the rest of the syllabus over the Summer Session.

Note: The Session 2 syllabus of PHYS1002 is not repeated in Session 1 of the next year.

PHYS1011**Physics 1 (FT1)**

Staff Contact: First Year Director
CP15 S2 HPW6

Prerequisites, corequisites and syllabus: identical to PHYS1002, S1.

PHYS1021**Physics 1 (FT2)**

Staff Contact: First Year Director
CP15 Summer Session HPW9
Prerequisite: PHYS1011

Syllabus identical to PHYS1002, S2

Physics

Physics Level I Subjects

Notes: Where mathematics subjects are specified as prerequisites or as corequisites, the higher levels of such subjects are acceptable and preferable. The total value of the combination of PHYS1022 and PHYS1002 is 45 Credit Points.

PHYS1002**Physics 1**

Staff Contact: First Year Director
CP30 F HPW6

Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics (90-100), or 2 and 3 unit Mathematics (100-150), or 3 and 4 unit Mathematics (100-200) or (for PHYS1002 only) MATH1011, and 2 unit Science (Physics) 65-100, or 2 unit Science (Chemistry) 75-100, or 3 unit Science 100-150, or 4 unit Science 1-50 or PHYS1022 (2 unit Mathematics in this instance refers to the 2 unit Mathematics subject which is related to the 3 unit Mathematics subject, and does not refer to the subjects Mathematics in Society or Mathematics in Practice).

Elective Syllabus for PHYS1002, S2

Those students enrolled in a physics program in the Science Course, and who have achieved a satisfactory performance in Session 1, may elect to take the following option for Session 2. (This option is not repeated in Summer Session).

QUANTUM AND LASER PHYSICS

Waves in elastic media; sound waves; early quantum physics; the laser, operation and applications, interference, diffraction and polarisation.

AC CIRCUIT THEORY

Addition of alternating quantities; series circuits, impedance, power, resonance, parallel circuits; ideal transformer.

SOLAR SYSTEM ASTROPHYSICS

Celestial dynamics: orbits; shape and rotation of planets, planetary rings; energy generation in sun; thermal physics; planetary atmospheres.

PHYS1022**Physics 1 For Health and Life Scientists***Staff Contact: First Year Director*

CP30 F HPW6

Corequisites: MATH1021 or MATH1032 or MATH1131.

Principally for students majoring in the life and health sciences disciplines. Topics at an introductory level.

The methods of physics, describing motion, the dynamics of a particle, conservation of energy, kinetic theory of gases, properties of liquids, vibrations and waves, electricity and conduction in solids, ions and ionic conduction, magnetism and electromagnetic induction, alternating current, atomic nature of matter, X-rays, the nucleus and radio-activity, geometrical optics, optical instruments, wave optics, microscopes and their uses.

PHYS1601**Computer Applications in Experimental Science 1***Staff Contact: First Year Director*

CP15 S1 or S2 HPW6

Corequisites: PHYS1002 or PHYS1022, MATH1032 or MATH1131**Note/s:** Excluded PHYS1611.

An introduction to the internal structure, operating and interfacing of computers. Binary and digital electronic logic; logic control devices; bus communication structures; instruction execution in a processor; machine language code and instruction sets; interfaces and interaction schemes between processor and the outside world.

PHYS1611**Laboratory Computers in Physical Science***Staff Contact: First Year Director*

CP15 HPW6

Corequisites: MATH1021 or MATH1032 or MATH1131 and PHYS1002 or PHYS1022**Note/s:** Excluded programs 0600. Not offered in 1998.**PHYS1889****Physics 1 (Aviation)***Staff Contact: Dr M Box*

CP22.5 F HPW6

Corequisites: MATH1021 or MATH1079 or MATH1131**Note/s:** Restricted to course 3980.

The methods of Physics, describing motion, the dynamics of particle, conservation of energy, kinetic theory of gases, properties of liquids, vibrations and waves, electricity and conduction in solids, ions and ionic conduction, magnetism and electro magnetic induction, alternating current.

PHYS1999**Physics I (Optometry)***Staff Contact: First Year Director*

CP15 S1 HPW6

Note/s: Restricted to course 3950.

Vectors, linear mechanics, Newton's Laws of Motion. Rotational mechanics, electric forces, fields and potential. Magnetic forces and fields. Ampere's Law, Faraday's Law. Electric circuit theory, AC, DC and transient circuits. Fluid

mechanics; Bernoulli's equation; viscosity; Stoke's Law. Nuclear Physics; radioactivity, half-life, nuclear forces, binding energies, fission and fusion.

Physics Level II Subjects

Notes: Where mathematics subjects are specified as prerequisites or as corequisites, the higher levels of such subjects are acceptable and preferable. Students are also advised that other subjects may be acceptable equivalent prerequisites or corequisites to those listed, eg PHYS2949 of course 3640 may be acceptable in place of PHYS2021. Enquiry should be made to the Executive Assistant.

PHYS2000**responsibility and Ethics in Science***Staff Contact: Prof R F Howe, Chemistry*

CP7.5 S2 HPW2

Prerequisite: none**Note/s:** General Education objective 5 designed for chemistry and physics students

Professional and ethical action and social responsibility in science. Case studies of the process of scientific discovery, ethics and fraud in science, science in industry, science and the military, science and religion, science and the media, intellectual property and patent law.

PHYS2001**Mechanics, and Computational Physics***Staff Contact: Executive Assistant*

CP15 S1 HPW4

Prerequisites: PHYS1002, MATH1032 or MATH1231.*Corequisite:* MATH2011 or MATH2110**Note/s:** Excluded PHYS2999.

Harmonic motion, systems of particles, central force problems, Lagrange's equations, coupled oscillations, travelling waves, pulses, energy and momentum transfer, computer operating systems, introduction to FORTRAN, libraries and software packages, use of computers to solve problems in physics.

PHYS2011**Electromagnetism and Thermal Physics***Staff Contact: Executive Assistant*

CP15 S2 HPW4

Prerequisites: PHYS1002, MATH1032 or MATH1231*Corequisites:* MATH2011 or MATH2110**Note/s:** Excluded PHYS2999.

Electric field strength and potential, Gauss' law, Poisson's and Laplace's equations, capacitance, dielectrics and polarisation, magnetism, electro-magnetic induction, Maxwell's equations, electromagnetic waves. Laws of thermodynamics, kinetic theory, microscopic processes, entropy, solid state defects, Helmholtz and Gibbs functions, Maxwell's relations, phase diagrams, chemical and electrochemical potential.

PHYS2021**Quantum Physics and Relativity***Staff Contact: Executive Assistant*

CP15 F HPW2

Prerequisites: PHYS1002, MATH1032 or MATH1231**Note/s:** Excluded PHYS2989, PHYS2949.

Wave-particle duality. Operators, postulates of quantum mechanics. Applications: steps, barriers and tunnelling. H atom. Orbital, spin angular momentum, magnetic moment. Spin orbit interaction. Molecules, LCAO, rotation and vibration. Introduction to statistical mechanics. The nucleus: properties, forces, models, fission and fusion. Special theory of relativity, simultaneity, time dilation, length contraction, momentum and energy.

PHYS2031**Laboratory***Staff Contact: Executive Assistant*

CP15 F HPW3

Prerequisites: PHYS1002, MATH1032 or MATH1231**Note/s:** Excluded PHYS2920.

Experimental investigations in a range of areas: x-ray diffraction, work function, semiconductor bandgap, Hall effect, carrier lifetimes, nuclear magnetic resonance, magnetic properties and electrostatics. Electronics bench experiments and tutorials on diodes, transistors, operational amplifiers, power supplies and digital electronics.

PHYS2030**Laboratory A***Staff Contact: Executive Assistant*

CP7.5 S1 HPW3

Prerequisites: PHYS1002, MATH1032 or MATH1231**Note/s:** Excluded PHYS2031.

Experimental investigations in a range of areas: x-ray diffraction, work function, semiconductor bandgap, Hall effect, carrier lifetimes, nuclear magnetic resonance, magnetic properties and electrostatics.

PHYS2160**Astronomy***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisite: PHYS1002

Galaxies, the distance scale, large structure of the universe, galaxy evolution, the very early universe.

PHYS2410**Introductory Biophysics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisite: PHYS1002 or PHYS1022.

Biomechanics. Scaling theory. Fluid physiology and dynamics. Electrochemical potential. Membrane impedance, origin of membrane potentials. Generation and propagation of the nerve impulse. Physics of vision and hearing.

PHYS2500**Methods in Mathematical Physics**

CP7.5 HPW2

Prerequisites: PHYS1002, MATH1032 or MATH1231.*Corequisites:* MATH2011, MATH2120, MATH2510**Note/s:** Not offered in 1998.**PHYS2601****Computer Applications in Experimental Science 2***Staff Contact: Executive Assistant*

CP15 S1 HPW5

Prerequisite: PHYS1601

Technical aspects of computer hardware, peripherals and systems. Bus logic devices; simple interface design; use of a general purpose interface for communication, data collection and control. Speed and capacity limitations of conventional peripherals; techniques to improve performance beyond the computer's capabilities.

PHYS2630**Electronics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW3

Prerequisite: PHYS1002 or PHYS1022*Exclusions:* PHYS2920, PHYS2031

Electronic bench experiments and tutorials on diodes, transistors, operational amplifiers, power supplies and digital electronics.

PHYS2810**Atmospheric Physics***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisites: PHYS1002 or PHYS1022 or PHYS1889, MATH1021 or MATH1231 or MATH1079**Note/s:** Excluded PHYS2819

Atmospheric composition, thermodynamics of dry and moist air, stability, cloud physics, atmospheric electricity, radiation laws, solar and terrestrial radiation, applications, atmospheric energy transport, 1D and 3D climate models, applications.

PHYS2850**Environmental Acoustics***Staff Contact: Executive Assistant*

CP7.5 S1 HPW 2.5

Prerequisites: PHYS1002 or PHYS1022 or PHYS1889**Note/s:** Excluded PHYS1159.

Elasticity of solids and fluids, intensity pressure and particle velocity. Audiology. Response and threshold curves, loudness, A-weighting. Speech. Sources of noise: aerodynamic, engines, panels. Noise criteria. Noise reduction.

PHYS2991**Mechanics and Thermal Physics***Staff Contact: Executive Assistant*

CP15 F HPW2

Prerequisites: MATH1032 or MATH1231 or MATH1042 or MATH1241, PHYS1002*Corequisite:* MATH2100**Note/s:** Excluded PHYS2001, PHYS2011.

Particle mechanics, harmonic motion, central force problems, systems of particles, Lagrange's equations with applications, coupled oscillations, wave equation. Thermodynamic laws, entropy, kinetic theory, M-B distribution, microscopic processes, Maxwell's relations, chemical potential, phase diagrams, multicomponent systems, electrochemical potential, statistics of defects in solids.

Physics Level III Subjects**Note:** See notes for Physics Level II subjects.**PHYS3010****Higher Quantum Mechanics***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisite: PHYS2021*Corequisite:* MATH2120**Note/s:** Excluded PHYS3210. Not available in courses 3970, 3400, 3930 and 4075 without a mark of 65 or greater in PHYS2021.

Fundamental principles and matrix formulation, spherically symmetric systems, angular momentum theory, perturbation theory and semiclassical radiation theory, variational methods, identical particles.

PHYS3021**Statistical Mechanics and Solid State Physics***Staff Contact: Executive Assistant*

CP15 S1 HPW4

Prerequisites: MATH2120, PHYS2011, PHYS2021

Canonical distribution, paramagnetism, Einstein solid, ideal gas, equipartition, grand canonical ensemble, chemical potential, phase equilibria, Fermi and Bose statistics, Bose condensation, blackbody radiation. Crystal structure, bonding, lattice dynamics, phonons, free-electron models of metals, band theory, point defects, dislocations.

PHYS3030**Higher Electromagnetism***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisites: PHYS2011, MATH2011, MATH2120, MATH2520**Note/s:** Excluded PHYS3230. Not available in courses 3970, 3400, 3930 and 4075 without a mark of 65 or greater in PHYS2011.

Electromagnetic fields; Maxwell's equations, Poynting theorem, electromagnetic potentials. Plane and spherical waves. Reflection and transmission, fields in dispersive

media, models and applications, emission of radiation from accelerated charges, covariant formulation of electromagnetism.

PHYS3041**Experimental Physics A***Staff Contact: Executive Assistant*

CP15 F HPW4

Prerequisite: PHYS2031

Basic experimental techniques and analysis of results in the following areas: electricity, magnetism, diffraction optics including X-ray and electron diffraction, solid state physics, nuclear physics, atomic physics and spectroscopy, vacuum systems.

PHYS3050**Nuclear Physics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisite: PHYS3010 or PHYS3210 with a mark of 65 or greater

Nuclear shell model; theory of beta decay; the deuteron, nucleon-nucleon scattering; theories of nuclear reactions, resonances; mesons and strange particles, elementary particle properties and interactions; symmetries and quark models; strong and weak interactions.

PHYS3060**Advanced Optics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisite: PHYS1002*Corequisite:* MATH2120

Review of geometrical optics, including ray tracing, aberrations and optical instruments: physical optics, including Fresnel and Fraunhofer diffraction, transfer functions, coherence, and auto and cross correlation: applications of optics, including fibre optics, lasers and holography.

PHYS3110**Experimental Physics B1***Staff Contact: Executive Assistant*

CP7.5 S1 HPW4

Prerequisite: PHYS2031

Selected experiments and projects. Advanced experimental techniques and open ended projects in the areas covered in PHYS3041 Experimental Physics A together with projects involving electron and nuclear magnetic resonances, low temperature physics and superconductivity. Fourier optics, holography.

PHYS3120**Experimental Physics B2***Staff Contact: Executive Assistant*

CP7.5 S2 HPW4

Prerequisite: PHYS2031

As for PHYS3110 Experimental Physics B1.

PHYS3160**Astrophysics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisite: PHYS2021

Stellar radiation, spectra classification. Hertzsprung Russell diagrams, determination of stellar masses and radii. Equations of stellar structure, energy sources in stars, nuclear reaction cycles energy transport, equations of state, degeneracy, opacity. Properties of main sequence stars, stellar evolution, structure of red giants and white dwarfs. The solar atmosphere.

PHYS3210**Applied Quantum Mechanics***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisite: PHYS2021*Corequisite:* MATH2120*Excluded:* PHYS3010

Note/s: Not available to Advanced Science students in programs 0100, 0121 and 0161

Principles of wave mechanics and its applications including harmonic oscillator, spherically symmetric systems, angular momentum, perturbation theory and semi classical radiation theory identical particles and the theory of atoms, solid state devices and quantum wells

PHYS3230**Applied Electromagnetism***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisites: PHYS2011, MATH2011, MATH2120*Excluded:* PHYS3030

Note/s: Not available to Advanced Science students in programs 0100, 0121 and 0161.

Review of Maxwell's equations in integral and differential form, boundary conditions, applications to plane electromagnetic waves in vacuum and material media, dispersion, reflection and transmission, waves in waveguides, fibres and cavities, dipoles and antenna systems.

PHYS3310**Physics of Solid State Devices***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Corequisite: PHYS3021

Review of electronic structure in semiconductors; p-n junctions; bipolar and field effect transistors including formation, characteristics and electrical breakdown. Optical devices including light emitting diodes and junction lasers. Integrated circuit structures.

PHYS3320**Topics in Condensed Matter Physics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Corequisite: PHYS3021

Superconductivity, Meissner-Ochsenfeld effect, entropy, thermodynamics and relevant theories, Josephson

junctions. Amorphous materials, preparation, magnetic properties, bandgaps, dangling bonds and ESR, mobility edge, solar cells. Polymers, structure, bonding, relaxation phenomena, electrical breakdown, liquid crystals.

PHYS3410**Biophysics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisites: PHYS2011, PHYS2410

Physics of self-assembling systems, cellular ultrastructure. Thermodynamics of irreversible processes, application to life processes. Thermodynamical description of ecological associations. Structure of proteins and other macromolecules. Physics of nerve and muscle.

PHYS3510**Advanced Mechanics, Fields and Chaos***Staff Contact: Executive Assistant*

CP7.5 S1 HPW2

Prerequisites: PHYS2001, MATH2011

Lagrange's equations and applications, variational principles, dissipative systems, Hamiltonian formulation, canonical transformations, Poisson brackets, Hamilton-Jacobi equation, continuous systems and fields, stability and chaos.

PHYS3550**General Relativity***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisites: PHYS2021, MATH2011

Relativistic kinematics and dynamics, tensors and tensor operations, Christoffel symbols, formulation of general relativity, curvature of space, geodesics, gravitational field equations, Schwarzschild solution, tests of the theory, astrophysical and cosmological implications.

PHYS3610**Computational Physics***Staff Contact: Executive Assistant*

CP7.5 S2 HPW2

Prerequisites: PHYS2001, PHYS2021, MATH2120

Use of computers in solving and visualising physical problems, including applications of least squares techniques, quantum mechanical eigenvalues and boundary value problems (Woods Saxon potential, Poisson's equation, heat conduction) and Monte Carlo techniques

PHYS3630**Electronics***Staff Contact: Executive Assistant*

CP7.5 S1 HPW3

Prerequisite: PHYS2031

Noise and drift. Instrumentation, amplifiers, precision amplifier techniques. Digital electronics. Active filters. Oscillators. Modulation and demodulation, phase locked loops. RF techniques. Conversion between analogue and digital. Transducers. Bandwidth narrowing techniques. Power supplies.

PHYS3710**Lasers and Applications**

Staff Contact: Executive Assistant
CP7.5 S1 HPW2

Note/s: Offered in odd-numbered years only.

Interaction between light and matter, fundamental properties of laser amplifiers and oscillators, giant pulse generation, mode locking and Q switching, specific laser systems including gas lasers and semiconductor lasers, applications of lasers.

PHYS3720**Optoelectronics**

Staff Contact: Executive Assistant
CP7.5 S1 HPW2

Note/s: Offered in even-numbered years only.

Introduction to non-linear optics, second harmonic generation, parametric amplification, phase matching, optical bistability, modulation of light, types of optical detectors including thermal detectors, photomultipliers and semiconductor detectors.

PHYS3760**Laser and Optoelectronics Laboratory**

Staff Contact: Executive Assistant
CP7.5 S2 HPW4

Techniques employed in laser technology and components used in laser applications. Construction, operation and characterisation of several types of lasers. Applications of lasers such as holography, acousto-optics, fibre optics, optical spectroscopy, safety aspects of lasers.

Physics Level IV**PHYS4103/PHYS4113****Physics 4 (Honours)**

Staff Contact: A/Prof J Cadogan
CP120 F

Prerequisite: Completion of program 0100 including Level III subjects totalling 105 Credit Points, or 0161 including Level III subjects totalling 90 Credit Points

Note/s: For the combined Physics/Geology honours see entry under Board of Studies in Science and Mathematics.

Honours programs consist of advanced lecture subjects and project work. Students normally undertake two separate projects during the year, in different research areas. All students take subjects in quantum mechanics, statistical mechanics and solid state physics. Additional subjects totalling 60 Credit Points are chosen from topics such as astronomy, atomic and molecular spectroscopy, condensed matter physics, experimental methods, biophysics, quantum field theory and quantum theory of solids.

Admission to the honours program is at the invitation of the Head of School and normally requires at least a credit average in Year 3.

PHYS4411**Medical Physics**

Staff Contact: A/Prof J Wolfe
CP15 F HPW2
Prerequisite: PHYS2021

Radiotherapy: radiation sources, interactions of radiation with the body, radiation detection and measurement. Dosimetry and radiotherapy planning. Radioisotopes, brachytherapy.

Nuclear Medicine: Radioisotope production. Radiopharmaceuticals. Basic instrumentation. Gamma camera. SPECT and PET.

Medical Imaging: x-rays and C.T. Magnetic Resonance Imaging (MRI). Ultrasound. Safety and quality control in Medical Physics.

PHYS4413**Medical Physics Projects**

Staff Contact: A/Prof J Wolfe
CP45 F HPW9

Note/s: Restricted to Course 3973 Medical Physics.

These projects for final year Medical Physics students will be in areas such as Radiotherapy, Nuclear Medicine, Medical Imaging or Biophysics. Generally carried out in a hospital environment under the supervision of a practising medical physicist but may be carried out in the university or elsewhere, if suitable facilities available. Students required to submit a written thesis and present a seminar describing their project work.

Servicing Subjects

These are mainly subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the relevant Faculty Handbooks.

PHYS1918**Physics 1 (Mechanical Engineering)**

Staff Contact: First Year Director
Note/s: Re-run in S2.

Mechanics of intermolecular systems. Atomic structure of solids; forces and defects. Plasticity of solids. Fracture of solids. Thermal properties of solids, liquids and gases. Geometrical optics, optical instruments, interference and diffraction, polarisation. Electrostatics, direct-current circuits. Elementary circuit theory. Magnetic forces and fields, electromagnetic induction. Alternating currents.

PHYS1936**Physics 1 (Textile Management)**

Staff Contact: First Year Director
Note/s: Not re-run in Summer Session.

Energy transfer: concepts of temperature and heat; calorimetry; gas laws; phase changes and humidity; heat transmission; refrigeration. Electrostatics and electromagnetism: electric and magnetic fields; DC circuits; electromagnetic induction. Sound: wave properties;

absorption of sound. Properties of matter: atomic bond types and their relation to elasticity, plasticity and fracture; pressure in stationary and moving fluids.

PHYS1937

Physics (Industrial Design)

Staff Contact: First Year Director

Note/s: Not re-run in Summer Session.

Energy transfer: concepts of temperature and heat; calorimetry; gas laws; phase changes and humidity; heat transmission; refrigeration. Electrostatics and electromagnetism: electric and magnetic fields; DC circuits; electromagnetic induction. Sound: wave properties; absorption of sound. Properties of matter: atomic bond types and their relation to elasticity, plasticity and fracture; pressure in stationary and moving fluids.

PHYS1938

Physics 1 (Building)

Staff Contact: First Year Director

Note/s: Not re-run in Summer Session.

Energy transfer: concepts of temperature and heat; calorimetry; gas laws; phase changes and humidity; heat transmission; refrigeration. Electrostatics and electromagnetism, electric and magnetic fields; DC circuits. Properties of matter: atomic bond types and their relation to elasticity, plasticity and fracture; pressure in stationary and moving fluids.

PHYS1969

Physics 1 (Electrical Engineering)

Staff Contact: First Year Director

Electrostatics, magnetostatics in vacuum, ferromagnetism, electromagnetic induction. Vectors, kinematics, particle dynamics, work and energy, the conservation of energy, conservation of linear momentum, rotational kinematics and dynamics, simple harmonic motion, gravitation. Temperature, heat and the first law of thermodynamics, kinetic theory of gases. Waves in elastic media, sound waves, interference, diffraction, grating and spectra, polarisation. Relativity, quantum physics, wave nature of matter.

Mid-Year Start

Students who fail Session 1 of PHYS1969 are strongly advised to discontinue the subject and enrol in Session 2 in PHYS1949 Physics I (EE, FT1). This subject covers the Session 1 material of PHYS1969 during Session 2. Then PHYS1959 covers the rest of the syllabus over the Summer Session.

Note: The Session 2 syllabus of PHYS1969 is not repeated in Session 1 of the next year.

PHYS1949

Physics 1 (EE, FT1)

Staff Contact: First Year Director

CP15 S2 HPW6

Prerequisites, corequisites and syllabus: identical to PHYS1969, S1

PHYS1959

Physics 1 (EE, FT2)

Staff Contact: First Year Director

CP15 Summer Session HPW9

Prerequisite: PHYS1949

Syllabus identical to PHYS1969, S2.

PHYS1979

Physics 1 (Civil Engineering)

Staff Contact: First Year Director

Note/s: Re-run in S2.

Mechanics; elastic waves; electromagnetism; DC and AC circuits; introduction to electric measurement systems; instrumentation; digital electronic information processing systems; mechanical properties of matter; atomic structure; elasticity of solids; surface tension and viscosity of fluids; non-destructive testing; wave phenomena and acoustic techniques.

PHYS1998

Physics 1 (Geomatic Engineering)

Staff Contact: First Year Director

Vectors, linear mechanics. Newton's laws of motion, rotational mechanics. Electric forces, fields and potential, magnetic forces and fields. Ampere's Law, Faraday's Law, Electric circuit theory, AC, DC and transient circuits. Geometrical optics and instruments. Fluid mechanics; Bernoulli's equation, viscosity; Stoke's Law, Nuclear physics, radioactivity, half-life, nuclear forces, binding energies, fission and fusion.

PHYS2920

Electronics (Mining Engineering and Industrial Chemistry)

Staff Contact: Executive Assistant

CP7.5 S1 HPW3

Prerequisite: PHYS1022 or PHYS1002

Note/s: Excluded PHYS2031, PHYS2630.

The application of electronics to other disciplines. Includes principles of circuit theory; amplifiers, their specification and application, transducers; electronic instrumentation; industrial data acquisition.

PHYS2959

Introductory Semiconductor Physics (Computer Engineering)

Staff Contact: Executive Assistant

Semiconductor crystals and electrical conduction; elementary quantum theory; energy bands; band properties of semiconductor and applications, optical properties and applications, new developments, materials and techniques.

PHYS2969

Physics of Measurement (Geomatic Engineering)

Staff Contact: Executive Assistant

Digital electronics, CCD arrays and computerised image enhancement. analogue-to-digital conversion. Transducers including direct digital output. Wave motion. Geometrical optics. Physical optics including interference, diffraction and

polarisation. Optical instruments: Telescopes, image brightness and resolution, photography.

PHYS2949

Physics 2 (Electrical Engineering)

Staff Contact: Executive Assistant

Electrostatics in vacuum and in dielectric materials. Electric current. Magnetostatic in vacuum and magnetic media, magnetic materials and magnetic circuits. Time-varying fields. Capacitance and inductance calculations. General field concepts. Superconductivity. Maxwell's equation. Quantum mechanics; optical spectra and atomic structure, structural properties of solids, band theory and its applications, uniform electronic semiconductors in equilibrium, excess carriers in semiconductors.

PHYS2999

Mechanics and Thermal Physics (Electrical Engineering)

Staff Contact: Executive Assistant

Particle mechanics, harmonic motion, central force problems, systems of particles, Lagrange's equations with applications, coupled oscillations, wave equation. Thermodynamic laws, entropy, kinetic theory, M-B distribution, microscopic processes, Maxwell's relations, chemical potential, phase diagrams, multicomponent systems, electrochemical potential, statistics of defects in solids.

Physiology and Pharmacology

Physiology and Pharmacology Level II

Notes: Normal prerequisites for the courses in Physiology may be waived by the Head of School for students with a good academic record.

PHPH2112

Physiology 1

Staff Contact: Dr JW Morley

CP30 F HPW6

Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201, MATH1131 and MATH1231 or MATH1141 and MATH1241 or MATH101 and MATH1021
Corequisites: BIOC2101 and BIOC2201, or BIOC2181 and BIOC2291

Note/s: Students intending to major in Physiology and/or Pharmacology should note Level III Physiology prerequisites. Student numbers in Physiology 1 may be limited and entry to the course may be allocated on academic merit. Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School.

Introduces fundamental physiological principles, from basic cellular function in terms of chemical and physical

principles, to the operation of the various specialised systems in the body, eg, the cardiovascular system, the respiratory system, the gastrointestinal system, the endocrine system, the nervous system. Includes a substantial series of practical class experiments on these different areas of physiology. This subject is taken by students enrolled in any of the Physiology programs.

PHPH2122

Principles of Physiology (Optometry)

Staff Contact: Dr JW Morley

CP30 F HPW6

Note/s: Restricted to course 3950.

Covers the same general areas of physiology as Physiology 1. Principles of Physiology is taken only by students enrolled in the BOptom degree course.

Physiology and Pharmacology Level III

PHPH3121

Membrane and Cellular Physiology

Staff Contact: Prof PH Barry

CP15 S1 HPW6

Prerequisites: PHPH2112 and both BIOC2101 and BIOC2201, or BIOC2181 and BIOC2291

Note/s: Student numbers in this subject may be limited and entry to the course may be allocated on academic merit. Students who take BIOC2181 and BIOC2291 are advised that a grade of credit is normally required for progression to Level III Physiology subjects. Students who do not obtain a credit in these subjects may be enrolled at the discretion of the Head of School.

The properties of cell membranes, generation of potentials, permeation of ions, solutes and water across membranes, single channel measurements, unstirred layer effects, generation of electrical signals in nerve and muscle cells produced by ion movements, transmission of information between cells and the mechanisms underlying muscle contraction. Stress on modern research techniques, underlying principles of molecular physiology and on a critical examination of appropriate classical papers.

PHPH3131

Neurophysiology

Staff Contact: Prof MJ Rowe

CP15 S1 HPW6

Prerequisites: As for PHPH3121

Note/s: Student numbers in this subject are limited and entry to the course is allocated on academic merit.

The neural mechanisms in sensation and the control of posture and movement. Includes segments on neural control of cardiorespiratory function; transmitters and neuromodulators; neural mechanisms in certain higher functions, eg language and memory; nervous system plasticity; computer applications in neuroscience. Experimental work introduces the student to electrophysiological and other neuroscience research techniques.

PHPH3152**Pharmacology***Staff Contact: Dr R Knibinicki*

CP30 F HPW6

Prerequisite: As for PHPH3121

Includes a study of the absorption, distribution and metabolism of drugs, plus a study of the pharmacology of the autonomic nervous system, the cardiovascular system, the central nervous system, the kidney, the endocrine system and also a study of pharmacokinetics. Practical classes complement the lecture program by demonstrating a variety of basic pharmacological techniques.

PHPH3211**Cardio-respiratory and Exercise Physiology***Staff Contact: A/Prof MA Perry*

CP15 S2 HPW6

Prerequisites: As for PHPH3121

An advanced course which emphasises function and control of the cardiovascular system; gas exchange in the lung and blood gas carriage in the respiratory system and work capacity, preventive medicine and laboratory testing in exercise physiology. Extensive practical components involve mammalian preparations and human subjects.

PHPH3221**Endocrine, Reproductive and Developmental Physiology***Staff Contact: Dr L Ulman*

CP15 S2 HPW6

Prerequisites: As for PHPH3121

There are three major components to this subject, which consists of lectures, practical classes, tutorial and case studies. The first component of the course is a study of neuroendocrinology, molecular and systematic endocrinology, and of the endocrinology of exercise and disease. The second component of the course deals with female and male reproductive physiology. The third component of the course details the physiology of pregnancy, and that of the fetus and the newborn.

Physiology and Pharmacology Level IV**PHPH4218/PHPH4224****Physiology 4 (Honours)***Staff Contact: Dr B Nail*

CP120 F

Prerequisite: Completion of program 7300 including Level III subjects totalling 105 Credit Points. 60 Credit Points must be from Level III Physiology subjects.

The Honours Year provides an introduction to research. Students undertake a research project with supervision which is written up as a thesis and presented as a seminar. Students are also required to participate in a General Education program which consists of a core program of seminars, an essay and participation in discussion groups.

PHPH4258/PHPH4264**Pharmacology (Honours)***Staff Contact: Dr B Nail*

CP120 F

Prerequisite: Completion of program 7301 including Level III subjects totalling 105 Credit Points

The Honours Year provides an introduction to research. Students undertake a research project with supervision which is written up as a thesis and presented as a seminar. Students are also required to participate in a General Education program which consists of a core program of seminars, an essay and participation in discussion groups.

Psychology**Psychology Level I Subjects****PSYC1001****Psychology 1A***Staff Contact: Dr R Richardson*

CP15 S1 HPW5

Note/s: Excluded GENB4001, GENS5050, PSYC1002.

This subject introduces the content and methods of psychology as a basic science, with emphasis on the social bases of behaviour. After an initial review of the historical foundations for the scientific study of human behaviour, several specific topics related to the social aspects of human behaviour are discussed. Specific topics covered in this subject include: development, measurement of personality, theories of consciousness, and social influences on behaviour. In addition, training in the methods of psychological inquiry and basic procedures of data analysis is also provided.

PSYC1011**Psychology 1B***Staff Contact: Dr R Richardson*

CP15 S2 HPW5

Note/s: Excluded GENB4002, GENS4620, PSYC1002.

This subject introduces the content and methods of psychology as a basic science, with emphasis on the biological bases of behaviour. Specific topics covered in this subject include: perception, learning, memory, motivation, emotion, and abnormal behaviour. After describing the basic phenomena within an area, the goal will be to explore the neural bases of these behaviours. In addition, training in the methods of psychological inquiry and basic procedures of data analysis is also provided.

Psychology Level II Subjects

PSYC2001

Research Methods 2

Staff Contact: Ms M Gleitzman

CP15 S1 HPW4

Prerequisites: PSYC1001 and PSYC1011 with an Advanced Pass (a mark of 55 or greater) in either PSYC1001 or PSYC1011

General introduction to the analysis of data by means of inferential statistics (z, t and chi square). Issues in the use of statistics (power, robustness). General features of research methodology. Laboratory and statistical traditions affecting design and control procedures. The implications of the use of inferential statistics for research methodology generally. Ethics of research and interpretation of data.

PSYC2011

Psychological Measurement and Assessment

Staff Contact: Dr S McDonald

CP15 S2 HPW4

Prerequisite: PSYC2001

Principles and techniques of psychological measurement. Types of tests and issues relevant to their construction, administration and interpretation in decisions about selection and classification. Professional responsibilities in use of tests in decision making.

PSYC2061

Social and Developmental Psychology

Staff Contact: Prof J Forgas

CP15 S1 HPW4

Prerequisites: PSYC1001 and PSYC1011 with an Advanced Pass (a mark of 55 or greater) in either PSYC1001 or PSYC1011

Note/s: Excluded PSYC2031, PSYC2051, PSYC2116, PSYC3111

Two strands:

1. Social – The basic principles of research and theory in social psychology, with a special emphasis on understanding how people relate to each other. Issues such as the nature of human sociability, the perception and interpretation of social behaviour, ambiguities of interpretation of interpersonal behaviour, verbal and nonverbal communication processes, impression formation and impression management and related topics will be covered.

2. Developmental – The age at which certain abilities or dispositions develop or are learned, and the processes by which developmental changes occur. Issues such as nature and nurture, continuity vs discontinuity, nomothetic vs ideographic approaches and the methods and ethics of developmental research will be covered from various perspectives – psychodynamic, biological/ethological, environmental/learning, and cognitive – developmental.

PSYC2071

Perception and Cognition

Staff Contact: Prof B Gillam

CP15 S2 HPW4

Prerequisites: PSYC1001 and PSYC1011 with an Advanced Pass (a mark of 55 or greater) in either PSYC1001 or PSYC1011

Note/s: Excluded PSYC2021, PSYC3021

Introduces the fundamental principles underlying human perception and cognition such as sensory coding, perceptual organisation, perception of spatial layout, perceptual learning, object recognition, attention, memory storage and retrieval, problem solving and decision making. The practical program will provide an introduction to the use of psychophysical methods, experimental approaches to the study of cognitive processes, and the application of findings in society.

PSYC2081

Learning and Physiological Psychology

Staff Contact: Prof G Paxinos

CP15 S1 HPW4

Prerequisites: PSYC1001 and PSYC1011 with an Advanced Pass (a mark of 55 or greater) in either PSYC1001 or PSYC1011

Note/s: Excluded PSYC3031

An examination of brain and behaviour relationships with emphasis on learning, memory and motivation. Topics may include habituation, sensitisation, classical/operant conditioning, basic motivations, hunger, sex aggression, neuropsychology of amnesia and normal memory.

PSYC2091

Psychology 2A

Staff Contact: A/Prof J Taplin

CP15 S2 HPW4

Prerequisites: PSYC1001 and PSYC1011 with an Advanced Pass (a mark of 55 or greater) in either PSYC1001 or PSYC1011

Note/s: Excluded PSYC2042. Restricted to course 3431.

The approach of psychology to issues arising in the management of human affairs and to the remediation of human problems. Topics include psychology as a scientific discipline, an overview of areas such as clinical psychology, neuropsychology and developmental disabilities in which psychological knowledge is applied to help individuals to change or to function optimally, and specific areas of public concern where psychology has a major contribution to make such as education, selection, training in industry, traffic and aircraft safety, and the law. The practical program will aim to teach survey research skills and will focus also on the professional and social responsibilities of psychologists.

Psychology Level III Subjects

Notes: Students may not complete more than six Level III Psychology subjects (90 Credit Points) unless PSYC3001 Research Methods 3A has been passed.

Students may not enrol in more than seven Level III Psychology subjects (105 Credit Points).

Not all Level III Psychology subjects will necessarily be offered in each year.

PSYC3001

Research Methods 3A

Staff Contact: Dr K Bird

CP15 S1 HPW4

Prerequisite: PSYC2001

Analysis of variance for single factor and multifactor designs. MANOVA model analyses of repeated measures data. Simultaneous inference procedures for contrasts defined on parameters of ANOVA and MANOVA models. General principles of experimental design. Analysing experimental data with the PSY program.

PSCY3011

Research Methods 3B

Staff Contact: Dr K Bird

CP15 S2 HPW4

Prerequisite: PSYC3001

Multiple regression and its application to prediction, analysis of designed experiments and construction of structural models. Principal components analysis and factor analysis. Data analysis using SPSS.

PSYC3051

Physiological Psychology

Staff Contact: Prof G Paxinos

CP15 S2 HPW4

Prerequisites: PSYC2001 and PSYC2081

The neural control of behaviour with special emphasis on cerebral localisation of function in humans. Clinical conditions will be considered to the extent they illuminate mechanisms and theory of brain function, and the professional issues raised by different theories will be canvassed.

PSYC3121

Social Psychology

Staff Contact: Prof J Forgas

CP15 S2 HPW4

Prerequisites: PSYC2001 and PSYC2061

A review of the history, principles and methods, and ethics of social psychology at an advanced level. Substantive research areas such as the nature of affiliation and attraction, interpersonal relationships, the study of beliefs, values and attitudes, persuasion and processes of attitude change, social influence processes, and group behaviour, among others, will be covered.

PSYC3141

Behaviour in Organisations

Staff Contact: Dr S Schneider

CP15 S1 HPW4

Prerequisites: PSYC2001 and PSYC2061

The application of general psychological theories and principles to contemporary management problems. It will acquaint students with research in employee motivation,

satisfaction, selection, training, evaluation, and teamwork as well as other topics in industrial and organisational psychology, including the role of the professional in organisations and in dealing with other professionals.

PSYC3151

Cognition and Skill

Staff Contact: A/Prof J Taplin

CP15 S1 HPW4

Prerequisites: PSYC2001 and PSYC2071

Considers the cognitive processes underlying the development of skill in a variety of domains ranging from general skills such as reading and recognising objects to specialised skills such as solving algebra problems and air-traffic control. The differences between novice and expert performance are discussed to illustrate theories of expertise and demonstrate the contribution of individual and environmental factors to skill acquisition. Implications for training and assessing skilled performance are considered.

PSYC3161

Language and its Development

Staff Contact: A/Prof M Taft

CP15 S2 HPW4

Prerequisites: PSYC2001 and PSYC2071

Describes the structure of language and how it is acquired and used in reading, writing, speech comprehension and speech production. All levels of language are examined: phonemes and graphemes, morphemes, words, sentences and text. Bilingualism and language dysfunction are also given consideration.

PSYC3201

Psychopathology

Staff Contact: Dr P Birrell

CP15 S1 HPW4

Prerequisites: PSYC2001 and PSYC2081

Note/s: Excluded PSYC3071, PSYC3081.

An introduction to the scientific analysis of behavioural and mental disorders. The major syndromes, focussing upon current models and theories of causation and the empirically-based evaluation of these aetiological models and theories will be described. Treatment of the disorders will be outlined, especially where modern treatment developments throw light on fundamental causal mechanisms. Professional and ethical aspects of various treatments will be considered.

PSYC3211

Cognitive Science

Staff Contact: Dr P Atkins

CP15 HPW4

Prerequisites: PSYC2001 and PSYC2071

Note/s: Subject not offered in 1998.

Considers a variety of different approaches adopted in the study of mental processes. In particular the underlying assumptions of cognitive models are highlighted and critically appraised. Includes topics such as computer

models of learning and memory, artificial intelligence, consciousness, cognitive representations and the association between mind and body. The professional implications of these topics will be discussed.

PSYC3221

Vision and Brain

Staff Contact: Prof B Gillam

CP15 S1 HPW4

Prerequisites: PSYC2001 and PSYC2071

Seeing is an amazing achievement, taking up 40% of the visual cortex. This subject will consider how we see and how this reveals and is related to principles of brain functioning. Topics will include stereo (3-D vision), the coding of brightness and colour, perceiving motion and self-motion, brain damage and the question of specialised visual systems, visual imagery, visual attention, and vision and art.

PSYC3231

Child Development: Perception and Cognition

Staff Contact: A/Prof D Burnham

CP15 S2 HPW4

Prerequisites: PSYC2001, PSYC2061 and PSYC2071

Note/s: Excluded PSYC3111.

The development of infants' and children's auditory and visual abilities will be considered in relation to their adaptive search for perceptual, cognitive and social invariance in their environment. Cognitive development will be considered from three different theoretical perspectives: Piagetian theory, changes in information processing capabilities, and the formation of domain-specific knowledge and beliefs from infancy to adulthood.

PSYC3241

Psychobiology of Memory and Motivation

Staff Contact: Dr R Richardson

CP15 S2 HPW4

Prerequisites: PSYC2001 and PSYC2081

Research and theory in memory and motivation as they underpin adaptive behaviour. Primary consideration will be given to general-purpose and specialised forms of learning. Implications for the origin and treatment of clinical disorders will be described.

PSYC3251

Animal Cognition

Staff Contact: A/Prof RF Westbrook

CP15 S2 HPW4

Prerequisites: PSYC2001 and PSYC2081

Note/s: Excluded PSYC3041. Not offered in 1998.

Key topics include how animals represent space, time, and number, their capacity to solve problems and to reason, to learn about relations including causal ones, and the means by which they communicate. Questions about animal intentionality and consciousness will also be dealt with, as will issues concerning interpretation of data obtained from animal research.

PSYC3261

Current Topics in Behavioural Neuroscience

Staff Contact: Prof EJ Kehoe

CP15 HPW4

Prerequisites: PSYC2001 and PSYC2081

Note/s: Not offered in 1998.

An occasional elective dealing with recent developments in behavioural neuroscience.

PSYC3271

Personality and Individual Differences

Staff Contact: Dr G Huon

CP15 S1 HPW4

Prerequisites: PSYC2011 and PSYC2061

Note/s: Excluded PSYC3101.

The study of persons from two separate, but related perspectives. The psychology of *personality* involves the study of the structure and the processes involved in the organised functioning of individuals, their traits, cognitions and motives. The expression and measurement of the differences in those psychological characteristics between individuals and groups, and the theories or explanations that account for them, is what is involved in a psychology of *individual differences*.

PSYC3281

Interpersonal Behaviour

Staff Contact: Prof J Forgas

CP15 HPW4

Prerequisites: PSYC2001 and PSYC2061

Note/s: Not offered in 1998.

A critical, evaluative perspective, dealing with selected topic areas of contemporary research on social behaviour, such as the development of social understanding, emotional development, the role of affect in social behaviour, social cognition, social interaction processes, and group dynamics. The range of topics will reflect the changing emphasis in contemporary research on interpersonal behaviour.

PSYC3291

Psychology 3A

Staff Contact: Prof K McConkey

CP15 S2 HPW4

Prerequisite: PSYC2091

Note/s: Excluded PSYC2042. Restricted to course 3431.

A range of seminar topics aimed at assisting students to develop a position on key questions or issues in psychology as scientific discipline and how to argue that position in a logical and coherent way. There will be an emphasis on placing theoretical and scientific knowledge in a social context and on using that knowledge in professionally responsible ways.

Psychology Level IV Subjects

PSYC4003

Psychology 4 (Thesis/Course 3431)

Staff Contact: Dr B Spehar

CP120 F

Prerequisites: PSYC2001, PSYC2011, PSYC2061, PSYC2071, PSYC2081, PSYC2091 and Level III Psychology subjects totalling 120 Credit Points (consisting of PSYC3001, PSYC3011, PSYC3201, PSYC3291, 1 subject selected from PSYC3151, PSYC3161, PSYC3211, PSYC3221 and PSYC3231, 1 subject selected from PSYC3051, PSYC3241, PSYC3251 and PSYC3261, 1 subject selected from PSYC3121, PSYC3141, PSYC3271 and PSYC3281 and 1 other) with an average of at least 70%.

Psychology 4 in the BSc(Psychol) degree course. A supervised research thesis and course work to be determined in consultation with the Head of School.

PSYC4013

Psychology 4 (Course 3431)

Staff Contact: Dr B Spehar

CP120 F

Prerequisites: PSYC2001, PSYC2011, PSYC2061, PSYC2071, PSYC2081, PSYC2091 and Level III Psychology subjects totalling 120 Credit Points (consisting of PSYC3001, PSYC3011, PSYC3201, PSYC3291, 1 subject selected from PSYC3151, PSYC3161, PSYC3211, PSYC3221 and PSYC3231, 1 subject selected from PSYC3051, PSYC3241, PSYC3251 and PSYC3261, 1 subject selected from PSYC3121, PSYC3141, PSYC3271 and PSYC3281 and 1 other).

Psychology 4 in the BSc(Psychol) degree course. A supervised research project and course work to be determined in consultation with the Head of School.

PSYC4023

Psychology 4 (Thesis) Honours

Staff Contact: Dr B Spehar

CP120 F

Prerequisites: Completion of Stages 1 – 3 of Advanced Science programs 1200 or 1206 or 7312 with an average of at least 70% across Level II and Level III Psychology subjects.

A supervised research thesis and course work to be determined in consultation with the Head of School.

PSYC4033

Psychology 4 Honours

Staff Contact: Dr B Spehar

CP120 F

Prerequisites: Completion of Stages 1 – 3 of Advanced Science programs 1200 or 1206 or 7312.

A supervised research project and course work to be determined in consultation with the Head of School.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

PSYC2106

Psychology (Industrial Relations)

CP15 HPW3

Note/s: Not offered in 1998.

Problems and limitations affecting social research in industry. Critical review of American research from Hawthorne to Herzberg and of British research from Tavistock and Trist to Emery in Australia. Conflict and organic theories of organisation and related theories of motivation and morale. The use of library resources. Practice in the skills and discipline required to obtain and evaluate empirical evidence in this field. Recent developments under the heading of 'participation' and democracy in industry.

For further information see the Faculty of Commerce and Economics handbook.

PSYC2116

Human Development (Optometry)

Staff Contact: Dr M Rohan

CP7.5 S1 HPW3

Note/s: Restricted to Course 3950. Excluded PSYC2051, PSYC2061, PSYC3111.

Historical background and schools of psychology; current approaches to psychology; introduction to statistics and statistical inference; human development, including introduction to issues and methods in developmental psychology, and investigation of the physical, perceptual, cognitive, and psychosocial development of the human through the life span.

PSYC3506

Psychology for Optometrical Practice

Staff Contact: Dr P Birrell

CP7.5 S2 HPW3

Prerequisite: PSYC2116

Note/s: Restricted to Course 3950.

Areas of psychology relevant to optometrical practice. Abnormal psychology: concepts of normality and abnormality, symptoms of various mental disorder, eye movement dysfunctions, referral; psychological testing: standardisation, norms, types of test, validity, reliability, selection/diagnosis; neuropsychology: general deficits due to brain damage and those with visual implications, referral; developmental disability: diagnosis, assessment, prevalence and distribution, association with other disabilities, e.g. visual; reading difficulties: causes, assessment and treatment approaches.

Safety Science

Safety Science Level II

SESC2560

Risk Management 2

Staff Contact: Dr J Cross

CP7.5 S2 HPW2

Note/s: Excluded AVIA2203

This subject looks into safety issues in aviation, identifies problems which could lead to emergency situations then considers the planning required for different types of emergency. The subject covers writing safety and emergency procedures, emergency plans, setting up an emergency control centre, running emergency exercises and the links with state emergency planning system. General safety issues such as human factors in aviation safety and emergency planning, OHS and major hazard legislation.

SESC6011

Physical Principles of Safety

Staff Contact: Ms Sharon Walt

CP15 S1 HPW6

The basic principles of statics and dynamics applied to examples from biomechanics and safety. Topics include forces and moments, equilibrium and stability, friction, linear and rotational motion, collisions, simple machines, stress fraction relationships, properties of fluids, fluid flow and properties of solids.

SESC6021

Statistics for Safety Scientists

Staff Contact: Head of School

CP15 S2 HPW6

An introduction to the theory of statistics and to those statistical techniques which are relevant to planning and management of safety and health services. The subject covers statistical methods which are a prerequisite to the study of epidemiology, risk management, ergonomics and behavioural study.

SESC6610

Work and Safety

Staff Contact: Dr Boban Markovic

CP7.5 S1 or S2 HPW2

An introduction to the interactions between humans, work and safety. It concentrates on identification of workplace hazards, their associated risks to health and how they can be controlled.

Safety Science Level III

SESC3111

Introduction to Safety Engineering

Staff Contact: Dr Tony Green

CP15 S1 HPW6

The identification, assessment and engineering improvement of hazardous workplace situations with reference to: safety management, safety audits, basic safety practice, ergonomic hazards, physical hazards, biohazards and major hazards.

SESC3311

Effective Behaviour in Organisations

Staff Contact: Ms Dianne Gardner

CP15 S2 HPW6

Human behaviour as a major system factor in occupational health and safety. Learning and safety programs. Attitudes and attitude change. Individual and group factors affecting safety culture and compliance with safety programs. Work motivation and safety practice. Planning and implementing organisational change.

SESC3611

Introduction to Occupational Health

Staff Contact: Assoc Prof Chris Winder

CP15 S1 HPW6

An outline of the inter-relationships between the roles of some of the occupational health and safety disciplines (notably, occupational hygiene, occupational medicine, epidemiology and toxicology, as well as risk management, general issues relating to the identification, assessment and control of workplace risks, and chemical hazards).

SESC3621

Introduction to Occupational Health and Safety Law

Staff Contact: Head of School

CP15 S2 HPW6

An outline of occupational health and safety law. The concept of law, the creation and interpretation of legislation and standards. The judicial and court systems, locus standi, common law and equity. Basic principles of: legal liability (civil and criminal), administrative law and liability of the Crown. Common law of employment, statutory regulation of employment. Outline of occupational health, safety and compensation legislation in Australia. Common law actions.

SESC4410

Radiation Protection

Staff Contact: Dr Ron Rosen

CP7.5

Principles and practices of radiation protection for both ionising and non-ionising radiation. Radiation physics, detection and measurement; background radiation; biological effects of radiation, dose limits; radiological monitoring and personal dosimetry. Legislative, standards and technical controls for radioactive sources and irradiating apparatus. Storage, transport and disposal of sources, environmental impact; administrative controls;

emergency procedures. Control of non-ionising radiation. Practical work and site visit.

SESC4411

Principles of Ergonomics

Staff Contact: Dr Kamal Kothiyal
CP15 S1 or S2 HPW6

An introduction to ergonomics, emphasising the principles of user-centred, human-machine-environment systems. Topics include definition and justification for ergonomics, design and human error, human capabilities and limitations, controls and displays, design of human-machine-environment systems, job design and work organisation, anthropometry, workplace design, manual handling, occupational overuse syndrome.

SESC4511

Risk Management

Staff Contact: Prof Jean A Cross
CP15 S2 HPW6

An overview of the general principles risk management following the format of AS4360. Tools and techniques for each step of the risk management process are discussed using practical examples. Processes for risk management are applied to a wide range of activities, including health and safety, the environment, finance and project management.

SESC4811

Chemical Safety and Toxicology

Staff Contact: Assoc Prof Chris Winder
CP15 S1 HPW6

An outline of the toxicological, occupational hygiene and environmental aspects of chemical hazards and exposures. Metals, solvents, toxic and irritant gases, pesticides, carcinogens, hazardous wastes and dioxins are used as case studies.

SESC4960

Research Project (60 Cr)

Staff Contact: Head of School
CP15 S1 or S2

Stage 4 undergraduate project comprising 60 credit points (50% of Year 4 load, with the other 50% made up from Stage 4 subjects). This subject provides an introduction to the research process. Students will undertake a research project with supervision which is written up as a research project report.

Science and Technology Studies

The School of Science and Technology Studies (STS) offers subjects in two streams: History and Philosophy of Science and Technology; and Science, Technology, and Society. The subjects in the two streams are designated by two different subject codes (HPST and SCTS). However, any

combination of HPST or SCTS subjects is permissible, subject to the relevant prerequisites or corequisites. Entrance to most Level II/III subjects is possible without having studied Level I HPST or SCTS subjects.

Science and Technology Studies Level I

Students undertaking subjects in Science and Technology Studies supplement class contact hours by study in the Library. Only two Level I subjects may be counted towards course 3970

HPST1106

Myth, Megalith, and Cosmos

Staff Contact: Tony Corones
CP15 S1 HPW3

A general introduction to the history and philosophy of science. Provides a background to HPST1107, From the Closed World to the Infinite Universe, but is a self-contained subject in its own right. Examines the evidence for scientific knowledge in prehistoric cultures, the astronomy and cosmology of the ancient Near East civilisations, and the development of earlier Greek scientific thought.

HPST1107

From the Closed World to the Infinite Universe

Staff Contact: Guy Freeland
CP15 S2 HPW3

A general introduction to the history and philosophy of science. Follows on from HPST1106, Myth, Megalith, and Cosmos, but constitutes a self-contained subject in its own right without prerequisites. Examines the momentous transition from the ancient/medieval model of a closed world to modern cosmological theory.

HPST1108

Science: Good, Bad, and Bogus: An Introduction to the Philosophy of Science

Staff Contact: Peter Slezak
CP15 S2 HPW3

What is science? What are its distinctive characteristics as a form of inquiry? Why are astrology and 'creationism' widely considered to be pseudosciences? A critical consideration of the claims of astrology, psychoanalysis, parapsychology, and creation science provides a vehicle for raising central questions concerning the nature of science.

SCTS1106

Science, Technology, and Social Change

Staff Contact: David Miller
CP15 S1 HPW3

Relations between science, technology, and society in the 20th century. Theories of technological design and change. Examination of controversies including: pollution protection; nuclear energy; and genetic engineering. The control of technology. Technology assessment. The nature of public involvement in decisions about scientific and technological development.

SCTS1107**Understanding Technological Controversy***Staff Contact: David Miller*

CP15 S2 HPW3

Prerequisite: SCTS1106

The lecture series examines scientific and technical controversies in general; how they arise, how they are conducted, how and why they are resolved or remain unresolved. The tutorials are devoted to supervised group work on issues of concern to students in the areas of the environment, energy, genetic engineering, and communication technologies.

Science and Technology Studies Level II/III**HPST2106****The Scientific Theory***Staff Contact: Tony Corones*

CP15 S1 HPW3

Prerequisite: Completion of Level I Science subjects totalling at least 60 Credit Points

A critical examination of the scientific theory, its origins, nature and nurture, with particular reference to selected historical examples chosen from both the physical and biological sciences. Topics include the structure of scientific revolutions; scientific explanation; relationships between theory and observation; the function of models; the principles of theory establishment and rejection.

HPST2107**The 'Darwinian Revolution' and The Order of Nature 1790-1890***Staff Contact: Nicolas Rasmussen*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Examines the various theories of evolution from the early Romantic period of the later 19th century in cultural and political context, including the West's quest for an explanation of living creation in terms of life forces and their interaction with a changing Earth. Also looks at the major historical developments that set the stage for these scientific developments in an age of dramatic political and economic revolution.

HPST2108**Introduction to the History of Medicine***Staff Contact: Susan Hardy*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Note/s: Excluded GENS5522, GENT0902, HPST2128.

Development of theory and practice in Western medicine from Hippocratic times to the 20th century. 'Bedside' medicine from antiquity to the French Revolution; 'Hospital' medicine in the early 19th century; 'Laboratory' medicine in the late 19th century; 'Technological' medicine in the 20th century, with particular emphasis on the social role of modern medicine.

HPST2109**Computers, Brains, and Minds: Foundations of Cognitive Science***Staff Contact: Peter Slezak*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Note/s: Excluded GENS5525.

Introduction to contemporary discussions of the mind, thought, intelligence, and consciousness. Stress on the recent revolutionary developments in the computer simulation of thought or 'artificial intelligence' and linguistics. Can computers think? Is the brain a machine? Exploration of theories, methods, and philosophical issues.

HPST2116**History of the Philosophy and Methodology of Science***Staff Contact: Tony Corones*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Note/s: Not recommended for students without some background in philosophy or HPST. Not offered in 1998.

A survey of the history of ideas about the nature and method of science, considering such issues as Aristotelianism, rationalism and empiricism, Kantianism, positivism, pragmatism, conventionalism, falsificationism, realism, and instrumentalism.

HPST2117**Production, Power, and People: The Social History of Technology in the 18th and 19th Centuries***Staff Contact: Nessy Allen*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Note/s: Excluded GENT0908.

The history of technology in its social and cultural context, with special emphasis on the Industrial Revolution. Technology and its effects on human beings; the professionalisation of engineering; the spread of industrialisation and the Second Industrial Revolution. Emphasis on the social and economic effects of the interactions of technology and society.

HPST2118**Body, Mind, and Soul: The History and Philosophy of Psychology***Staff Contact: Peter Slezak*

CP15 S1 HPW3

Prerequisite: As for HPST2106

The development of ideas concerning the nature of mind and its relation to the body. Topics include the immortality of the soul; division of mind and body; the dispute over innate ideas; behaviourism; psychoanalysis; experimental psychology and the 'cognitive revolution'; minds as machines and the question of whether computers can think.

HPST2119**Philosophy of the Social Sciences: Issues and Topics***Staff Contact: Peter Slezak*

CP15 S1 HPW3

Prerequisite: As for HPST2106**Note/s:** Not offered in 1998.

Can human behaviour be understood and explained scientifically? Are social behaviour and meaningful action to be explained by causal laws, as in the natural sciences, or are there special methods which are uniquely appropriate to human behaviour? Examines the long-standing controversy about the radically contrasting ways to understand human beings and their social existence. The course examines this debate through considering laws, explanations, causes, and theories in the natural sciences, in contrast with the empathic or intuitive understanding of the meaningfulness of human actions.

HPST2126**God, Life, the Universe & Everything: Science and the Search for Ultimate Meaning***Staff Contact: Peter Slezak*

CP15 S1 HPW3

Prerequisite: As for HPST2106

'Ultimate' questions about God, the meaning of life and the point of it all, have traditionally been the business of religion. Can science provide an answer to these questions, or is there always a realm of understanding which is beyond scientific knowledge? This subject examines philosophical issues in epistemology, metaphysics and philosophy of science. Topics will include arguments for the existence of God and the underlying questions of evidence and explanation in science.

HPST2127**Discrediting Science? – Postmodernism and the Crisis of Legitimation***Staff Contact: Tony Corones*

CP15 S2 HPW3

Prerequisite: As for HPST2106**Note/s:** Not offered in 1998.

This subject examines the perception that postmodernism discredits science. Discussion is focused on postmodernist 'incredulity towards metanarratives', and the way in which this provokes the crisis of legitimation. Topics and debates covered include constructivism, relativism, realism and anti-realism, the naturalistic turn in epistemology, rationality, hermeneutics, and the politics of knowledge.

HPST2128**Australian Medical History: A Comparative Study***Staff Contact: Susan Hardy*

CP15 S2 HPW3

Prerequisite: As for HPST2106**Note/s:** Excluded GENS5522, GENT0902, HPST2108, HPST3119.

Examines how the European version of medicine evolved in and was adapted to the Australian environment from

1788 to the mid-twentieth century – how the landscape, climate and social, political and economic structures affected the way medical care and medical personnel were viewed. Consideration is also given to the development of medicine on the North American continent, noting similarities and differences between the situation there and in Australia.

HPST2136**Agriculture and Civilisation in Historical Perspective***Staff Contact: Nicolas Rasmussen*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Examines the ways civilisations have developed an agriculture to sustain them, and how a people's way of embedding itself in the ecosystem can inform its culture. Also considers how the agriculture of Western civilisations has been transformed in the tiny span of time (evolutionarily and ecologically speaking) since the scientific revolution and the industrial revolution that followed it.

HPST2137**Life Science in the 20th Century: The Molecular Revolution***Staff Contact: Nicolas Rasmussen*

CP15 S2 HPW3

Prerequisite: As for HPST2106**Note/s:** Not offered in 1998.

Explores the rise of the experimental biology disciplines, from the embryology, genetics, bacteriology and physiology of the early 20th century through to the 'Molecular Revolution' of the period around the Second World War and the new sciences it spawned – cell biology, immunology and above all molecular genetics – the science of the genetic code and the linchpin of current biotechnology.

HPST3106**The Discovery of Time***Staff Contact: Guy Freeland*

CP15 S2 HPW3

Prerequisite: As for HPST2106

The history of time, from Antiquity through the Twentieth Century. Clocks and other instruments for the measurement of time; civil and religious calendars; concepts of time; philosophy and theology of time; conceptions of history and progress; the cognition of time; the age of the Earth and the antiquity of humanity. Time and the development of modern science.

HPST3108**Deity and Mother Earth***Staff Contact: Guy Freeland*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Conceptions of deity, from earliest time to the present, in relation to changing notions of sexuality and generation, and the place of human beings in relation to their environment and the cosmos; the roles of the sexes within different cultures. The Earth Mother Goddess. The environmentalist movement; the Gaia hypothesis.

HPST3118**Reading Option in History and Philosophy of Science and Technology***Staff Contact: David Miller*

CP15 S1 or S2 HPW3

Prerequisite: As for HPST2106 and permission of Head of School

Students wishing to work in an area not covered by an existing subject may apply to the School to take a reading option. Approval of a program for a reading option will depend on its suitability, and the availability of a staff member to undertake supervision.

HPST3119**Researching Medical History in Australia***Staff Contact: Susan Hardy*

CP15 S2 HPW3

Prerequisite: HPST2108**Note/s:** Excluded HPST2128

This research-oriented subject is intended for students who have completed HPST2108 'History of Medicine' and who wish to undertake further study in this area, with a particular focus on Australia. Background information will be provided in lectures, and students will engage in original research. Weekly seminars will address the techniques and resources available for researching the history of medicine in Australia.

HPST3126**Thinking Technology Through: Philosophies of Technology***Staff Contact: Tony Corones*

CP15 S1 HPW3

Prerequisite: As for HPST2106**Note/s:** Not offered in 1998.

What is Technology? How does it shape our form of life? Can we do anything about it? What should we be doing about it? These issues are approached through the philosophy of technology. Issues considered include technology and the life-world, technological determinism, technology and values, and the relations between philosophy of technology and philosophy of science.

SCTS2106**Scientific Knowledge and Political Power***Staff Contact: George Bindon*

CP15 S1 HPW3

Prerequisite: As for HPST2106

An introduction to the political dimensions of 20th century science. Topics include: growth of expenditure on science in the twentieth century; science and politics; science and economic growth; the science-technology relationship; approaches to science policy; critiques of the role of science in contemporary society.

SCTS2107**The Sociology of Science and Technology***Staff Contact: David Miller*

CP15 S2 HPW3

Prerequisite: As for HPST2106

An examination of the communal nature of scientific and technological activities which will include: an historical survey of the development of scientific and engineering professions; the internal working of scientific communities; scientific communication; the reward system; fraud; disciplines and specialities in science and engineering.

SCTS2108**Information Technology, Politics and the Media***Staff Contact: John Merson*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Examines the global expansion of information technology and its social and economic impacts, including the role of the internet, intranet and satellite broadcasting systems. Topics include: the spread of global media services; international telemedicine; education and training accessed globally; international consumer banking and finance; and manufacturing processes controlled globally on-line. Explores the political implications of these changes, and the efforts of communities in both developed and underdeveloped countries to take advantage of this information 'superhighway' without being culturally annihilated in the process.

SCTS2109**The Challenge of the New Biotechnologies***Staff Contact: Nicolas Rasmussen*

CP15 S2 HPW3

Prerequisite: As for HPST2106**Note/s:** Not offered in 1998.

Examines the new medical and agricultural technologies, stemming from the molecular biology revolution, in social context. Topics: xenotransplantation; the human genome project; new reproductive biotechnologies for humans; the genetic manipulation of food crops and animals for altered product qualities; the impact of biotechnology on agricultural sustainability.

SCTS2116**Technological Change and Economic Development***Staff Contact: George Bindon*

CP15 S2 HPW3

Prerequisite: Completion of Level I science subjects totalling at least 60 Credit Points including SCTS1106; or permission of Head of School

Ideas about technological change and its relationships to economic development. Rise of the industrial estate; emergence of the 'post-modern'/'post-industrial' state; Reich's 'global web'; metropolitan centres and the periphery; collapse of Soviet empire; emergence of 'Asia-Pacific rim' and implications of this for Australia.

SCTS2117**The Challenge of Managing and Measuring Science and Technology***Staff Contact: George Bindon*

CP15 S2 HPW3

Prerequisite: Completion of Level I science subjects totalling at least 60 Credit Points including SCTS1106; or permission of Head of School

Note/s: Not offered in 1998.

The attempts to analyse and control science and technology by use of rational/quantitative techniques. Science and technology 'indicators'. Management and innovation. Technological forecasting. Science policy. Use of scientometrics in social studies of science.

SCTS2118**Technology, Environment, Politics***Staff Contact: Paul Brown*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Provides a theoretical background for understanding 'the social crisis of the environment'. Images of nature and science as key factors in the development of modernity. Positivism, nature science and the birth of social science. Progress, technocracy, totalitarianism in the twentieth century. Critical theory and the philosophical/political critique of science and technology since World War Two. Postmodernity, the lifeworld, trust and system feedbacks. Global markets and ecological impacts.

SCTS2119**Science, Technology and Everyday Life: History and Current Issues***Staff Contact: David Miller*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Note/s: Not offered in 1998.

Examines and analyses the place of science and technology in everyday existence in Australia, Britain and the United States over the last two hundred years as a way of addressing the 'public understanding' of science and technology. The history of infrastructural and domestic technologies (water, sewerage, heating and cooling, transport, communications). Contemporary community efforts to mobilise scientific and technical knowledge in pursuit of infrastructural, environmental and health objectives.

SCTS3106**Technology, Sustainable Development, and the Third World***Staff Contact: John Merson*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Sustainable development, along with the technological and social changes that are involved in achieving it, both at a national and global level. The course is divided into three parts: (1) the historical causes of the present global environmental and economic crisis; (2) possible solutions

to problems of food production, environmental degradation, industrialisation, energy use, and population growth; (3) ideas for a New World Economic Order and the economic and technological changes required to bridge the ever increasing gap between rich and poor nations.

SCTS3107**Women and Science***Staff Contact: Nussy Allen*

CP15 S2 HPW3

Prerequisite: As for HPST2106

A series of seminars on: the constraints and opportunities facing women scientists; an historical survey of women scientists, including some eminent Australians; the philosophical issues and implications for social policy raised by women's participation in science.

SCTS3108**Technological Development in 20th-Century Australia***Staff Contact: George Bindon*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Note/s: Not offered in 1998.

The historical development of technology in Australia during the 20th century, with focus on three key dimensions: linkage between scientific research, industrial development, and economic growth; technological change and its impact on Australian society; the distinctive feature of Australia's geopolitical situation.

SCTS3109**Society, Technological Hazards, and Environmental Management***Staff Contact: David Miller*

CP15 S1 HPW3

Prerequisite: As for HPST2106

Note/s: Not offered in 1998.

Concerns over risks associated with technological and environmental hazards. The present anxieties over social control and the relations between ethics and politics. Institutional and global aspects of environmental management in relation to hazards such as toxic wastes, genetic engineering, ozone hole; international negotiation.

SCTS3116**The Political Economy of Energy and Sustainable Development***Staff Contact: David Miller*

CP15 S2 HPW3

Prerequisite: As for HPST2106

Note/s: Not offered in 1998.

Energy, force, work, and power; social construction of energy use; the 'energy' crisis; energy use and climate change; introduction to environmental economics; institutional power and market arrangements for energy; environmental management. International relations and issues in energy use and control.

SCTS3119**Reading Option in Science and Technology Studies***Staff Contact: David Miller*

CP15 S1 or S2 HPW3

Prerequisite: As for HPST2106 and permission of Head of School

Students wishing to work in an area not covered by an existing subject may apply to the School to take a reading option. Approval of a program for a reading option will depend on its suitability, and the availability of a staff member to undertake supervision.

SCTS3126**Society and Environmental Process: Botany Bay in the Sydney Region***Staff Contact: Paul Brown*

CP15 S2 HPW3

Prerequisite: SCTS2118 and any two of: GEOG2025, GEOG3042, GEOG3062, GEOG3211, HIST2039, HPST3108, SCTS3106, SCTS3109, SCTS3116, SOCI3607

Note/s: Excluded SCTS3020.

Provides an interdisciplinary framework for the interpretation of the ways in which human environments have been socially constructed. This will be done in the particular context of Botany Bay and the Sydney Region. Emerging environmental issues at the regional, national, and global levels will be identified and examined in the light of geographic, historical, sociological, economic, political, and urban change and development. Prospects and processes for intervention will be examined. Each student will complete a research project.

Science and Technology Studies Level IV Honours Program**SCTS4106/SCTS4156****Science and Technology Studies (Honours) (FT/PT)***Staff Contact: David Miller*

CP120 F

Prerequisite: Completion of program 6200 including Level II/III subjects totalling 105 Credit Points with an average grade of credit or better

In the Honours Program, candidates are required to present a thesis and to complete coursework as approved by the Head of School.

Textile Technology**TEXT1101****Science for Textiles***Staff Contact: Prof Ron Postle*

CP5 S2 L1 T1

Note/s: Restricted to courses 3170, 3175 and 3177

The atomic structure of matter; x-rays; optics and optical instruments; wave theory. Properties of elements and compounds; introductory organic chemistry.

TEXT1201**Introductory Textile Technology***Staff Contact: Dr Xungai Wang*

CP10 S2 L3 T1

Note/s: Restricted to courses 3170, 3175 and 3177

Sampling theory and practice for textile testing. Introductory statistics for data processing. Basic techniques for the measurement of fibre properties, including transverse dimensions and length. The application of engineering principles to textile machines and processes, including mechanics of solids, statics, mechanical transmission of power.

TEXT1301**Fibre Science 1***Staff Contact: Prof Ron Postle*

CP10 S1 L2 T2

Note/s: Restricted to courses 3170, 3175 and 3177

Fibre classification and raw materials. Polymer requirements for fibre formation. Introduction to fibre structure and morphology. Physical and chemical properties of textile fibres. Production of natural and man-made fibres. Necessary and desirable attributes of textile fibres. Fibre mechanical properties, structure and physical properties of wool keratin. Laboratory classes on fibre identification and fibre microscopy.

TEXT2101**Fibre Science 2***Staff Contact: Prof Ron Postle*

CP10 S2 L2 T2

Prerequisite: TEXT1101/ TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Fibre microscopy. Electron microscopy. Fibre reflection and lustre. Morphological and fine structure of fibres. X-ray Crystallography. Polymer crystallisation. Molecular structure of proteins. Optical properties and fibre orientation. Infra-red spectroscopy. Fibre rheology. Mechanical properties. Addition and condensation polymerization. Chemical constitution and reactivity of man-made fibres. Introduction to high technology fibres. Laboratory experiments on fibre and electron microscopy, x-ray diffraction and infra-red spectroscopy, fibre structure and viscoelasticity.

TEXT2201**Textile Statistics***Staff Contact: Dr John Curiskis*

CP5 S2 L2

Note/s: Restricted to courses 3170, 3175 and 3177

Application of mathematical techniques to textile data processing and analysis. Probability theory, distribution functions, tests of significance. Analysis of variance, regression analysis. Introduction to computer statistical packages.

TEXT2301**Yarn Technology 1***Staff Contact: Dr Xungai Wang*

CP15 S1 L3 T3

Prerequisite: TEXT1201**Note/s:** Restricted to courses 3170, 3175 and 3177

The preparation of staple fibres for yarns and non-woven fabrics: processes for tow conversion, opening, cleaning, blending, carding, drawing, and combing. Short-staple, worsted and woollen preparation systems. Computer blend selection; drafting theory; theory and measurement of irregularity; levelling of slivers.

TEXT2401**Fabric Technology 1***Staff Contact: Dr John Curiskis*

CP15 S2 L3.5 T2.5

Prerequisite: TEXT1201**Note/s:** Restricted to courses 3170, 3175 and 3177

Principles of weaving. Mechanisms of shedding, picking, and beating up. Secondary and auxiliary mechanisms of looms. Cam, dobby and jacquard shedding. Shuttle, projectile, rapier and jet weft insertion. Multiphase weaving; circular weaving. Woven cloth construction principles and weave representation; basic weave structures. Leno and narrow fabric weaving. Woven pile fabric constructions; tufting. Yarn preparation for weaving. Mechanics of woven fabric formation. Introduction to knitting technology.

TEXT2501**Computing Applications***Staff Contact: Dr Xungai Wang*

CP10 S1 L2 T2

Note/s: Restricted to courses 3170, 3175 and 3177

Introductory computing. Online computer architecture. Features common computing languages; syntax, structure, variable typing, portability. Basic syntax. Common numerical techniques, function evaluation, Monte Carlo techniques. Word processing, spreadsheets and databases. Tutorial assignments will relate to textile computing applications.

TEXT2901**Textile Design 1***Staff Contact: Prof Mike Pailthorpe*

CP20 S1 L2 T2 S2 L2 T4

Note/s: Restricted to course 3177

Introduction to textile design, history of textile design, textile design concepts as applied to fibres, yarns and fabrics.

The role and utilisation of fibre properties in textile design, including microfibres, bicomponent fibres and fibre blends. Design and construction of fancy yarns. Design and construction of fabric structures for specific purposes, eg apparel, domestic household, commercial, medical, industrial, architectural and geotextile fabrics. Commercial aspects in textile design including design practice, costings and marketing principles.

TEXT3101**Textile Structures 1***Staff Contact: Prof Ron Postle*

CP7.5 S1 L1 T2

Prerequisite: TEXT1101/ TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Fibrous structures and textile assemblies. Fibre friction and visco-elasticity. Lubrication. Static electrification of textiles. Yarn structures. Fibre migration in yarns. Mechanics of continuous filament yarns, staple-fibre yarns, plied and textured yarns. Fabric testing; structure and dimensions; tensile strength; tear strength; fabric abrasion. Fabric low-stress mechanical and surface properties. Drape and handle. Fabric tailorability. Laboratory experiments on yarn and fabric structure, mechanical and physical properties.

TEXT3301**Yarn Technology 2***Staff Contact: Dr Xungai Wang*

CP15 S2 L3 T3

Prerequisite: TEXT1201**Note/s:** Restricted to courses 3170, 3175 and 3177

Properties of yarns. Introduction to geometry and mechanics of twisted structures. Staple yarn forming by ring, rotor and unconventional spinning methods. Twisting and winding processes. Throwing and texturing of continuous filament yarns. On-line monitoring of production and quality; automation. Measurement of yarn properties.

TEXT3401**Fabric Technology 2***Staff Contact: Dr John Curiskis*

CP15 S1 L3.5 T2.5

Prerequisite: TEXT1201**Note/s:** Restricted to courses 3170, 3175 and 3177

Principles of knitting. Techniques of loop formation in weft and warp knitting; essential machine mechanisms. Knitted cloth construction principles and knitted structure representations; basic knitted structures. Techniques of jacquard needle selection and loop transfer for extended design effects in weft knitting; derivative weft knitted structures. Shaped weft knitted structures, including fully-fashioned knitting, hosiery manufacture, integral knitting techniques. Use of multiple guide bars, part-set threading, and auxiliary mechanisms for extended design effects in tricot and raschel warp knitting; derivative warp knitted structures. Double needle bed warp knitting. Mechanics of knitted fabric formation. Stitch-bonded and non-woven fabric manufacture.

TEXT3501**Finishing Technology A***Staff Contact: Prof Mike Pailthorpe*

CP10 S1 L2 T2

Prerequisite: TEXT1101/ TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Objects of finishing and typical flow diagrams for wool and cotton. The principles and technology of textile finishing processes for protein and cellulosic fabrics, including the removal of impurities and discolouration, the elimination or minimisation of deficiencies in properties, the development of specific properties. Properties of surfactant solutions, micelle formation, surfactants as emulsifiers and detergents. Practical exercises in fabric bleaching, wool milling and shrinkproofing. Analysis of hard water by titration.

TEXT3601**Colour Science***Staff Contact: Prof Mike Pailthorpe*

CP7.5 S1 L2 T1

Note/s: Restricted to courses 3170, 3175 and 3177

Aspects of colour, colour mixing and colour vision. Absorptiometry, spectrophotometry and tristimulus colorimetry. Measurement and specification of colour and colour difference. Applications of colour measurement. Computer aided colour match prediction.

TEXT3602**Colouration Technology***Staff Contact: Prof Mike Pailthorpe*

CP10 S2 L2 T2

Prerequisite: TEXT1101/TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Classification of dyes and pigments and their methods of application. General properties of dyes, dyeing auxiliaries and after treatments. Assessment of colourfastness properties of dyes and pigments. Mill water supplies and their treatment. Aspects of dyehouse effluent treatment. Textile dyeing machinery. Recent developments in dyeing and printing technology.

TEXT3801**Textile Engineering***Staff Contact: Prof Mike Pailthorpe*

CP7.5 S2 L2 T1

Prerequisite: TEXT1201**Note/s:** Restricted to courses 3170, 3175 and 3177

Applied Electricity. Illumination design. Introduction to process control. Thermodynamic principles and applications in textile processing including first and second laws, states and processes, fluid properties. Properties and use of steam. Air conditioning. Heat transfer. Introduction to fluid mechanics. Energy utilisation in textile processes.

TEXT3901**Textile Design 2***Staff Contact: Prof Mike Pailthorpe*

CP10 S2 L2 T2

Prerequisite: TEXT2901**Note/s:** Restricted to course 3177

Appreciation of textile products with surface design. Historical aspects of surface design. Concepts and limitations in the dyeing and printing of piece goods. Fabric design limitations for various printing methods, eg direct, reserve, discharge and transfer printing. Novel textile printing methods. Surface design by shearing and embossing. Introduction to automatic embroidery machines. Surface design using applique techniques. Commercial aspects in surface design including performance requirements, coatings and marketing principles.

TEXT4003**Project***Staff Contact: Prof Ron Postle**Corequisite:* TEXT4013

CP35 F S1 T5 S2 T9

Note/s: Restricted to courses 3170, 3175 and 3177

Students are required to carry out a research project and to submit a thesis describing their investigations. It is usual for students to be allocated projects in areas related to the particular course option they are studying.

TEXT4013**Seminar***Staff Contact: Prof Mike Pailthorpe**Corequisite:* TEXT4003

CP10 F T2

Note/s: Restricted to courses 3170, 3175 and 3177

Students prepare and present a seminar before an audience consisting of staff of the Department, final year students, Graduate Diploma students, and any other interested undergraduate or postgraduate students, on a subject of topical and specific interest in the field of textile science, technology or management, and subsequently submit the seminar in writing.

TEXT4101**Textile Structures 2***Staff Contact: Prof Ron Postle*

CP7.5 S2 L1 T2

Prerequisite: TEXT1101/TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Physical equilibration of textile materials, ageing and annealing. Structural mechanics of woven, knitted and non-woven fabrics. Composite materials, fabric membrane properties. Clothing mechanics and tailorability. Fabric rheology. Wrinkling properties. Clothing comfort and physiology. Thermal insulation. Diffusion of moisture. Heat and mass transfer. Capillary action of textiles. Laboratory experiments on textile equilibration, tailorability of textile materials, heat and moisture transfer in textiles.

TEXT4201**Processing Laboratory****Staff Contact: Dr John Curiskis*

CP7.5 S1 T3

Note/s: Restricted to courses 3170, 3175 and 3177

*Co-Op students only.

Students undertake a project involving the design, production and assessment of a textile product manufactured by their Co-Op IT3 sponsor company.

TEXT4202**Textile Quality Control***Staff Contact: Prof Mike Pailthorpe*

CP5 S2 L1 T1

Prerequisite: TEXT2201**Note/s:** Restricted to courses 3170, 3175 and 3177

User-serviceability testing. Fibre content and care-labelling. Process and quality control. Consumer problems.

TEXT4501**Finishing Technology B***Staff Contact: Prof Mike Pailthorpe*

CP10 S2 L2 T2

Prerequisite: TEXT1101/TEXT1301**Note/s:** Restricted to courses 3170, 3175 and 3177

Wet and dry fabric finishing. The application of special finishes including flame retardant finishes, crease resistant and antistatic finishes, etc. Fabric setting Dimensional stability and its measurement. The drying of textile materials. Recent developments in finishing technology.

TEXT4601**Field Trip***Staff Contact: Dr John Curiskis*

CP7.5 S1 T3

Prerequisite: Completion of all Years 1, 2 and 3 TEXT subjects**Note/s:** Restricted to courses 3170, 3175 and 3177

A five day field trip, normally undertaken during Session 1, designed to give wide exposure to the natural fibre and man-made fibre processing industries in New South Wales and Victoria. Students will incur some personal expenses in connection with this subject, which is a compulsory part of the course.

TEXT4701**Textile Industry Studies***Staff Contact: Dr John Curiskis*

CP7.5 S1 L T3

Note/s: Restricted to courses 3170, 3175 and 3177

Econometrics of the textile and clothing industries. Models of production, import and export and consumption of textiles and clothing in Australia, and comparison with world data. Case studies in textile and clothing manufacture operations. Environmental considerations in relation to pollution from the textile industry. Waste water treatment methods.

TEXT4702**Textile Management****Staff Contact: Dr John Curiskis*

CP15 S1 T6

Note/s: Restricted to courses 3170, 3175 and 3177

*Co-Op Students only

Selected readings in the Management of manufacturing systems with particular reference and examples from specific manufacturing enterprises.

TEXT4901**Textile Design 3***Staff Contact: Prof Mike Pailthorpe*

CP15 S1 L3 T4

Prerequisite: TEXT3901**Note/s:** Restricted to course 3177

Appreciation of the role of computers in textile design. Computer Aided Design (CAD) applications in fibre blending, yarn manufacture, woven and knitted fabric manufacture, dyeing technology, printing technology, embroidery, etc. Computer Aided Manufacture (CAM) systems for various sectors of the textile industry. Commercial aspects of CAD/CAM systems including performance requirements and coatings.

Wool and Animal Science

WOOL3211**Pasture and Range Ecology***Staff Contact: Dr Gordon King*

CP7.5 S1 L2 T1

Pastures and rangelands as ecosystems. Concepts of ecosystems, competition and development of ecotypes. Establishment and management of native, annual and perennial pastures and fodder crops. Effects of animals on pasture productivity and composition. Vegetation management in arid and semi-arid areas. Fertiliser use and acidification of soils. Problem solving issues. Students may incur costs for any field trips.

WOOL3221**Pasture Utilisation and Grazing Management***Staff Contact: Dr Geoff Robards*

CP7.5 S2 L3

Pasture-animal relationships. Grazing intake by sheep, goats and cattle. Effects of climate on pasture type, productivity and seasonal changes in quality, and subsequently on livestock production systems. Utilisation of poor quality pastures and supplementary feeding, particularly during drought. Effect of weeds and toxic plants on livestock productivity and product quality. Grazing management of improved, naturalised and native pastures, with particular emphasis on contrasting the effects on pastures, soil and animals of set stocking and a range of

rotational grazing, deferred grazing and strip grazing systems.

WOOL3231

Range Management

Staff Contact: Dr Gordon King

CP7.5 S2 L2 T1

Prerequisite: WOOL3203

Basic range ecology and range ecosystems. Physiology, growth and development of rangeland plants. Rangeland and associated water management practices. Monitoring of longterm trends in productivity, including application of remote sensing and GIS technology. Sheep, goat and beef production, including emphasis on interactions with wild life and feral animals. Multiple use of rangelands, and the administration of rangeland areas and systems in Australia. Students may incur personal costs for any field work.

WOOL3241

Cropping Systems

Staff Contact: Dr Gordon King

CP10 S2 L1 T3

Prerequisite: WOOL2203 and WOOL2204

Incorporation of cropping practices into farming and pastoral systems. Studies of a range of appropriate crops including cotton; their physiology and agronomy, pests and diseases. Study of alternate cropping systems in Mediterranean, temperate and sub-tropical environments. The use of models in assessing agricultural and farming systems practice. Students may incur personal costs for any compulsory field work.

WOOL3301

Farm Business Management

Staff Contact: Dr Gordon King

CP7.5 S1 L2 T1

This course focuses on decision making processes and resource allocation on farms. It covers an introduction to production function economics, gross margin analysis and partial budgeting and linear programming. It also introduces the special issues of farm tenure and valuation, rural accounting and taxation for primary producers.. Students may incur personal costs for any field work.

WOOL3401

Animal Nutrition

Staff Contact: Dr Geoff Robards

CP10 S2 L3 T1

Composition and classification of foodstuffs and pastures. Digestion absorption and metabolism of carbohydrates, proteins, fats, mineral and vitamins. Digestibility of feedstuffs. Nutrient and energy balances and requirements of livestock. Feeding standards and the quantitative application of nutritional data with particular reference to Australian conditions. Supplementary and drought feeding. Consideration of disorders due to nutrition. While particular emphasis is given to nutritional requirements of sheep, those of other farm livestock are dealt with in this section.

WOOL3501

Wool Science 3 (Wool, Technology and Metrology) CRC

Staff Contact: Dr Peter Auer

CP15 S1 L3 T3

An overview of the position of wool in the total world fibre market, the markets for wool and a description of the international wool industry. A detailed look at the processes involved in the conversion of raw wool to weavable yarn, including the latest advances in technology. The methods and precision of various raw wool properties, and the utilisation of these measurements as both a commercial and processing tool. The effect of the wool fibre structure on the final products. The lecture content of this subject is taught with students from the Universities of Western Australia, New England and Adelaide by video-conferencing by presenters from the universities, research institutes and industry personnel.

WOOL3511

Wool Science 4 (Wool Biology)

Staff Contact: Dr Peter Auer

CP15 S2 L2 T1

Prerequisite: WOOL2501

Study of the biology of the skin and fleece, relating the characteristics of the wool follicle and fibre to the production, technology and processing of wool. An understanding of the potential utilisation of this knowledge to manipulate fleece characteristics by understanding the factors controlling follicle morphology and function. The techniques used in the study of wool biology. The lecture content of this subject is taught with students from the universities of Western Australia, New England and Adelaide by video-conferencing by presenters from the universities, research institutes and industry.

WOOL3801

Genetics 1

Staff Contact: Dr Geoff Robards

CP10 S2 L3 T1

The nature and transmission of genetic material. Mechanisms by which genes produce their effect. The genetic structure of populations and the factors which affect it. Methods for the study of quantitative characters. Application of genetics to animal and plant improvement. Goals and breeding programmes for Australian sheep.

WOOL3901

Biostatistics 1

Staff Contact: Dr Geoff Robards

CP10 S1 L2 T2

The characteristics of random variation. Populations and samples. Estimation, tests of significance and confidence intervals. Design and analysis of comparative experiments involving continuous and discrete random variables. Comparison of means and proportions, analysis of variance and linear regression. Computer statistics packages..

WOOL4003**Project***Staff Contact: Dr Geoff Robards*

Students are required to conduct an experimental or theoretical investigation under supervision and to submit a thesis describing the results of their investigations. Throughout the year students are required to submit progress reports to their supervisors and to present seminars. The written reports of the project shall be submitted by the last day of Session 2.

WOOL4013**Seminar***Staff Contact: Dr Geoff Robards*

Seminars deal with research and or development work being undertaken or recently completed by students and staff of the Department, or other University schools or research organisations. There are also seminars on communication in wool and pastoral sciences and on problems facing rural industries.

WOOL4021**Agricultural Systems***Staff Contact: Dr Gordon King*

CP10 S1 L1 T3

This subject is problem based with students working in small groups. Two different 'problems' are provided for the session with students being expected to analyse the problem and to provide a solution in a report and presentation. One problem will be 'farm' based, – that is the students will be expected to analyse the operations and financial aspects of a nominated farm, and by the use of linear programming – or cash flow and profitability budgets provide a report *which can be implemented* improving profitability. A second problem will be market-oriented or a specific technical issue such as the marketing and development of a product for export, or changing the existing marketing system for current production, using futures, a marketing programme to sell to farmers etc or a technical issue to solve a pasture or livestock productivity problem, -to design a chart of accounts for management reporting, designing a promotional programme for agricultural produce, or to -prepare a contract for the export of goods. The problems allocated will be determined by the background knowledge of the students involved. The subject involves a variety of staff at the reporting and presentation stages. Students may incur personal costs for any field work.

WOOL4101**Animal Science 3 (Intensive Animal Production)***Staff Contact: Dr Geoff Robards*

CP7.5 S2 L2 T1

Intensive systems of ruminant production. Production, management, health and welfare of animals in feedlots, sheep dairies, sharlea-type wool production, and overseas transport of live animals. Environmental issues and ration formulation.

WOOL4111**Animal Science 4 (Animal Reproduction)***Staff Contact: Dr Geoff Robards*

CP7.5 S1 L2 T1

Reproduction in ruminants; sources of reproductive wastage; management to reduce wastage; profitability of increasing reproductive rate. Application of controlled breeding technologies such as oestrus synchronisation, embryo sexing, cloning and embryo transfer.

WOOL4121**Animal Science 5 (Meet Science and Marketing)***Staff Contact: Dr Geoff Robards*

CP7.5 S2 L2 T1

Muscle biology; factors affecting carcass composition, pre- and post-mortem factors affecting meat quality. Consumer requirements, marketing options for meat producers; quality management in the meat industry.

WOOL4411**Ruminant Nutrition***Staff Contact: Dr Geoff Robards*

CP10 S1 L2 T2

Utilisation of metabolisable energy: protein digestion and utilisation; digestion of complex carbohydrates; digestive upsets: bloat, acidosis, rumen stasis; techniques for measuring nutrient dynamics and body turnover rates; formulation of specialised rations for: feedlots, live sheep trade, Sharlea wool production, milk production.

WOOL4511**Wool Science 5 (Wool Production) CRC***Staff Contact: Dr Peter Auer*

CP7.5 S1 L3

Prerequisite: WOOL3501

This subject focuses on the characteristics of Merino wool which influence its value, such as fleece weight, average fibre diameter, staple length, colour vegetable matter and style. Studies will include details on the impact of genetic, nutritional, environmental, physiological and management factors on these characteristics. The interactions between these factors will be explored in a range of environments, providing a systems approach to wool production at a national level. This will enable students to identify and evaluate the options available to the commercial wool grower for improving productivity and the value of the clip. Attention will also be given to the ram breeding industry in terms of breeding objectives, selection strategies, bloodline comparisons and sire evaluation schemes. The lecture content of this subject is taught with students from the universities of Western Australia, New England and Adelaide by video-conferencing by presenters from the universities, research institutes and industry personnel.

WOOL4521**Wool Science 6 (Wool Marketing) CRC***Staff Contact: Dr Peter Auer*

CP7.5 S2 L2 T1

Prerequisite: WOOL3501

This unit examines the global supply and demand for wool. The options of ownership transfer available in the market are outlined and analysed. The promotion of wool and the flow of information affecting the market for wool are also outlined and analysed. The issues of quality assurance that affect the wool market are examined. An analysis of the important future issues in the wool market is presented. The lectures are shared with students from the universities of Western Australia, New England and Adelaide by video-conferencing by presenters from the universities, research institutes and industry.

WOOL4531**Wool Science 7 (Advanced Wool Topics)***Staff Contact: Dr Peter Auer*

CP10 S1 L2 T2

Prerequisite: WOOL3501

Sale by description; breeding for wool quality; current research and development in wool production; woollen metrology; modelling wool production; the Australian wool processing industry; fabric technology [weaving and knitting]; wool dyeing and finishing; fabric objective measurement.

WOOL4811**Genetics 2***Staff Contact: Dr Geoff Robards*

CP15 S2 L3 T3

Theory of population genetics. Partition of variation in quantitative traits. Estimation of genetic parameters, including the use of Residual Maximum Likelihood. Prediction of breeding values, including selection index and Best Linear Unbiased Prediction. Definition of goals for breeding programmes. Design of selection and crossbreeding programmes. Use of molecular genetics and reproductive technology in livestock improvement.

WOOL4911**Biostatistics 2***Staff Contact: Dr Geoff Robards*

CP10 S2 L2 T2

Factorial experiments. Least squares methods applied to multiple regression and experimental design models. Analysis of covariance. Elements of multivariate analysis. Non-additivity. Use of computer packages for statistical analyses.

Postgraduate Study

Courses and Programs

Faculty of Life Sciences

Dean: Professor MJ Sleigh

The Schools of the Faculty of Life Sciences offer facilities for students to proceed to the award of a Graduate Diploma in Biochemistry and Molecular Genetics (5345), Biotechnology (5015), Food Technology (5020), Biological Science (5350), Microbiology and Immunology (5355) and Psychology (5330).

The award of a Masters degree by course work is offered in Psychology (8251 and 8252) with a course work Masters program in Forensic Psychology (8253) planned for 1998. Course work Masters programs are also available in Biotechnology (8042), Biopharmaceuticals (8043), Food Science and Technology (8032) and Marine Science (8265).

Programs leading to degrees of Masters by research and PhD are available in all Schools of the Faculty. Graduates are advised to contact the relevant Head of School to obtain advice on entry requirements.

Faculty of Science and Technology

Dean: Professor CE Sutherland

The Schools of the Faculty of Science and Technology offer programs leading to the Award of the degrees of Doctor of Philosophy, Master of Science and (through the School of Materials Science and Engineering) Master of Engineering.

The following formal courses leading to graduate awards are also offered:

- School of Chemistry: Graduate Diploma in Food and Drug Analysis, Master of Chemistry in Food and Drug Chemistry
- School of Geography: Graduate Diploma in Remote Sensing, Master of Applied Science in Geography
- School of Materials Science and Engineering: Graduate Diploma in Textile Technology, Master of Applied Science in Corrosion Engineering, Master of Applied Science in Engineering Materials
- School of Mathematics: Graduate Diploma in Physical Oceanography, Graduate Diploma in Statistics, Master of Mathematics, Master of Statistics
- School of Optometry: Master of Optometry
- School of Physics: Graduate Diploma in Physics, Graduate Diploma in Physics Research Techniques
- Department of Applied Geology: Master of Applied Science in Applied Geology

- Department of Safety Science: Graduate Certificate in Safety Science, Graduate Diploma in Environmental Studies, Graduate Diploma in Ergonomics, Graduate Diploma in Safety Science, Master of Applied Science in Ergonomics, Master of Applied Science in Industrial Safety, Master of Applied Science in Occupational Health and Safety, Master of Engineering Science in Industrial Safety, Master of Environmental Studies, Master of Safety Science
- Centre for Advanced Numerical Computation in Engineering and Science: Graduate Diploma in Computational Science, Master of Computational Science.

Graduates are advised to consult the Head of Department before making formal application for registration in any of the above courses.

Students completing undergraduate science degrees which include an appropriate mix of subjects may qualify for admission to higher degree programs in Faculties other than Life Sciences and Science and Technology.

Enrolment Procedures

All students re-enrolling in 1998 or enrolling in graduate courses should contact the Postgraduate Section for enrolment details.

Faculty of Life Sciences

Facilities are available in each of the Schools for research leading to the award of the degrees of Master of Science, Doctor of Philosophy and Graduate Diploma. The Department of Biotechnology (within the School of Applied Bioscience) offers a Graduate Diploma in Biotechnology and a Masters degree course in Biotechnology by formal study. The Department of Food Science and Technology (within the School of Applied Bioscience) offers a Graduate Diploma in Food Technology and Master of Applied Science degrees in Food Technology, Food Microbiology, Food Engineering and Food Science and Nutrition by formal study. The School of Psychology offers Master of Psychology (Applied) and Master of Psychology (Clinical) degree courses. A Master of Psychology (Forensic) course is planned for 1998. A Master of Marine Science program is also available.

Higher Degree Qualifying Program

Students without a BSc Honours degree wishing to register as higher degree candidates must usually complete a qualifying program, admission to which is subject to the approval of the Faculty Higher Degree Committee.

Applicants must normally have a degree or diploma in an appropriate field of study from an approved university or institution, and in the case of a diploma, appropriate professional experience.

Undergraduates of this University may be admitted to the full-time or part-time Honours undergraduate course. Other applicants may be admitted to a full-time, part-time or external qualifying program. The duration of the qualifying program is a minimum of one year for full-time and two years for part-time or external students.

Content of Qualifying Program

The qualifying program consists of the whole of the usual program for the final Honours year of the undergraduate course, the following being the prescribed Level IV subjects:

BIOC4318	Biochemistry Honours (Full-time)
BIOC4618	Biochemistry Honours (Part-time)
BIOS4018	Biological Science Honours (Full-time)
BIOS4014	Biological Science Honours (Part-time)
BIOS4028	Botany Honours (Full-time)
BIOS4024	Botany Honours (Part-time)
BSSM4103	Genetics Honours (Full-time)
BSSM4109	Genetics Honours (Part-time)
MICR4013	Microbiology and Immunology Honours (Full-time)
MICR4023	Microbiology and Immunology Honours (Part-time)
PSYC4023	Psychology 4 (Thesis) Honours
PSYC4033	Psychology 4 (Honours)
BIOS4038	Zoology Honours (Full-time)
BIOS4034	Zoology Honours (Part-time)

The qualifying program is graded in the usual way, and in appropriate cases the results are expressed as a grading equivalent to Honours.

Students undertaking a qualifying program in the Department of Food Science and Technology will enrol in Course 6138 Postgraduate Qualifying in Food Science and Technology and undertake such subjects as approved by the Head of Department.

Alternative Qualifying Program

Applicants who cannot attend the University regularly for the above programs may be admitted as external qualifying students to a program similar to a standard Honours year. The following are the alternative qualifying subjects:

BIOC6308	Biochemistry
BIOS9917	Biological Science
BIOS9943	Botany
MICR6043	Microbiology
PSYC6000	Psychology
BIOS9945	Zoology

The results in alternative qualifying subjects are graded *Pass* or *Fail* only.

Fees

Candidates enrolled in the Alternative Qualifying Program are exempt from student service fees.

Graduate Diplomas

The Graduate Diploma is designed as a one year full-time period of study and research in all Schools except Applied Bioscience. It is intended primarily as an advanced training program for graduates from overseas universities who wish to obtain specialised training in particular areas of life sciences. The expectation is that for suitably qualified students, the course would allow entrance to a higher degree program (MSc or PhD) provided suitable supervision and facilities were available. The course is also available to graduates of Australian universities who have not done an Honours course and who wish to pursue graduate study in a discipline other than that in which they obtained their first degree.

At the successful conclusion of the course the students would be provided with a Diploma Certificate showing their Higher Degree Qualifying status by the University and a statement of their proficiency from the relevant School.

Entrance for students for whom English is the second language would be dependent on achieving an adequate standard of written and spoken English.

The academic year for the University of New South Wales consists of two sessions, commencing in late February – early March and mid-July, respectively. It is preferred that new students arrive 2-3 weeks prior to the beginning of the Session, so that they can be oriented prior to the commencement of formal teaching.

The Graduate Diplomas in Biotechnology and Food Technology are coursework programs that offer retraining for graduates of other disciplines.

Brief descriptions of the courses currently offered within the Schools of the Faculty of Life Sciences follow.

School of Applied Bioscience

Comprises the Departments of Biotechnology and Food Science and Technology.

Department of Biotechnology

5015

Biotechnology Graduate Diploma Course Full-time or Part-time

Graduate Diploma GradDip

Staff Contact: P Rogers

The graduate diploma course provides the opportunity for graduates with no previous tuition in biotechnology to undertake training in this discipline.

A degree in a science-based course is required for admission. If the degree course has not included a biology component, the candidate is required to undertake some basic biology training as a prerequisite or corequisite.

Under normal circumstances, students whose previous training has included a substantial component of biotechnology are not admitted to the course.

The course comprises study of undergraduate and graduate formal subjects, plus extensive laboratory training in biotechnology.

The diploma is awarded after one year's full-time study, consisting of an average of 18 hours per week, or two years part time study, consisting of an average of 9 hours per week. The program includes the listed obligatory subjects plus sufficient of the listed elective subjects to meet the hours of study required. The electives include subjects necessary for students without previous tuition in biochemistry and/or microbiology, as well as alternatives for those with previous tuition in these disciplines. The choice of electives in each individual case is subject to approval by the Head of School.

Obligatory Subjects

BIOT3011	Biotechnology A
BIOT3021	Biotechnology B
BIOT5013	Practical Biotechnology

Elective Subjects

BIOT3031	Microbial Genetics
BIOT3061	Monoclonal Antibody and Genetic Techniques in Biotechnology
BIOT8010	Graduate Seminars
BIOT7100	Biological Principles
BIOT7110	Bioengineering Principles

Other suitable electives from the Department of Food Science and Technology and/or other Schools.

5020

Food Technology Graduate Diploma Course Full time or Part-time

Graduate Diploma GradDip

The Graduate Diploma course is designed to provide professional training at an advanced level for graduates in Science, Science and Technology or Engineering who have not had previous training in Food Technology.

Requirements are a first degree and, in some cases, the successful completion of assignments or examinations, as directed by the Head of Department.

The course is a blend of formal lectures and laboratory work. The Graduate Diploma is awarded on the successful completion of one year of full-time study (at least 119 credit points), or two years of part-time study (at least 59.5 credit points/year). It involves the following program:

Compulsory subjects	CP*
FOOD1527 Principles of Food Preservation	21
FOOD1537 Plant Food Products	7
FOOD1547 Animal Food Products	10.5
FOOD1557 Food Technology Laboratory	21
FOOD2517 Food Microbiology	14

Students who have previously studied compulsory subjects or their equivalent at an acceptable level may be granted an exemption by the Head of Department but the equivalent number of credit points must be completed by taking other approved subjects.

**Credit points may be concentrated in one session.*

Elective subjects

The elective subjects making up the remainder of the credit points, may be selected from those offered by the School of Applied Bioscience, or from those offered by other Schools in the University subject to approval by the Head of Department. Only graduate subjects will count towards credit points.

School of Biochemistry and Molecular Genetics

5345

Biochemistry Graduate Diploma Course

Full-time

CP120

Part-time

CP60

Graduate Diploma (by Research) GradDip

Staff Contact: Dr D Lee

The course is tailored according to the background and requirements of the individual student. In most cases it would include advanced formal undergraduate training, including lectures in general and medical biochemistry, training in the use of modern biochemical techniques, eg scintillation counting, gas liquid chromatography (GLC), high performance liquid chromatography (HPLC), molecular biology, spectrophotometry, nuclear magnetic resonance (NMR) spectroscopy, and animal and plant cell culture. The student would also carry out a research project (or projects) in the laboratory of an academic member of staff and write a report on the project.

The School of Biochemistry and Molecular Genetics has a wide range of interests and can offer research projects in most areas of biochemistry. Specialised areas of research are molecular biology, marine biochemistry, parasite biochemistry and plant biochemistry.

School of Biological Science

5350

Biological Science Graduate Diploma Course Full-time

Graduate Diploma

GradDip

Full-time

CP120

Part-time

CP60

Staff Contact: School Office

The course is designed to meet the needs and objectives of individual students building on that students' competence and experience. It includes a formal coursework component and a research project which is carried out under the supervision of a member of the academic staff. Students receive advanced formal training to provide them with background information relevant to their research project.

The School has a wide range of interests, and training and research are offered in both plant and animal sciences. Areas of biology in which facilities and appropriate supervision are available include: ecology, taxonomy, environmental physiology, marine and fisheries biology, genetics and evolution, mycology, ultrastructure, comparative physiology, mammalian studies.

School of Microbiology and Immunology

5355

Microbiology and Immunology Graduate Diploma Course Full-time

CP120

Graduate Diploma GradDip

Staff Contact: School Office

The structure of the course would be decided after discussions with students, taking into account their particular background, interest and career goals. Usually students would attend one or more of the advanced third year courses in either microbial genetics, environmental microbiology, immunology, medical bacteriology or animal

virology. The rest of the year would be spent carrying out a research project supervised by a member of academic staff.

The School of Microbiology and Immunology has a number of research teams working on a range of well funded projects in microbiology, molecular biology and immunology. Specialised areas of research include microbial ecology, molecular genetics, environmental microbiology, marine microbiology; the pathogenesis of intestinal and gastroduodenal infection, Tcells, cytokines, the allergic reaction.

School of Psychology

5330

Psychology Graduate Diploma Course Full-time

CP120

Graduate Diploma GradDip

Staff Contact: Dr J Cranney

This one year course is adapted to suit the needs and objectives of each student, taking into account the areas of psychology in which they have already demonstrated competence. The expectation is that students who achieve an appropriate standard in the course are then admitted to a higher degree program, provided suitable supervision and facilities are available.

The course comprises formal teaching in an approved set of subjects drawn from the following areas: research methods and statistics, perception, learning, cognitive psychology, psycholinguistics, social psychology, clinical psychology, developmental psychology, personality, physiological psychology, abnormal psychology, and applied psychology. Both lectures and practical work will be given.

Students normally also carry out a research project under the supervision of a member of the academic staff of the School. Active research programs exist in most areas including abnormal and clinical psychology, behavioural neuroscience, cognitive science, cognition and perception, data analysis and psychometrics, industrial and organisational psychometrics, and social, personality and developmental psychology. Particular attention within each of these programs is paid to the interrelationship between scientific theory and the practical application of psychological knowledge.

Masters Degrees

Department of Biotechnology

Master of Applied Science Degree Courses

The MAppSc degree courses provide for a comprehensive study of theoretical and applied aspects of the science, technology and engineering of foods. The courses are elective in nature providing an opportunity for graduates to apply their basic skills in areas relevant to these fields of Science and Technology in which the Department has developed special expertise. Intending candidates are invited to contact the Head of Department for advice and recommendation.

The Department of Biotechnology offers three formal masters courses, the Master of Applied Science (Biotechnology) 8042, the Master of Applied Science (Biopharmaceuticals) 8043.1000, and the Master of Applied Science (Biopharmaceuticals) by distance education 8043.2000.

8042

Master of Applied Science (Biotechnology)

MAppSc(Biotech)

The course includes advanced treatments of all areas of biotechnology. It is open to graduates with a four-year degree in biotechnology or a related discipline, or who have, in the opinion of the Higher Degree Committee, acquired equivalent qualifications or experience. Intending students are referred to Conditions for the Award of Graduate Degrees set out later in this handbook.

The course consists of lectures, tutorials, practical sessions, case history studies and a supervised project.

The minimum period of registration before the award of the degree is two sessions for full-time students and four sessions for part-time students.

An acceptable course would be a program of subjects involving a minimum of 18 hours per week for two sessions full-time or a minimum of 9 hours per week for four sessions part-time. Course details are as follows:

		HPW		C P
		S1	S2	
BIOT7051	Applied Genetics	0	5	20
BIOT7061	Peptide and Protein Technology	5	0	20
BIOT7071	Biochemical Engineering	5	0	20

		HPW		CP
		S1	S2	
BIOT7081	Environmental Biotechnology	0	5	20
BIOT7091	Applied Cellular Physiology	0	5	20
BIOT7110	Bioengineering Principles	3	0	12
BIOT7123	Biotechnology Project Minor	4	4	32
Total HPW Session 1		17		
Total HPW Session 2		19		
Total Credit Points		144		

Elective components

Elective subjects, may be selected from those offered by the School of Applied Bioscience, or from those offered by other Schools in the University subject to approval.

Each individual course would comprise:

1. A major strand of related material comprising approximately 75% of the total program, including a project comprising not less than 15% nor more than 50% of the program.
2. A minor strand of broader based material comprising up to 25% of the total program.
3. At least 60% of the non-project component must be taken in the Department of Biotechnology unless otherwise approved by the Head of School. The remainder, subject to approval and availability, may be undertaken elsewhere in the University.

8043.1000

Master of Applied Science (Biopharmaceuticals)

MAppSc(Biopharmaceuticals)

This is an interdisciplinary program designed for graduates with backgrounds in either pharmacology or biotechnology who wish to obtain advanced training in both areas in order to gain expertise necessary for the development and use of the new generation of biopharmaceuticals which have been developed by, or result from, the application of molecular biology. It is open to graduates with a four year degree in a related discipline or who have, in the opinion of the Higher Degree Committee, acquired equivalent qualifications or experience. Prior study of biochemistry is required for the course. The course consists of lectures, tutorials, practical sessions, case history studies and a supervised project. The minimum period of registration before the award of the degree is two sessions for full-time students and four sessions for part-time students. The course is also offered through distance education. An acceptable course would be a program of subjects involving

a minimum of 18 hours per week for two sessions full-time or a minimum of 9 hours per week for four sessions part-time. Choice of subjects is dependent on the background of the student.

Principles of Pharmacology (PHPH5461) must be taken by students who have not completed an approved Pharmacology course, while Principles of Biotechnology (BIOT7040) must be taken by students who have not completed an approved Biotechnology course program.

All students must pass Advanced Pharmacology (PHPH5471) and Advanced Biotechnology (BIOT7030) and Biotechnology Principles (BIOT7040) and/or Pharmacology Principles (PHPH5461) whichever is applicable. Course details are as follows:

		HPW		C P
		S1	S2	
BIOT7060	Biopharmaceuticals Project (Minor) <i>or</i>	4	4	32
BIOT7050	Biopharmaceuticals Project (Major)	8	8	64
BIOT7030	Advanced Biotechnology	3	3	24
BIOT7040	Biotechnology Principles	6	2	32
PHPH5461	Pharmacology Principles	5	3	32
PHPH5471	Advanced Pharmacology	3	3	24
PHPH5481	Pharmacology Project (Major) <i>or</i>	8	8	64
PHPH5491	Pharmacology Project (Minor)	4	4	32

A recommended program for full-time students with a Biotechnology background would then be:

BIOT7030	Advanced Biotechnology	3	3	24
PHPH5461	Pharmacology Principles	5	3	32
PHPH5471	Advanced Pharmacology	3	3	24
BIOT7050	Biopharmaceuticals Project (Major) <i>or</i>	8	8	64
PHPH5481	Pharmacology Project (Major)	8	8	64

A recommended program for full-time students with a Pharmacology background would then be:

BIOT7030	Advanced Biotechnology	3	3	24
BIOT7040	Biotechnology Principles	6	2	32
PHPH5471	Advanced Pharmacology	3	3	24
BIOT7050	Biopharmaceuticals Project (Major)	8	8	64
PHPH5481	Pharmacology Project (Major)	8	8	64

Elective Components

If a minor project is selected, additional elective subject(s) may be selected from those offered by the Department of Biotechnology or the School of Physiology and Pharmacology, or from those offered by other Schools in the University subject to approval.

Each individual course would comprise: (i) a major strand of related material comprising approximately 75% of the total program including a project comprising not less than 15% of the program (ii) a minor strand of broader based material comprising up to 25% of the total program.

8043.2000

Master of Applied Science (Biopharmaceuticals) Distance Education

The CRC for Biopharmaceutical Research has developed this strongly interdisciplinary Masters of Science and Technology in Biopharmaceuticals course. The course teaches the scientific basis underscoring the development of recombinant biopharmaceuticals, combined with aspects of clinical trials, regulatory considerations, patent issues, and licencing. The course content is incorporated in 8 distance education modules comprised of written text and video/audio tapes containing course material, demonstrations and self-testing exercises. Access to the Subject Co-ordinators will be by phone, fax, electronic mail and teleconferencing facilities.

The Master's Program can be completed in a minimum of 2 years. The minimum time option would entail the completion of two modules per session. These are offered concurrently. A maximum time for completion has been set at 8 years.

Modules consist of printed notes containing subject material, readings, assessment questions and exercises. Some modules also include audio and video taped material so access to audio equipment is essential.

The Master's Program calls for the completion of 8 modules coursework (exemptions may be allowed in exceptional circumstances) plus completion of a major project or two mini projects. Depending upon circumstances, projects may be industry or laboratory related or may be literature based. Completion of a minimum of 4 modules is required before projects may be commenced.

There will be two tutorials per session per module. These will be conducted via a multiple telephone link and will be structured and interactive.

Each module will be assessed separately at module completion and a certificate awarded. The assessment of modules will be flexible and will be based on two pieces of submitted work. This may be in the form of written assignments or as a timed, faxed examination.

Students module choices are from the following:

Module 1

Basic Principles of Drug Actions

PHPH5501 Basic Principles of Drug Actions

This module covers general principles of pharmacodynamics and pharmacokinetics. Pharmacodynamics (what the drug does to the body) considers drug-receptor interactions, the basis of dose-response curves, reversible and irreversible antagonists, partial agonists and related topics. Events following the drug-receptor interaction, which include stimulation of second messenger systems and the pharmacology of ion channels, are described. The principles governing pharmacokinetics (what the body does to the drug) and their clinical importance are discussed in some detail. There are several simple graphical and

problem solving exercises to be completed to aid in your understanding of this material.

Module 2

PHPH5511 Selected Topics in Pharmacology

For this module the topics were chosen to enable students to gain knowledge of the receptors in the human body with which drugs commonly interact to produce their main clinical effects, or their side-effects/toxicological actions. The module begins with an introduction to the autonomic nervous system, then works through autonomic receptors, receptors for histamine and serotonin, then to the newer areas of peptide receptors and cytokines, the latter areas being those for which drugs are now being developed. With this background, plus some reading material on receptors for drugs affecting the central nervous system, it is felt that students will be able to read and understand the pharmacology of most drugs in clinical use. A video which covers many autonomic drug effects on the cardiovascular system, plus questions based around this film, are included.

Module 3

PHPH5521 Techniques for Drug Development

This module extends the concepts raised and discussed in the Basic Pharmacokinetics section of Module 1. More advanced pharmacokinetic problems, such as compartmentation, kinetics of effects and problem solving are included. The technique of measuring receptor binding is shown in some detail on video, with explanation of how the technique is set up, and how and why it is much used in new drug development. Also included in this module is a section on techniques used in the assay of drugs. The determination of molecular structure, and quantitation of drugs in the body are vital areas of drug development, and indeed pharmacokinetics depends upon such quantitation.

Module 4

PHPH5531 Discovery and Development of New Medicines

This module gives an overview of most aspects of the development of new drugs. There is a very short historical introduction and examples of the discovery and development of drugs from natural products (plants) plus some examples of drugs developed using synthetic programs (chemical modifications). There is an example of a Natural Products program with examples of broad based screens and follow up testing in animals (Phase 0) followed by a section on the necessary toxicological testing in animals (also Phase 0) before a drug can be tested in humans. Phase 1-4 of clinical trials are then discussed, followed by the Pharmaceutical Company's and the Clinical Investigator's viewpoints of drug development. Regulatory issues and some ethical problems are briefly considered.

Module 5

BIOT7070 Production of Recombinant Products

In this module, the topics deal with some basic recombinant DNA techniques and then heterologous protein expression in prokaryotes and eukaryotes are discussed in greater details. For prokaryotes, *Escherichia coli* is the model species chosen and for eukaryotes, the cell systems of

yeast and mammalian cells are described. The advantages and disadvantages of the various expression cell systems are outlined. The vectors used for cloning of the protein genes are also described and illustrated. Cloning of genes into the vectors, production and subsequent characterisation of the recombinant protein are also described. These examples are actual biopharmaceutical products currently produced by the biotechnology industry and students are referred to published journal papers throughout the modules.

Module 6

BIOT7080 Principles of Fermentation and Downstream Processing

The units in this module were selected to give the students a good understanding of the fundamental principles associated with biopharmaceuticals manufacture. The module begins by discussing basic fermentation principles for the large-scale culture of bacterial and mammalian cells to produce recombinant protein biopharmaceuticals. This is followed by a thorough study of the main unit operations associated with product recovery, commonly referred to as downstream processes. The principles of Good Manufacturing Practice are discussed in the third unit, which is relevant to all aspects of drug manufacturing, including fermentation and product recovery operations. This unit is thus designed to put regulatory principles into the context of biopharmaceutical manufacture. The last unit covers modern methods of product characterisation, which forms a critical component of the regulatory procedure.

Module 7

BIOT7090 Monoclonal Antibody Technology

This module is made up of 4 units covering techniques for the production of monoclonal antibodies and discussing their therapeutic applications. Unit 1 is designed as an introduction to immunology, emphasising the areas of immunology relevant to antibody production. In addition the structure of antibody molecules is studied in detail. Unit 2 describes the processes in the production of hybridomas, the specialised cells which produce monoclonal antibodies. This unit includes information on immunisation protocols, methods of cell fusion and selection, and the production of human monoclonal antibodies by EBV-transformed B cells. Unit 3 is associated with the more recent developments in antibody engineering techniques. The phage display system, and genetic manipulations for the production of humanised antibodies and antibody fragments are described in details. Unit 4 covers the applications of monoclonal antibodies both for *in vivo* diagnostics and for therapy. Also, some of the more recent innovations such as the production of recombinant immunotoxins are described.

Module 8

BIOT7120 Regulatory Considerations, Patent Issues and Licensing

The first unit of this module looks at the code of Good Manufacturing Practice (GMP) for the production of recombinant biopharmaceuticals and the establishment of Standard Operating Procedures (SOPs) for a production

process. This is especially relevant as many of the M.App.Sc. (Biopharmaceuticals) graduates will take up positions in industry. The international biopharmaceutical industry is a vigorous, rapidly growing industry. Compared to the pharmaceutical industry it is still at a fairly early stage of development and undergoing some interesting changes. The second unit provides an understanding of the nature of the biopharmaceutical industry at this stage of its evolution. It includes the concept of licensing as an important factor in its development as well as an appreciation of the basics of licensing activity. The final unit introduces the student to the concept of intellectual property as it relates to biopharmaceuticals and provides some guidelines on its management. Intellectual property is the collection of statute and common law principles giving ownership of inventions, trade secrets, trade marks, designs and copyright in literary and artistic works to their creators. The creation and protection of intellectual property is the basis on which development and commercialisation of biopharmaceuticals is built and as such is of vital concern to the industry. This unit will provide a detailed consideration of patents and trade secrets and touch briefly on the subject of trade mark registrations, industrial design registrations and copyright. Special issues relating to patents and trade secrets in biopharmaceuticals will also be examined.

Module 9

BIOT7130 Biotechnology Mini Project 1

A small experimental or design project, or an extensive literature review and analysis of a selected topic in biotechnology.

Module 10

BIOT7140 Biotechnology Mini Project 2

A small experimental or design project, or an extensive literature review and analysis of a selected topic in biotechnology.

Modules 9 and 10

BIOT7150 Biotechnology Major Project

An experimental or technical investigation or design project in the general field of biotechnology.

Module 9

PHPH5541 Pharmacology Mini Project 1

A small laboratory or industry based project or an extensive literature review or extensive data analysis in the area of drug development.

Module 10

PHPH5551 Pharmacology Mini Project 2

A small laboratory or industry based project or an extensive literature review or extensive data analysis in the area of drug development.

Modules 9 and 10

PHPH5561 Pharmacology Major Project

A laboratory or industry based project in the area of drug development.

Department of Food Science and Technology

Master of Applied Science Degree Courses

The MAppSc degree courses provide for a comprehensive study of theoretical and applied aspects of the science, technology and engineering of foods. The courses are elective in nature providing an opportunity for graduates to apply their basic skills in areas relevant to these fields of Science and Technology in which the Department has developed special expertise. Intending candidates are invited to contact the Head of Department for advice and recommendation.

Graduate courses are available for Master of Applied Science degree programs in the following areas:

Food Technology Course	8032.1000
Food Microbiology Course	8032.2000
Food Engineering Course	8032.3000
Food Science and Nutrition Course	8032.4000

Entry qualifications

A four-year Bachelor degree, honours degree or equivalent (e.g. three-year degree plus relevant employment experience) is the minimum requirement for admission to the courses.

Study programs

Students are required to complete a program of study totalling at least 126 credit points made up of compulsory subjects, a compulsory project and elective subjects. Students who have previously studied compulsory subjects or their equivalent may be granted an exemption by the Head of Department but the equivalent number of credit points must be completed by taking other approved subjects. The degree will comprise one year of full-time study (normally two sessions of at least 63 credit points each) or two years of part-time study (normally four sessions of at least 31.5 credit points each), and would comprise:

1. A major strand of related material comprising approximately 75% of the total program, including a project comprising not less than 15% nor more than 50% of the program.
2. A minor strand of broader based material comprising up to 25% of the total program.
3. Undergraduate material may be included in one or both strands but will not be included in credit points.
4. At least 60% of the non-project component must be taken in the School of Applied Bioscience unless otherwise approved by the Head of Department. The remainder, subject to approval and availability, may be undertaken elsewhere in the University. Full details of all subjects are listed under Disciplines of the University in the Calendar.

8032.1000**Food Technology****Master of Applied Science
MAppSc**

The MAppSc course in Food Technology is particularly relevant to graduates in Agriculture, Science and Technology and Applied Science with principal interests in chemistry, biochemistry, microbiology, physiology, nutrition and engineering. This is a formal course consisting of core components (including a project), and an elective component that allows reasonable flexibility and a choice of subjects in food science and technology based on the candidate's background, subject to the availability of staff and resources.

The course comprises:

Compulsory subjects		CP*
FOOD1527	Principles of Food Preservation	21
FOOD1557	Food Technology Laboratory	21
FOOD1707	Seminar	7

Compulsory project

Either

FOOD1717	Major Research Project (available only to exceptional candidates) <i>or</i>	63
FOOD1727	Research Project <i>or</i>	42
FOOD1737	Minor Project	21

* Credit points may be concentrated in one session.

Elective subjects

Elective subjects making up the remainder of the credit points may be selected from those offered by the School of Applied Bioscience, or from those offered by other Schools in the University subject to approval by the Head of Department.

The work involved in the project must be embodied in a report and submitted in accordance with the requirements of the Faculty.

Depending on the candidate's background, enrolment in some of the above subjects may be accompanied by enrolment in related undergraduate subjects as prerequisites or corequisites. Undergraduate subjects do not count towards course credit points. A particular subject may not necessarily be conducted in any one year.

8032.2000**Food Microbiology****Master of Applied Science
MAppSc**

The MAppSc course in Food Microbiology is a program of study designed for graduates in Food Science, Food

Technology, Microbiology, Biochemistry, Biotechnology or related disciplines who have an interest in microorganisms associated with foods. The course provides advanced training in all aspects of food microbiology as well as fundamental aspects of food science and technology.

Entry qualifications

A four year Bachelor degree, honours degree or equivalent involving some basic training in microbiology and biochemistry is the minimum requirement for admission to the course.

The course comprises:

Compulsory subjects		CP*
FOOD2597	Food Microbiology Seminar	7
FOOD2517	Food Microbiology	14
FOOD2527	Microbiological Examination of Foods	21
FOOD2537	Microbiological Quality Assurance	7

Compulsory project

Either

FOOD2617	Major Research Project in Food Microbiology (available only to exceptional candidates) <i>or</i>	63
FOOD2607	Food Microbiology Research Project <i>or</i>	48
FOOD2547	Food Microbiology Project	21

Elective subjects

FOOD1517	Chemistry, Biochemistry and Physics of Foods	10.5
FOOD1527	Principles of Food Preservation	21
FOOD2507	Introductory Microbiology	10.5
FOOD2557	Microbial Spoilage of Foods	3.5
FOOD2567	Foodborne Microorganisms of Public Health Significance	7
FOOD2577	Food and Beverage Fermentations	7
FOOD2587	Microorganisms as Food Processing Aids and Ingredients	3.5

or other subjects offered by the Departments of Food Science and Technology and of Biotechnology or other Schools subject to approval by the Head of Department.

* Credit points may be concentrated in one session.

8032.3000**Food Engineering****Master of Applied Science
MAppSc**

The MAppSc course in Food Engineering is a formal course designed for graduates in Engineering or related disciplines who have an interest in the processing of biological resources for human consumption. The formal components of the course provide professional training at an advanced level in food engineering and food science. The studies in food engineering are designed to strengthen and broaden the engineering background of candidates and emphasise

the use of fundamental principles in solving problems associated with food processing. Problem solving skills in engineering are developed further in a research project devoted to an area of food engineering.

Compulsory subjects		CP*
FOOD1707	Seminar	7
FOOD4557	Food Engineering Laboratory	10.5
FOOD4567	Food Engineering Field Work	10.5
FOOD4587	Advanced Food Engineering A	14
FOOD4597	Advanced Food Engineering B	14
FOOD4607	Packaging and Production	14

Compulsory project

Either

FOOD1717	Major Research Project (available only to exceptional candidates) or	63
FOOD1727	Research Project or	42
FOOD1737	Minor Project	21

**Credit points may be concentrated in one session.*

Elective subjects

The elective subjects making up the remainder of the credit points may be selected from those offered by the School of Applied Bioscience, or from those offered by other Schools in the University subject to approval by the Head of Department.

8032.4000

Food Science and Nutrition

Master of Applied Science

MAppSc

The MAppSc course in Food Science and Nutrition is relevant to graduates in science with principal interests in chemistry, biochemistry, physiology and human nutrition. The course comprises a core component (including a project) and an elective component that allows reasonable flexibility and a choice of subjects in human nutrition and food science and technology based on the candidate's background. This new course is still subject to Academic Board approval.

Compulsory subjects		CP*
FOOD1527	Principles of Food Preservation	21
FOOD1707	Seminar	7
FOOD3507	Introductory Nutrition	10.5
FOOD3517	Nutrition	10.5

Compulsory project

Either

FOOD1717	Major Research Project (available only to exceptional candidates) or	63
FOOD1727	Research Project or	42
FOOD1737	Minor Project	21

Elective subjects

FOOD3527	Nutritional Evaluation of Foods	21
FOOD3537	Public Health Nutrition	7

FOOD3547	Nutritionally Modified Foods and Ingredients	3.5
FOOD3557	Advanced Nutritional Science	7
CMED9610	Community Nutrition and Food Policy Studies	10
SLST9250	Nutrition for Peak Performance	15

**Credit points may be concentrated in one session.*

Centre for Marine and Coastal Studies

Presiding Member of Management Committee:

Professor JH Middleton

Director: Dr PI Dixon

8265

Master of Marine Science Degree Course (MMarSc)

CP120

The Master of Marine Science is a course work degree to be completed in one year of full time study. It is intended primarily as an advanced training program for

Graduates from overseas universities who require specialised training in marine science but do not wish to undertake a research degree.

Graduates, especially from overseas universities, who do not meet the requirements for entry to the MSc (Research) degree.

Australian Science graduates who wish to update their qualifications or obtain a qualification in an area which is different from that of their initial award.

The course is multi disciplinary in approach and includes advanced treatments of all areas of marine science with provision for specialisation. It consists of lectures, tutorials, practical sessions, case history and a supervised project.

The Master of Marine Science degree course is available to graduates in science who have completed a four year degree. Others may be admitted if they have submitted evidence of such academic and/or professional attainment as may be approved by the appropriate Faculty on the recommendation of its Higher Degree Committee. Applicants with other qualifications may be admitted after completion of a qualifying program approved by the appropriate Faculty. The program shall be of one year duration (full-time) or two years part-time.

The program is as follows:

MSC15001	Marine Environmental Monitoring and Assessment
MSC15002	Management of Marine Resources
MSC15003	Experimental Design and Analysis
MSC15004	Oceanographic Processes
MSC15005	Topics in Marine Science
MSC15006	Graduate Seminars in Marine Science

MSC15007 Marine Science Project
 MSC15008 Special topic*

* If a student has previous relevant experience in one of the courses designated, a special topic may be substituted in consultation with the course director.

School of Psychology

Head of School: Professor KM McConkey

Senior Administrative Officer: Mr T Clulow

The School offers courses leading to the award of the degrees of Master of Psychology (Applied) and Master of Psychology (Clinical).

8252

Master of Psychology (Applied) Degree Course

Full-time or Part-time

Master of Psychology (Applied)

MPsychol(App)

This course provides graduate training for psychologists who intend to work in industry, commerce, consulting practice, service organisations, trade unions, or the public service. The program focuses on the theories, practice, and research in industrial and organisational psychology and in human factors. It is accredited as fifth and sixth years of study leading to full membership of the Australian Psychological Society and to its College of Organisational Psychologists, and registration as a psychologist in New South Wales.

The normal entrance requirement is completion of an honours Class 1 or Class 2 degree in Psychology from the University of New South Wales or a qualification considered equivalent.

Selection is based on academic qualifications and suitability for the course. As the number of places is limited, entry into the course is competitive. Referees reports will be sought for applicants who are shortlisted and an interview may be required.

Applicants who do not satisfy these entrance requirements may in exceptional circumstances be admitted, depending upon their knowledge, experience, occupation and the nature of their undergraduate training. Students applying under these provisions will usually be required to complete a qualifying program before they are admitted.

The minimum period of registration before the award of the degree is four sessions for full-time students and six sessions for part time students. Students with advanced standing may have the minimum period reduced by up to one half of the program ie a reduction of one session if a student has completed a PhD in an approved area of Psychology and one session if a student has completed part of the course work program.

The course consists of three components, all of which are compulsory: 1. course work (weekly lectures and seminars with associated written forms of assessment), 2. professional practice (completion of a minimum of 1,000 hours of supervised applied practice in applied field settings, weekly Applied meetings and Career Development Workshops), and 3. a research thesis. The three components total 300 credit points (135 in Stage 1 and 165 in Stage 2).

Stage 1

PSYC7000	Research and Evaluation Methods
PSYC7001	Psychological Assessment 1
PSYC7002	Psychological Assessment 2
PSYC7100	Psychology of Human Resources 1
PSYC7101	Psychology of Human Resources 2
PSYC7102	Psychological Principles of Training
PSYC7115	Vocational Interviewing and Counselling
PSYC7118	Professional Practice (Applied) 1
PSYC7119	Professional Practice (Applied) 2

Stage 2

PSYC7004	Professional and Ethical Issues
PSYC7108	Research Thesis (Applied)*
PSYC7116	Occupational Health and Stress
PSYC7117	Advanced Topics in Applied Psychology
PSYC7120	Professional Practice (Applied) 3
PSYC7121	Professional Practice (Applied) 4

*Contributes approximately 25% to the overall grading for the degree.

Notes: Part-time students normally are expected to take half the full-time program in any one session.

8251

Master of Psychology (Clinical) Degree Course

Full-time or Part-time

Master of Psychology (Clinical)

MPsychol(Clin)

This course provides graduate training for psychologists who intend to work as clinicians in hospitals, community health and other settings where they might be engaged in health promotion and the diagnosis, assessment or treatment of people with a range of psychological problems or disabilities. It is accredited as fifth and sixth years of study leading to full membership of the Australian Psychological Society and to its College of Clinical Psychologists, and registration as a psychologist in New South Wales.

The normal entrance requirement is completion of an honours Class 1 or Class 2 degree in Psychology from the University of New South Wales or a qualification considered equivalent.

Selection is based on academic qualifications and suitability for the course. As the number of places is limited, entry into the course is competitive. Referees reports will be sought for applicants who are shortlisted and an interview may be required.

Applicants who do not satisfy these entrance requirements may in exceptional circumstances be admitted, depending upon their knowledge, experience, occupation and the nature of their undergraduate training. Students applying under these provisions will usually be required to complete a qualifying program before they are admitted.

The minimum period of registration before the award of the degree is four sessions for full-time students and six sessions for part-time students. Students with advanced standing may have the minimum period reduced by up to one half of the program ie a reduction of one session if a student has completed a PhD in an approved area of Psychology and one session if a student has completed part of the course work program.

The course consists of three components, all of which are compulsory: 1. course work (weekly lectures and seminars with associated written forms of assessment), 2. professional practice (completion of a minimum of 1,000 hours of supervised clinical practice within the School Clinic and in field clinical settings, weekly Clinical meetings and Skills Training Workshops), and 3. a research thesis. The three components total 330 credit points (165 in Stage 1 and 165 in Stage 2).

It should be noted that the course extends over two calendar years and not just four academic sessions with vacation breaks.

Stage 1

PSYC7000	Research and Evaluation Methods
PSYC7001	Psychological Assessment 1
PSYC7002	Psychological Assessment 2
PSYC7204	Child Clinical Psychology
PSYC7209	Developmental Disabilities
PSYC7210	Human Neuropsychology
PSYC7212	Experimental Clinical Psychology 1
PSYC7213	Experimental Clinical Psychology 2
PSYC7214	Experimental Clinical Psychology 3
PSYC7216	Professional Practice (Clinical) 1
PSYC7217	Professional Practice (Clinical) 2

Stage 2

PSYC7004	Professional and Ethical Issues
PSYC7206	Research Thesis (Clinical)*
PSYC7215	Experimental Clinical Psychology 4
PSYC7218	Professional Practice (Clinical) 3
PSYC7219	Professional Practice (Clinical) 4
PSYC7220	Psychology of Health and Illness

**Contributes approximately 25 per cent to the overall grading for the degree.*

Notes: Part-time students normally are expected to take half the full-time program in any one session.

Faculty of Science and Technology

The Schools of the Faculty of Science and Technology offer programs leading to the Award of the degrees of Doctor of Philosophy, Master of Science and (through the School of Materials Science and Engineering) Master of Engineering.

The following formal courses leading to graduate awards are also offered:

- School of Chemistry: Graduate Diploma in Food and Drug Analysis, Master of Chemistry in Food and Drug Chemistry
- School of Geography: Graduate Diploma in Remote Sensing, Master of Applied Science in Geography
- School of Materials Science and Engineering: Graduate Diploma in Textile Technology, Master of Applied Science in Corrosion Engineering, Master of Applied Science in Engineering Materials
- School of Mathematics: Graduate Diploma in Physical Oceanography, Graduate Diploma in Statistics, Master of Mathematics, Master of Statistics
- School of Optometry: Master of Optometry
- School of Physics: Graduate Diploma in Physics, Graduate Diploma in Physics Research Techniques
- Department of Applied Geology: Master of Applied Science in Applied Geology
- Department of Safety Science: Graduate Certificate in Safety Science, Graduate Diploma in Environmental Studies, Graduate Diploma in Ergonomics, Graduate Diploma in Safety Science, Master of Applied Science in Ergonomics, Master of Applied Science in Industrial Safety, Master of Applied Science in Occupational Health and Safety, Master of Engineering Science in Industrial Safety, Master of Environmental Studies, Master of Safety Science
- Centre for Advanced Numerical Computation in Engineering and Science: Graduate Diploma in Computational Science, Master of Computational Science.

Graduates are advised to consult the Head of Department before making formal application for registration in any of the above courses.

For admission to registration for all degrees of Master (except Master of Statistics), candidates must have completed one of the following:

1. An approved degree of Bachelor with Honours;
2. An approved three year course leading to the award of the degree of Bachelor plus an approved qualifying program. Suitable professional and or research experience may be accepted in lieu of the qualifying program
3. An approved four year course leading to the award of the degree of Bachelor.

Applicants for registration for the degree of Master of Statistics shall have been admitted to the degree of Bachelor with major studies in the field of statistics in the University of New South Wales or other approved university.

The manner of presentation and examination of reports of projects undertaken as part of formal courses shall be determined by the Head of the School.

The conditions governing these higher degrees are set out later in this handbook.

Graduate Diplomas

School of Chemistry

5510

Food and Drug Analysis Graduate Diploma Course

Full-time or Part-time

Diploma in Food and Drug Analysis DipFDA

Staff Contact: Associate Professor P Southwell-Keely

This course is currently being restructured. Please consult with A/Prof Southwell-Keely with regard to this course.

According to demand, the course may be available on a full-time basis over one year or on a part-time basis over two years.

The course in food and drug analysis is designed to provide systematic training at an advanced level for chemists who wish to extend their acquaintance with analytical techniques, and thus is suitable for those who may wish to practice as public analysts. It is also suitable for those who wish to work in the food or pharmaceutical industry. The prime aim is to present discussions of the principles and design of analytical methods which are therefore presented on a comparative basis.

It is considered that the techniques involved in the handling of foods and drugs together with those discussed in the ancillary subjects of the course provide a firm basis of approach to many other fields of chemistry.

Intending students are referred to the conditions for the award of graduate diplomas set out elsewhere in this handbook.

Year 1*

CHEM7125	Food and Drugs 1
CHEM7115	Treatment of Analytical Data
CHEM7425	Instrumental Techniques in Food and Drug Analysis

Year 2*

CHEM7225	Food and Drugs 2
CHEM7325	Toxicology, Occupational and Public Health
MICR2201	Introductory Microbiology
or	
CHEM7555	Project Work in Food and Drug Chemistry

*Full-time students take years 1 and 2 in the one year.

School of Geography

5047.2000

Remote Sensing

Graduate Diploma GradDip

The graduate diploma program in Remote Sensing is offered in both the Faculty of Science and Technology and the Faculty of Engineering. Entry into either faculty depends on the background of the applicant and the orientation of the proposed program.

Entry qualifications. Three-year degree from an approved university and/or qualifications deemed appropriate by the relevant faculty.

Course requirements. Candidates are required to complete a program totalling a minimum of 84 credit points made up of 5 compulsory subjects (60 credit points) and 2 elective subjects (24 credit points). Compulsory subjects not offered in a particular year may be substituted by an approved equivalent subject.

The course will normally comprise one year of full-time study or two years part-time study.

Compulsory subjects

	CP
GEOG9150 Remote Sensing Applications	12
GEOG9290 Image Analysis in Remote Sensing	12
GMAT9600 Principles of Remote Sensing	12
GMAT9605 Field Data Collection and Integration	12
GMAT9606 Microwave Remote Sensing	12

Elective subjects

From the following (or as approved by the relevant Faculty):

CIVL9861	Environmental and Engineering Geophysics	12
CIVL9875	Hydrological Processes	12
GEOG9160	Directed Problems in Remote Sensing	12
GEOG9210	Computer Mapping and Data Display	12
GEOG9240	Principles of Geographic Information Systems	12
GEOL0110	Remote Sensing in Applied Geology	12
GEOL9060	Environmental Geology	12
GMAT9211	Introduction to Geodesy	12
GMAT9532	Data Acquisition and Terrain Modelling	12
GMAT9604	Land Information Systems	12

School of Materials Science and Engineering

The Department of Textile Technology, School of Materials Science and Engineering conducts a course which leads to the award of a Graduate Diploma in Textile Technology.

In addition, the Department welcomes inquiries from graduates in Science, Engineering and Science and Technology who are interested in doing research leading to the award of the degrees of Master of Science 2070 or Doctor of Philosophy 1060.

5090

Textile Technology Graduate Diploma Course

Graduate Diploma GradDip

		HPW		CP
		S1	S2	
TEXT5001	Textile Technology Dissertation	1.5	1.5	7.5
TEXT5003	Textile Technology	1.5	1.5	7.5
TEXT5101	Fibre Science A	6	0	15
TEXT5102	Fibre Science B	0	4	10
TEXT5201	Textile Quality Control	0	2	5

Plus two electives per session (averaging not less than 9 hours per session), selected from the following:

TEXT5301	Yarn Technology A	5	0	12.5
TEXT5302	Yarn Technology B	0	5	12.5
TEXT5401	Fabric Technology A	0	5	12.5
TEXT5402	Fabric Technology B	5	0	12.5
TEXT5501	Finishing Technology A	5	0	12.5
TEXT5502	Finishing Technology B	0	5	12.5
TEXT5601	Colour Science	4	0	10
TEXT5602	Dyeing Technology	0	4	10

or an alternative as approved by the Head of Department

School of Mathematics

5525

Statistics Graduate Diploma Course Full-time or Part-time

Graduate Diploma in Statistics GradDipStats

Staff Contact: Prof W Dunsmuir

This graduate diploma is intended for Statistics graduates wishing to further develop their knowledge and skills in

Statistical science. In particular, it provides an opportunity for advanced training in topics relevant to Medical Statistics and Financial Mathematics.

Intending students are referred to the conditions for the award of graduate diplomas set out elsewhere in the handbook. Basic entry qualifications for this program are a degree in Statistics or Econometrics or a degree in Commerce with a major in Business Statistics or an approved equivalent. The program consists of eight subjects from the MStats program (excluding MATH5925 and MATH 5935). At most two subjects may be selected from those offered by other Departments or Schools within the University.

The course may be taken over one year full-time or on a part-time basis. The total number of credit points is 96, twelve for each subject. The total number of Postgraduate Assessable Hours is estimated to be 1064.

5530

Physical Oceanography Graduate Diploma Course Full-time or Part-time

Graduate Diploma GradDip

Staff Contact: Dr John Middleton

This graduate diploma is intended to train graduates in the physical sciences or engineering in the basic techniques of physical oceanography particularly in preparation for study at postgraduate level.

It is intended to develop student skills in planning and execution of oceanographic experiments, in the theory of oceanographic fluid mechanics, the applications and limitations of oceanographic equipment and of commonly used data analysis techniques.

Recent rapid developments in marine science coupled with the relative scarcity of persons able to take up support positions demonstrate the need for skilled persons who will be able to assist oceanographic research with minimum training. This program is aimed at providing such skilled graduates.

Intending students are referred to the conditions for the award of graduate diplomas set out elsewhere in this handbook. Basic entry qualifications for this program are a degree in Engineering or in Science with major studies in mathematics or physics.

The program, requiring 140 credit points for completion, consists of a major project OCEA5115 worth 72 credit points of the total accreditation for the program, the remaining 68 being comprised as indicated below.

1. Compulsory Subjects		CP
OCEA5115	Experimental Project	54
OCEA5125	Geophysical Fluid Dynamics	15
OCEA5135	Instrumentation	6
OCEA5145	Applied Data Analysis	15

2. Elective Subjects

		CP
GEOG9290	Image Analysis in Remote Sensing	12
GMAT9606	Microwave Remote Sensing	12
CIVL9835	Coastal Engineering 1	12
CIVL9836	Coastal Engineering 2	12
CIVL9863	Estuarine Hydraulics	12
GEOG9150	Remote Sensing Applications	12
OCEA5155	Theoretical Project	32
MATH5285	Ocean Modelling	12

Appropriate existing subjects within mathematics, physics or engineering chosen on the basis of individual background

The course may be taken over one year full-time or two years part time. The total number of Postgraduate Assessable Hours (PAH) is estimated to be 1200 hours.

School of Physics

5515**Physics Graduate Diploma Course****Full-time or Part-time****Graduate Diploma in Physics****GradDipPhys**

Staff Contact: Associate Professor RJ Stening

The Graduate Diploma in Physics offers an advanced training program for graduates from overseas universities who wish to obtain specialized training in physics. The course is also available to graduates from Australian universities who have not done an Honours course and who wish to pursue postgraduate study in physics. Students qualified to enrol in the Honours course would be expected to do so rather than to enrol in the GradDipPhys. For suitably qualified students the expectation is that the course would allow entrance to a higher degree program provided suitable supervision and facilities were available.

The GradDipPhys will be offered with course work and research project requirement similar to Physics Level IV, with substitutions if required to be approved by the School Postgraduate Coordinator. The course involves two sessions full-time study or four sessions part-time study comprising a total of 60 CP, plus a single research project over the period of study or two different research projects, one in each half of the period of study (total credit points 60). All students normally take courses in quantum mechanics, statistical mechanics and solid state physics. Other lecture courses and the research projects are offered in general areas of physics including astrophysics, biophysics, condensed matter physics and theoretical physics.

5516**Physics Research Techniques Graduate Diploma Course****Full-time or Part-time****Graduate Diploma in Physics****GradDipPhysResTech**

Staff Contact: Associate Professor RJ Stening

The Graduate Diploma in Physics Research Techniques offers an advanced training program for graduates who wish to obtain specialised training in research techniques in physics. The course involves two sessions full-time study or four sessions part-time study and consists of subjects at Level III/IV totalling 60 CP and a research project (50 CP). The choice of subjects is very flexible. Most subjects selected should be from the School of Physics but subjects from other Schools may be included. Students wishing to proceed to a research degree will consult with their potential supervisor on their choice of subjects.

Department of Safety Science

The Graduate Diploma courses in Ergonomics and Safety Science consist of 72 credit points of compulsory core subjects, 24 credit points of elective subjects and 36 credit points of preliminary subjects. Students may be given advanced standing in preliminary subjects, if they have completed equivalent subjects in their undergraduate course or can demonstrate a satisfactory level of understanding of the subjects. Most students will need to complete two preliminary subjects and hence 120 credit points to complete the course.

The course is offered full-time or part-time and requires 2 sessions of full-time study or 4 session part-time after completion of preliminary subjects.

Preliminary subjects

To broaden the base of their previous tertiary studies, students take up to three preliminary subjects from the list below. The selection of these subjects is determined according to previous qualifications and experience. Thus engineers are usually required to include Introductory Functional Anatomy, and students from a health sciences background include Physical Principles of Safety. Students are expected to enter the course with a basic understanding of mathematics, physics and Chemistry. Where this is lacking students must undertake a bridging course.

5480**Graduate Diploma in Safety Science**

The Graduate Diploma in Safety Science is available in internal or external mode. External students may be required to attend at least one residential course of 2-3 days duration.

GradDip

Preliminary subjects		CP
ANAT6151	Introductory Functional Anatomy	7.5
SESC9011	Physical Principles of Safety	12
SESC9012	Statistics for Health and Safety Scientists	12

Core subjects

Core subjects, totalling 72 credit points, represent the central theme of safety science and are compulsory.

SESC9211	Introduction to Safety Engineering	12
SESC9224	Principles of Ergonomics	12
SESC9232	Introduction to Occupational Health and Safety Law	12
SESC9242	Effective Behaviour in Organisations	12
SESC9260	Introduction to Occupational Health	12
SESC9350	Risk Management	12

Elective subjects

Students are required to select two or more subjects from the list of electives or core subjects presented for the MAppSc (OHS) program. In special cases a 12 credit point Special Report in safety science (SESC9912) may be taken.

5485**Graduate Diploma in Ergonomics****GradDip**

The Graduate Diploma in Ergonomics is multidisciplinary and is designed to accept students from a range of backgrounds. To provide for a common base of knowledge some students are required to study some preliminary subjects which depend on their background.

Preliminary subjects

ANAT6151	Introductory Functional Anatomy	12
SESC9011	Physical Principles of Safety	12
SESC9012	Statistics for Health and Safety Scientists	12

Core subjects

SESC9224	Principles of Ergonomics	12
SESC9242	Effective Behaviour in Organisations	12
SESC9264	Assessment of the Workplace Environment	12
SESC9424	Applied Ergonomics	12
SESC9425	Physical Ergonomics	12
SESC9426	Ergonomics and New Technology	12

Elective subjects

To complete the requisite total of 132 credit points, students are required to select one or more subjects from the list of Electives presented for the MAppSc (Ergonomics) - 8075. In special cases a 12 credit point Special Report in ergonomics (SESC9912) may be taken which must involve the solution of a practical ergonomics problem.

5488**Graduate Diploma in Environmental Studies****GradDip**

The Graduate Diploma in Environmental Studies is similar to the Masters Program in Environmental Studies 8045, in that it is a faculty-wide, interdisciplinary course, administered by the Department of Safety Science. The course draws from schools, departments, and centres throughout the University.

The overall objective of the Graduate Diploma in Environmental Studies course is to provide students and graduates with:

- A conceptual framework for the study of environmental issues and problems, including:
- an understanding of natural systems and processes;
- an appreciation of how human activities impact on the environment;
- the ways in which these areas interact, including understanding of scientific, social, philosophical, economic, ethical, legislative and political concepts.
- knowledge and skills in a range of environmental subject areas, including environmental assessment, environmental planning, environmentally oriented decision-making and the ways in which various disciplines may be integrated together.

The course is designed to study the nature of environmental problems and the methodology of evaluation. Emphasis is placed on the development of relevant skills in environmental analysis and planning.

One further objective of the course is to provide opportunities for students to increase their skills in environmental management by extending their knowledge of environmental systems and processes. The course is one that has practical value which will help the careers of graduates.

Entry qualifications

A three year honours degree or equivalent, in a field relevant to environmental studies, or a four year degree in another field. Under exceptional circumstances, and at the discretion of the head of school, applicants with extensive experience in the environmental field, or with other professional or academic attainments, may also enrol in the Graduate Diploma program.

Course Requirements

Students enrolled on the Graduate Diploma in Environmental Studies are required to complete a course totalling 96 credit points made up of compulsory Core Subjects (36 credit points) and Elective Subjects (60 credit points). The structure of the course allows students to pursue specialised interests through the electives, or to develop new areas of expertise. Students may upgrade to the Masters in Environmental Studies upon completion of satisfactory progress, normally a credit grade average or

better. In such cases, students will be required to complete 144 credit points.

Core (minus the Research Project and Research Methods) and elective subjects are the same as those listed under the entry for the Master of Environmental Studies - 8045.

7340

Graduate Certificate in Safety Science

The Graduate Certificate provides recognition to students who are limited to study for one session full time or one year part time. The course provides a general introduction to safety science and is suitable as an introductory course for safety professionals or as a course in safety science for people who manage safety as part of their other roles within an organisation.

The Graduate Certificate is available in internal or external mode. External students may be required to attend at least one residential course of 2-3 days duration.

Candidates are required to complete 48 credit points of compulsory core subject and 12 credit points of electives selected from the core and elective subjects of the MAppSc (OHS) - 8044.

Core subjects		CP
SESC9211	Introduction to Safety Engineering	12
SESC9242	Effective Behaviour in Organisations	12
SESC9260	Introduction to Occupational Health	12

Electives

Elective subjects are listed in the MAppSc (OHS) - 8044.

No advanced standing will be granted for the Graduate Certificate. Where students have previously studied material equivalent to one of the core subjects exemption may be granted and an additional elective selected.

Centre for Advanced Numerical Computation in Engineering and Science

Director: Professor CAJ Fletcher

The Centre for Advanced Numerical Computation in Engineering and Science is a joint initiative of the Faculties of Engineering and Science to provide a focus for the very active UNSW community of computational engineers and scientists exploiting state-of-the-art workstation clusters, vector and parallel supercomputers. The Centre contributes to graduate training through coursework and research programs, carries out both fundamental and applied research through developing and using computer codes, provides short courses for industry-based engineers and scientists and organises conferences and workshops on the latest computational techniques. The Centre has three areas of special emphasis: a) Industrial Computational

Fluids and Heat Transfer, b) Environmental Modelling, c) Finite Element Structural Analysis.

1. Core Subjects (12 credit)		CP
ANCE8001	Computational Mathematics	12
MATH5315	High Performance Numerical Computing	12
ANCE8003	Project (M Computational Sc Degree)	48
2. Generic Computational Subjects (12 credit)		
ANCE8101	Data Analysis and Visualization	12
ANCE8102	Mesh Generation	12
ANCE8103	Fundamental Applied Computation	12
ANCE8104	Advanced Computational Algorithms	12
ANCE9105	Computational Techniques for Fluid Dynamics	12
ANCE8207	Advanced Computational Science	12
ANCE8208	Physics and Modelling of the Atmospheric Boundary Layer	12
MATH5435	Applied Algebraic Computation	12

Detailed course information is given under Computational Science.

* UNSW offers qualifications in both Computer Science and Computational Science. Computer Science provides broad training in computing, normally leading to careers in all areas of the computer industry. Computational Science provides training in computational simulation of complex scientific and engineering phenomena and lead to engineering or science based careers in industry, universities or government institutions such as CSIRO.

5535

Graduate Diploma in Computational Science

Staff Contact: Professor CAJ Fletcher

The graduate diploma will provide thorough training in modern computational techniques in the discipline-specific areas: A) Environmental Modelling; B) Computational Chemistry; C) Computational Physics, through coursework.

Admission to the Graduate Diploma program requires the student to have at least a pass degree in Science, Engineering or other mathematically-based discipline. The Graduate Diploma program can be completed in one year of full-time study.

Students are required to complete, satisfactorily, 96 credit points, as follows:

- I) The two core subjects (ANCE8001, MATH5315, above)
- II) One generic computational subject (above)
- III) Three discipline-specific subjects offered by the Centre or the Faculty of Science.
- IV) Two elective subjects offered by the Centre or the Faculties of Science and Engineering.

Candidates may apply to upgrade to the Masters program after completing not less than 36 credits. Entry will be competitive and based on the student's record. Transfer of credit is based on the particular circumstances of the case. One credit equals one hour per week of classes for a 14 week session.

Masters Degrees

School of Chemistry

Head of School: Professor MN Paddon-Row
Director of Graduate Studies: A/Prof M Guilhaus
(contactable via Chemistry Academic Office)

The School of Chemistry offers a Master of Chemistry degree course in Food and Drug Chemistry which is suitable for students wishing to obtain advanced specialised knowledge in these topics. The normal entry qualification is a good Honours degree or equivalent qualification, or lesser qualification together with significant scientific experience. Other candidates may be required to undertake a qualifying programme.

8770

Master of Chemistry (Food and Drug Chemistry)

This course is currently being restructured. Please consult with A/Prof Southwell-Keely with regard to this course. The course involves an advanced study of the chemistry, stability, mode of action where applicable, and analysis of food constituents, food additives, and selected drugs. The program may be taken either full-time or part-time. In addition to formal, examinable lecture courses and laboratory instruction, the program involves a short research project supervised by a member of the academic staff. Entry into this program is excluded in the case of applicants who have completed the Graduate Diploma in Food and Drug Analysis (Course 5510)

Lecture/Laboratory Courses

1. Food and Drugs 1
2. Treatment of Analytical Data
3. Instrumental Techniques in Food and Drug Analysis
4. Food and Drugs 2
5. Toxicology, Occupational and Public Health
6. Introductory Microbiology or Project Work in Food and Drug Chemistry

The lecture time for the whole course is 182 hours. An additional 350 hours is spent by students in formal laboratory work.

Research project

A short research project (approximately 100 hours) is undertaken involving analyses of multiple constituents in samples of foods or drugs.

School of Geography

Head of School: Associate Professor M Fox
Director of Graduate Studies: Dr MEC Sant

A number of coursework Masters degrees and Graduate Diplomas are available through the School of Geography. In addition the School welcomes enquiries from graduates who are interested in research leading to the award of the degrees of Doctor of Philosophy 1080 or Master of Science 2040.

Graduate Program in Geographic Information Systems

8047.1000

Geographic Information Systems

Master of Applied Science MAppSc

The Masters degree program in Geographic Information Systems is offered in both Geography and Geology within the Faculty. Entry into either discipline depends on the background of the applicant and the orientation of the proposed program.

Entry qualifications. Four-year Honours degree of appropriate standard in Geography, Geology, Geomatic Engineering, or a relevant environmental science.

Course requirements. Candidates are required to complete a course totalling a minimum of 120 credit points made up of 3 compulsory subjects, 3 elective subjects and a project. The degree will normally comprise one year of full-time study or two years of part-time study.

Compulsory Subjects		CP
GEOG9240	Principles of Geographic Information Systems	12
GEOG9241	Advanced Geographic Information Systems	12
GEOG9512	Project	48
<i>and either</i>		
GEOG9280*	Applications and Management of GIS	12
<i>or</i>		
GMAT9604*	Land Information Systems	12

Elective subjects

COMP9311	Introduction to Data Base Systems	15
GEOG9150	Remote Sensing Applications	12
GEOG9210	Computer Mapping and Data Display	12
GEOG9242	Transportation Applications of Geographic Information Systems	12

		CP
GEOG9250	Special Topic	12
GEOG9290	Image Analysis in Remote Sensing	
GMAT9530	Analytical Photogrammetry	12
GMAT9532	Data Acquisition and Terrain Modelling	12
GMAT9600	Principles of Remote Sensing	12
KCME1110	Geographical Information Systems in Applied Geology	12

Note: Other subjects may be substituted for those listed with permission of the Course Coordinator to suit the specific needs of individual students.

**Students wishing to include both of these subjects should take one as an elective.*

8047.2000

Remote Sensing

Master of Applied Science

MAppSc

The masters degree program in Remote Sensing is offered in both the Faculty of Science and Technology and the Faculty of Engineering. Entry into either Faculty depends on the background of the applicant and the orientation of the proposed program.

Entry qualifications. Four-year degree of appropriate standard in engineering, geography, geology, geomatic engineering, or in a relevant environmental science.

Course requirements. Candidates are required to complete a course totalling 120 credit points, made up of 3 compulsory subjects, 3 electives, and a project. Compulsory subjects not offered in a particular year may be substituted by an equivalent subject, approved by the appropriate Course Coordinator. The degree will normally comprise one year of full-time study or two years of part-time study.

Compulsory Subjects	CP
GEOG9150 Remote Sensing Applications	12
GEOG9290 Image Analysis in Remote Sensing	12
GMAT9600 Principles of Remote Sensing	12
GMAT9606 Microwave Remote Sensing	12
and either	
GEOG9512 Project or	48
GEOL0114 Project	48

Elective subjects

GEOG9042 Environmental Impact Assessment	12
GEOG9160 Directed Problems in Remote Sensing	12
GEOG9210 Computer Mapping and Data Display	12
GEOG9240 Principles of Geographical Information Systems	12
GEOG9241 Advanced Geographical Information Systems	12
GEOG9250 Special Topic	12
GEOG9280 Applications and Management of GIS	12
GEOL0110 Geological Remote Sensing*	12
GEOL0310 Image Processing of Spatial Data Sets	12
GEOL0360 Remote Sensing Applications in Geoscience	12

		CP
GMAT9530	Analytical Photogrammetry	12
GMAT9532	Data Acquisitions and Terrain Modelling	12

**Students who take GEOL0110 are precluded from taking GEOL0310 and GEOL0360.*

Note: Other subjects may be substituted for those listed with permission of the Course Coordinator to suit the specific needs of individual students.

Graduate Programs in Environmental Studies

8045

Environmental Studies

Master of Environmental Studies

MEnvStudies

This is an interdisciplinary course designed to study the nature of environmental problems and the methodology of evaluation. Emphasis is placed on the development of relevant skills in environmental analysis, management and planning. See entry under Safety Science

8047.3000

Environmental Management

Master of Applied Science

MAppSc

The Masters degree program in environmental management provides an opportunity to focus on the management of key natural resources, particularly soils, rivers, and vegetation. Emphasis is also placed on the application of information technology for planning and decision making.

Entry qualifications. Four year degree of appropriate standard in geography, environmental science, engineering, or in a relevant science.

Course requirements. Candidates are required to complete a course of study totalling 120 credit points made up of 3 compulsory subjects (36 credit points), a project (48 credit points), and 3 elective subjects (36 credit points). Compulsory subjects not available in a particular year may be substituted by an equivalent subject, approved by the Course Coordinator. The degree will normally comprise one year of full-time study or two years of part-time study.

Compulsory subjects	CP
GEOG9300 Vegetation Management	12
GEOG9310 River Management	12
GEOG9320 Soil Degradation and Conservation	12
GEOG9512 Project	48

Elective subjects*

GEOG9042 Environmental Impact Assessment	12
GEOG9150 Remote Sensing Applications	12

		CP
GEOG9240	Principles of Geographic Information Systems	12
GEOG9241	Advanced Geographic Information Systems	12
GEOG9250	Special Topic	12
GMAT9600	Principles of Remote Sensing	12
SAFE9273	Environment and Law	8

**Alternative subjects may be substituted with the permission of the Course Coordinator.*

School of Materials Science and Engineering

Head of School: Prof DJ Young

Postgraduate Coordinator: Prof CC Sorrell

The School welcomes enquiries from graduates in Science, Engineering and Science and Technology who are interested in doing research leading to the award of the degrees of:

- Doctor of Philosophy, Materials Science and Engineering 1045
- Master of Science, Materials Science and Engineering 2055
- Master of Engineering in Materials Science and Engineering 2175.

Programs involving formal course work and research leading to the award of Master of Applied Science in Engineering Materials 8065 or Master of Applied Science in Corrosion Engineering 8052 are also available.

Information about research scholarships, fellowships and grants in-aid is available from the Postgraduate Coordinator and graduates are advised to consult him before making a formal application for registration.

8065 Engineering Materials

Master of Applied Science MAppSc

The MAppSc course in Engineering Materials provides a comprehensive study of the full range of materials. The program is designed for graduates wishing to acquire expertise in the selection, use and design capabilities of modern materials. It is particularly appropriate to graduates in other branches of engineering, and to honours graduates in science. The program consists of one year of full-time study (two sessions) or two years of part-time study (four sessions). This is made up of a formal time allocation of 18 hours per week, and will normally be supplemented by additional project work during the summer break. The balance between formal lecture courses and project work will be varied to suit individual student's needs.

		HPW		CP
Compulsory subjects		S1	S2	
MATS6475	Materials Science and Engineering	3	3	15
MATS6485	Materials Technology	3	3	15
MATS6405	Graduate Materials Seminar	2	2	10
MATS6555	Minor Graduate Materials Project <i>or</i>	3	3	15
MATS6565	Major Graduate Materials Project	9	9	45

Elective subjects

Additional subjects are chosen from those offered by the School of Materials Science and Engineering, or from those offered by other Schools in the University subject to approval by the Head of School. Full details of all subjects are listed in the University calendar and handbooks. A minimum of two hours per week for one session of elective subjects is required.

Depending on the candidate's background, enrolment in a limited number of unmodified undergraduate subjects may be appropriate, but may not exceed 15% of the non-project component. In all cases, the total of the compulsory core, project and elective subjects will be a minimum of 18 hours per week.

8052 Corrosion Engineering

Master of Applied Science MAppSc (Corr Eng)

The Master of Applied Science course in Corrosion Engineering is open to graduates in Engineering, Science and Technology or Science who wish to undertake formal studies to promote their careers in industry. The course is designed for those professionals in industry who are faced with the problem of combating corrosion. Its aim is to develop an appreciation of the fundamentals, principles of corrosion and available methods whereby it may be overcome.

The program consists of one year's full-time study (2 sessions) or two years' part-time study (4 sessions). This is made up of a formal time allocation of 18 hours per week and will normally be supplemented by additional project work during the summer break.

		HPW		CP
		S1	S2	
MATS1092	Materials and Design 1	0	2	5
MATS6005	Corrosion Project	6	6	30
MATS6203	Design for Corrosion Control	0	2	5
MATS6475	Materials Science and Engineering	3	3	15
MATS6495	Corrosion Materials	4	2	15
MATS6535	Industrial Coatings for Corrosion Protection	2	0	5
MATS6545	Corrosion Technology	3	3	15

5090

Textile Technology Graduate Diploma Course**Graduate Diploma
GradDip**

The Graduate Diploma in Textile Technology course is designed to prepare graduates for careers in the textile and allied industries. It also provides formal studies for graduates who are already employed in the textile industry. The normal requirement for admission to the course is a Bachelor degree or equivalent tertiary qualification. The following program, comprising both formal lectures and laboratory work, may be taken as a one year full-time course or two-year part-time course.

Candidates wishing to specialise in the theory and practice of yarn and fabric technology (engineering/physics orientation) should undertake the optional subjects TEXT5301, TEXT5302, TEXT5401 and TEXT5402. Candidates wishing to specialise in the science and technology of textile dyeing and finishing (chemistry orientation) should undertake the optional subjects TEXT5501, TEXT5502, TEXT5601 and TEXT5602.

		HPW		CP
		S1	S2	
TEXT5001	Textile Technology Dissertation	1.5	1.5	7.5
TEXT5003	Textile Technology	1.5	1.5	7.5
TEXT5101	Fibre Science A	6	0	15
TEXT5102	Fibre Science B	0	4	10
TEXT5201	Textile Quality Control	0	2	5
Plus two electives per session (averaging not less than 9 hours per session), selected from the following:				
TEXT5301	Yarn Technology A	5	0	12.5
TEXT5302	Yarn Technology B	0	5	12.5
TEXT5401	Fabric Technology A	0	5	12.5
TEXT5402	Fabric Technology B	5	0	12.5
TEXT5501	Finishing Technology A	5	0	12.5
TEXT5502	Finishing Technology B	0	5	12.5
TEXT5601	Colour Science	4	0	10
TEXT5602	Dyeing Technology	0	4	10

or an alternative as approved by the Head of Department

**UNSW graduates who have done MATS9542 (4.952, 5.4222), CIVL2402 (8.240), MATS9530 (4.913), and/or CIVL4403 (8.440) must substitute other appropriate subjects approved by the Postgraduate Coordinator in the School of Materials Science and Engineering.*

School of Mathematics

Head of School: Professor GI Gaudry

Director of Graduate Studies: Dr PJ Blennerhassett

The School offers graduate courses leading to the award of the degrees of Master of Mathematics (MMath) and Master of Statistics (MStats).

8740

**Master of Mathematics Degree Course
Full-time or Part-time****Master of Mathematics
MMath**

The Master of Mathematics degree course is intended for suitably qualified graduates in applied mathematics, pure mathematics or statistics, but others may be admitted after completing a qualifying course. The course may be completed in one year of full-time or two years of part-time study. The course may be taken as a preliminary step towards the award of a PhD in mathematics. It also provides advanced training for persons specialising in the teaching of mathematics in tertiary institutions. In addition an appropriate program may provide training for those employed or seeking employment in the area of industrial mathematics.

The program consists of seven approved lecture courses, the duration of each being two hours per week for one session. With the approval of the Head of the School of Mathematics a student may substitute for one or more of these lecture courses a reading course supervised by a member of staff. Again with this approval a student may substitute for at most three of these courses graduate courses offered in a relevant discipline outside the School of Mathematics. Students are also required to participate in relevant departmental seminars. In addition, students are required to undertake a project supervised by a staff member. The project consists of either a critical review of the literature in a specific field of mathematics, or a short research project. It is anticipated that students spend three hours per week for two sessions on their project. Each candidate's proposed program of study requires the approval of the Head of the School of Mathematics.

The conditions for the award of the degree are set out elsewhere in this handbook.

8750

**Master of Statistics Degree Course
Full-time or Part-time****Master of Statistics
MStats**

The Master of Statistics Course covers a wide range of statistical theory and practice and provides advanced training for practising statisticians. The course may be completed in three sessions of full-time or three years of part-time study, and it is available to graduates with a pass degree in statistics or an honours degree in a related field (commonly mathematics) with supporting studies in statistics. Honours graduates in statistics may be exempted

from up to 5 lecture subjects. The conditions for the award of the degree are set out elsewhere in this handbook.

The academic requirement for the degree is 180 credit points. Unless otherwise noted, all subjects listed below are 12 credit points each, while subjects offered by other schools vary in value.

Each candidate's program of study must be approved by the Head of the School.

Compulsory Subjects (offered every year)

MATH5835	Stochastic Processes
MATH5905	Statistical Inference
MATH5925	Project (36 Credit Points)
MATH5935	Statistical Consulting

Elective Subjects (offered every second year)

MATH5806	Applied Regression Analysis
MATH5815	Experimental Design 1
MATH5816	Mathematics of Security Markets 2 (Prerequisite: MATH5965)
MATH5825	Experimental Design 2 (Prerequisite: MATH5815)
MATH5826	Statistical Methods in Epidemiology
MATH5845	Time Series
MATH5855	Multivariate Analysis 1
MATH5865	Multivariate Analysis 2
MATH5875	Sample Survey Design
MATH5885	Sequential Analysis
MATH5895	Nonparametric Methods
MATH5915	Medical Statistics
MATH5945	Categorical Data Analysis
MATH5955	Statistical Quality Control
MATH5965	Mathematics of Security Markets 1
MATH5975	Economic Quality Control Models (Prerequisite: MATH5955)
MATH5985	Industrial Designs (Prerequisite: MATH5815)

Up to 60 credit points may be taken in graduate subjects offered by other Departments or Schools within the University, subject to the approval of the Head of School. Such subjects include:

CIVL9403	Theory of Land Use/Transport Interaction
CIVL9405	Urban Transport Planning Practice
CIVL9417	Transport and Traffic Flow Theory
CMED8201	Population Genetics
CMED8202	Human Genetic Analysis
ECON3204	Econometric Model Building
MATH3161	Optimization Methods
MATH3181	Optimal Control
MNGT0331	Business Forecasting
MNGT0334	Total Quality Management
MNGT0336	Applications of Statistics in Finance and Accounting

School of Optometry

Head of School: Associate Professor DJ O'Leary

The course consists of any 4 subjects selected from the 13 electives offered. The subjects are generally independent and any 4 of them are suitable for a student seeking advanced professional training. However, before undertaking an overseas placement in OPTM8001 Advanced Clinical Optometry, students are required to have taken OPTM8009 Ocular Therapy. The course may be completed in one year of full-time study, or (to meet the needs of practising optometrists) in two or more years of part-time study. The course provides advanced training in clinical and theoretical aspects of optometry, with opportunities for specialisation in fields such as contact lenses, occupational optometry, and behavioural optometry. Conditions for admission and for the award of the degree of Master of Optometry are set out in this handbook.

8760

Master of Optometry Degree Course Full-time or Part-time

Master of Optometry MOptom

Four elective graduate subjects chosen from the list below

OPTM8001	Advanced Clinical Optometry
OPTM8002	Advanced Physiological Optics (Not offered in 1998)
OPTM8003	Behavioural Optometry
OPTM8004	Advanced Contact Lens Studies
OPTM8005	Advanced Contact Lens Practice (Not offered in 1998)
OPTM8006	Occupational Optometry (Not offered in 1998)
OPTM8007	Clinical Photography (Not offered in 1998)
OPTM8008	Project
OPTM8009	Ocular Therapy
OPTM8010	Public Health Optometry (Not offered in 1998)
OPTM8011	Advanced Studies in Ocular Disease
OPTM8012	Visual Neuroscience (Not offered in 1998)
OPTM8014	Human Visual Development (0.5 unit subject) (Not offered in 1998)

Department of Applied Geology

Head of Department: Associate Professor CR Ward

Director of Graduate Studies: Dr AC Dunlop

A coursework Masters degree with several areas of specialisations is available through the Department of Applied Geology. In addition, the Department offers the research degrees of Doctor of Philosophy PhD in Applied Geology 1000 and Master of Science MSc in Applied Geology 2000.

8022

Applied Geology

Master of Applied Science

MAppSc

The Master of Applied Science course in Applied Geology is designed to give advanced training in developing specialisations within geology. Programs are structured specifically for candidates from industry to take on a part-time basis.

Specialist programs are currently offered in the fields of Engineering Geology-Hydrogeology-Environmental Geology, Groundwater Studies and Geological Data Processing.

Alternative Graduate Programs

Alternative Graduate Programs in association with the Department of Applied Geology are available in the following areas:

Department of Safety Science

8045 Environmental Studies Graduate Course
(MEnvStudies)

School of Geography

5047.2000 Graduate Diploma in Remote Sensing

(GradDip)

8047.2000 Remote Sensing Graduate Course (MAppSc)

Faculty of Engineering

5496 Graduate Diploma in Remote Sensing (GradDip)

8641 Remote Sensing Graduate Course (MEngSc)

8022.1000

Engineering Geology/ Hydrogeology/ Environmental Geology

This is a flexible program covering a range of geotechnical disciplines. Completion of the course requires 120 credit points of which up to 96 (and no less than 60) credit points should be coursework subjects. The balance is made up of a research project of 24, 36 or 60 credit points which may be completed internally or externally. Most subjects are given in the first session, but some are available in second session, or in short course or external format. Core

subjects are recommended but not compulsory. Intending students should discuss their choice of subjects with the Program Director, Mr GH McNally.

Core subjects		CP
CIVL9788	Site Investigation	12
CIVL9860	Investigation of Groundwater Resources	12
GEOL9030	Geotechnical Engineering	12
GEOL9040	Fundamentals of Geomechanics	12
GEOL9060	Environmental Geology	12

Project		
GEOL9444	Project <i>or</i>	24
GEOL9454	Project <i>or</i>	36
GEOL9464	Project	60

Elective subjects		
CIVL9790	Stability of Slopes	12
GEOL0110	Geological Remote Sensing	12
GEOL9031	Engineering Geology of Surficial Deposits	12
GEOL9032	Soil and Rock Construction Materials	12
GEOL9033	Terrain Evaluation	12
GEOL9070	Engineering Geophysics	12

Other elective subjects may be drawn from those offered by the Key Centre for Mines, UNSW Groundwater Centre and the School of Civil Engineering.

8022.2000

Groundwater Studies

This program is coordinated through the UNSW Groundwater Centre. Candidates are required to complete 120 credit points, made up of the five core subjects, elective subjects and a project. The degree may be taken internally on a full-time (normally 2 sessions) or a part-time (normally 4 sessions) basis. The course of study must be approved by the Head of Department or the Head's nominee with core subjects totalling 60 credit points.

Core subjects		CP
CIVL9860	Investigation of Groundwater Resources	12
CIVL9875	Hydrological Processes	12
CIVL9891	Groundwater Contamination and Remediation	12
GEOL9010	Groundwater Environments	12
GEOL9051	Hydrogeochemistry	12

Project		
GEOL9124	Groundwater Project <i>or</i>	36
GEOL9144	Groundwater Project	48

Elective subjects		
CIVL9799	Environmental Geomechanics	12
CIVL9880	Groundwater Modelling	12
CIVL9890	Spatial Decision Support Systems in Water Resources	12
GEOL9052	Advanced Hydrogeochemistry	12
GEOL9070	Engineering Geophysics	12
GEOL9100	Remote Sensing of Groundwater Resources	12
KCME1110	Geographic Information Systems in Applied Geology	12

8022.3000**Geological Data Processing**

This program is intended for industry-based geologists who wish to enhance their skills in the computer processing of geological data. It is delivered as a series of separate academic subjects, each consisting of an intensive short course with additional assignment material. An industry-based project is also included in the program. The short courses are scheduled to allow the degree to be completed on a part-time basis over two years.

The program allows an emphasis to be placed on data processing in mineral exploration, exploration geochemistry, ore reserve estimation, image processing and remote sensing, exploration geophysics or fossil fuel deposits.

Optional subjects are also available to provide complementary training in topics such as mine and environmental management and project evaluation.

Candidates are required to complete a course of 120 credit points including either a 24 or 48 credit point project. Alternative subjects may be substituted in the published program at the discretion of the Head of the Department.

Core subjects (12 credit points)

GEOL0300	Computing and Statistics for Geologists*
GEOL0310	Image Processing of Spatial Data Sets
GEOL0320	Geostatistical Ore Reserve Estimation Project
GEOL0304	Project 1 (24 credit points) <i>or</i>
GEOL0314	Project 2 (48 credit points)

Elective subjects (12 credit points)

GEOL0330	Conceptual Models for Exploration Geology
GEOL0340	Geochemical Exploration Techniques
GEOL0350	Exploration Geochemical Data Processing
GEOL0360	Remote Sensing Applications in Geoscience
GEOL0370	Fundamentals of Exploration Geophysics
GEOL0380	Electrical Methods in Geophysical Exploration
GEOL0390	Data Processing for Fossil Fuel Resources
KCME1106	Soil and Rock Construction Materials
KCME1108	Applied Structural Geology
KCME1109	Geophysics for Mine Development
KCME1110	Geographical Information Systems in Applied Geology
KCME4133	An Introduction to Environmental Geology
KCME4302	Environmental Assessment
KCME4303	Mine Geology and Grade Control
KCME4202	Mine Evaluation and Project Assessment
KCME4204	Exploration Project Management
KCME4301	Environmental Management for the Mining Industry

or such other subjects as the course authority may deem to be appropriate and equivalent.

**For students with an adequate background in computing and statistics this subject may be replaced by an additional elective subject. The approval of the course authority is required.*

Department of Safety Science**8044****Master of Applied Science
(Occupational Health and Safety)****MAppSc (OHS)**

The Master of Applied Science in Occupational Health and Safety is a multidisciplinary course, and is designed to accept students from a range of backgrounds. The course is offered either full-time or part-time. Students may enrol either as internally registered students (by attendance) or externally registered students (by open learning).

The normal duration is 3 sessions full-time or 6 sessions part-time. However, students who are granted advanced standing in the preliminary subjects may be able to complete the course in one calendar year by completing the project in the summer recess.

Candidates are required to complete a total of 180 credit points, made up of 36 credit points of preliminary subjects, 60 credit points of core subjects, 48 credit points of elective subjects and a 36 credit point research project.

Preliminary subjects

Preliminary subjects are designed to provide a common base of knowledge for students from diverse backgrounds. Students who have studied equivalent subjects in their undergraduate courses or who are able to demonstrate a satisfactory standard of understanding are given advanced standing in these subjects.

		CP
ANAT6151	Introductory Functional Anatomy	12
SESC9011	Physical Principles of Safety	12
SESC9012	Statistics for Health and Safety Scientists	12

Core subjects

There are 60 credit points of core subjects required. Four core subjects are required to be taken by all students, the fifth core subject is dependent on subsequent areas of study.

SESC9210	Research Methods	12
SESC9211	Introduction to Safety Engineering	12
SESC9242	Effective Behaviour in Organisations	12
SESC9260	Introduction to Occupational Health and one of	12
SESC9224	Principles of Ergonomics <i>or</i>	12
SESC9261	Occupational Hygiene <i>or</i>	12
SESC9262	Occupational Medicine <i>or</i>	12
SESC9810	Chemical Safety and Toxicology	12

Students leaving the course should have knowledge and competencies in a number of areas which are reflected in the choice of core subjects.

- occupational health and safety principles

- occupational health and safety legislation and standards
- the interaction between people, hazards, risks and behaviour
- ability to undertake workplace surveys in their chosen fields of expertise.

Elective subjects

There are 48 credit points of elective subjects required. Students may structure their program so that they receive training as an occupational health and safety generalist, or they are able to specialise, taking electives in one of a number of strands, such as occupational hygiene, safety engineering, chemical safety, occupational medicine or safety management.

Subjects offered by the Department of Safety Science

Not all elective subjects are offered every year.

BIOM9541	Mechanics of the Human Body	12
SESC9224	Principles of Ergonomics	12
SESC9232	Introduction to Occupational Health and Safety Law	12
SESC9261	Occupational Hygiene	12
SESC9262	Occupational Medicine	12
SESC9264	Assessment of the Workplace Environment	12
SESC9265	Occupational Health Practice	12
SESC9267	Research Methods in Laboratory Science	12
SESC9272	Environment and Medicine	12
SESC9273	Environment and Law	12
SESC9343	Innovation, Productivity and Safety	12
SESC9350	Risk Management	12
SESC9353	Major Hazards Management	12
SESC9424	Applied Ergonomics	12
SESC9425	Physical Ergonomics	12
SESC9426	Ergonomics and New Technology	12
SESC9523	Plant and Construction Safety	12
SESC9531	Industrial and Environmental Noise	12
SESC9544	Traffic Safety	12
SESC9551	Experimental Biomechanics	12
SESC9553	Radiation Protection	12
SESC9573	Fire and Explosion	12
SESC9810	Chemical Safety and Toxicology	12
SESC9850	Management of Dangerous Materials	12

Subjects offered by other Departments

Students may also choose to take subjects offered by other Departments, subject to the approval of both the School concerned and the Course Coordinator. Examples of acceptable subjects in a study program in occupational health and safety include:

		CP
CEIC5930	Safety in Laboratories	4
CIVL9872	Solid Waste Management	12
CIVL9881	Hazardous Waste Management	12
CMED9600	Disability	10
CMED9609	Community Genetics	10
GEOG9230	Population, Health and the Environment	12

		CP
HEAL9411	Epidemiology	15
HEAL9421	Public Health	15
IROB5701	Australian Industrial Relations	20
LAWS5020	Occupational Safety and Health Law	15
MANF9410	Total Quality Management	12
MEED9125	Planning, Conducting and Evaluating Educational Workshops	10

Project

Students are required to undertake an investigative project and to present a satisfactory report. The project will normally be of 36 credit points value (SESC9936). Projects may be based on studies carried out at a student's place of work or in the laboratories of the Department or at any other place by arrangement with the Head of the Department. A range of instrumentation is available in the Department and liaison can be arranged with industry if students do not have a suitable project at their place of work. Each student is required to present a progress report at regular seminars which all project students are expected to attend. Generally there are at least three such seminars in each session.

8075

Master of Applied Science (Ergonomics)

MAppSc

The Master of Applied Science degree in Ergonomics is multi-disciplinary and is designed to accept students from a range of backgrounds. To provide for a common base of knowledge some students are required to study some preliminary subjects which depend on their background.

The course is offered full-time or part-time. The normal duration is 3 sessions full-time or 6 sessions part-time. However, students with advanced standing in preliminary subjects may complete the course in one calendar year of full-time study by completing the project in the summer recess.

Candidates are required to complete a total of 180 credit points, made up of 36 credit points of preliminary subjects, 84 credit points of compulsory core subjects, 24 credit points of elective subjects and a 36 credit point Project. For candidates with previous ergonomics qualifications a 72 credit point Major Project may be undertaken in place of 36 credit points of subjects.

Preliminary subjects

Preliminary subjects are designed to provide a common base of knowledge for students from diverse backgrounds. Students who have studied equivalent subjects in their undergraduate courses or who are able to demonstrate a satisfactory standard of understanding are given advanced standing in these subjects.

		CP
ANAT6151	Introductory Functional Anatomy	12
SESC9011	Principles of Engineering Mechanic	12
SESC9012	Statistics for Health and Safety Scientists	12

Core subjects		CP
SESC9210	Research Methods	12
SESC9224	Principles of Ergonomics	12
SESC9242	Effective Behaviour in Organisations	12
SESC9264	Assessment of the Workplace Environment	12
SESC9424	Applied Ergonomics	12
SESC9425	Physical Ergonomics	12
SESC9426	Ergonomics and New Technology	12

Elective subjects		
BIOM9541	Mechanics of the Human Body	12
SESC9211	Introduction to Safety Engineering	12
SESC9232	Introduction to Occupational Health and Safety Law	12
SESC9260	Introduction to Occupational Health	12
SESC9343	Innovation, Productivity and Safety	12
SESC9350	Risk Management	12
SESC9353	Major Hazards Management	12
SESC9523	Plant and Construction Safety	12
SESC9544	Traffic Safety	12
SESC9551	Experimental Biomechanics	12

Note: Other graduate subjects offered by other Schools may be taken subject to the approval of both the School concerned and the Ergonomics Course Coordinator. Not all elective subjects are offered every year.

Project

Students are required to undertake an investigative project and to present a written report according to guidelines established by the Department. The project will normally be of 36 credit points value (SESC9936) although in special cases, for example when a student enters the course with substantial background in the core material, a Major Project of 72 credit points value (SESC9972) may be taken.

Projects may be based on studies carried out at the student's workplace, in the Department's laboratories or at any other appropriate place with the agreement of the Ergonomics Course Coordinator.

Each student is required to present progress reports at regular seminars which all Project students are expected to attend. Generally there are at least three seminars in each Session.

8077

Master of Applied Science (Industrial Safety)

MAppSc

This course is designed as a specialist course which builds on a previous four year degree. It is suitable for people who manage safety as part of their line management role and wish to extend their learning in their base discipline in addition to gaining a grounding in Safety. The course has a core of only three subjects and a very wide choice of elective subjects to suit students from widely varying backgrounds. No preliminary subjects are required for this

course as the specialist area chosen must be based on the discipline of a student's first degree.

Entry to the Master of Applied Science (Industrial Safety) course requires a four year degree in an approved discipline.

The Master of Applied Science degree is obtained by satisfactory completion of 120 credit points of study, 24 of which represent a project. Students undertake 36 credit points of compulsory subjects, and 60 credit points of electives. The degree is normally completed by one year of full-time study or two years of part-time study. Part-time students may undertake the project at their place of work. Candidates may undertake interdisciplinary studies and, subject to approval, are able to take elective subjects from any school in the Faculty, other Faculties of the University and other universities or institutions. By means of this system, programs of studies best suited to the needs of the candidates may be selected.

Core subjects		CP
SESC9211	Introduction to Safety Engineering	12
SESC9242	Effective Behaviour in Organisations	12
SESC9350	Risk Management	12
SESC9924	Project	24

Electives

Students may choose postgraduate electives either from the MAppSc (OHS) - 8044 course or from other schools in the University. A full list of all subjects from other schools can be obtained from the various faculty handbooks but approval to take such subjects must be given by both the School concerned and the Course Coordinator. Not all elective subjects are offered every year.

Project

Students must undertake an investigative project of 24 credit points value.

Projects may be based on studies carried out at a student's place of work, or in the laboratories of the Department, or at any other place by arrangement with the Head of the Department. A range of instrumentation is available in the Department, and liaison can be arranged with industry if students do not have a suitable project at their place of work.

8671

Master of Safety Science

MSafetySc

This is a multidisciplinary course for students wanting a broad based understanding of safety engineering, occupational health, risk management, and ergonomics.

The normal duration is 4 sessions full-time or 8 sessions part-time. However students who are granted advanced standing in the preliminary subjects may be able to complete the course in a shorter time.

Students are required to complete a program totalling 216 credit points made up of 36 credit points of preliminary subjects, 84 credit points of compulsory subjects, 60 credit points of electives and a 36 credit point project.

Preliminary subjects

Preliminary subjects are designed to provide a common base of knowledge for students from diverse backgrounds. Students who have studied equivalent subjects in their undergraduate courses or who are able to demonstrate a satisfactory standard of understanding are given advanced standing in these subjects.

Preliminary subjects		CP
ANAT6151	Introductory Functional Anatomy	12
SESC9011	Physical Principles of Safety	12
SESC9012	Statistics for Health and Safety Scientists	12

Core subjects

Core subjects, totalling 84 credit points, represent the central theme of Safety Science and are compulsory.

SESC9210	Research Methods	12
SESC9211	Introduction to Safety Engineering	12
SESC9224	Principles of Ergonomics	12
SESC9232	Introduction to Occupational Health and Safety Law	12
SESC9242	Effective Behaviour in Organisations	12
SESC9260	Introduction to Occupational Health	12
SESC9350	Risk Management	12

Electives

Students are required to take at least 60 credit points from the list of electives for the Master of Applied Science (OHS) 8044.

Students may select as electives graduate subjects offered by other Schools in the University, subject to the approval of the School concerned and the Head of the Department.

Project

Project Students are required to undertake an investigative project and to present a satisfactory report. The project will normally be of 36 credit points value (SESC9936). In special circumstances, for example when a student enters the course with substantial prior knowledge in the core material, a Major Project of 72 credit points value (SESC9972) may be permitted. Projects may be based on studies carried out at a student's place of work, or in the laboratories of the Department, or at any other place by arrangement with the Head of the Department. A range of instrumentation is available in the Department and liaison can be arranged with industry if students do not have a suitable project at their place of work. Each student is required to present a progress report at regular seminars which all project students are expected to attend. Generally there are at least three such seminars in each Session.

Environmental Studies Courses

8045

Master of Environmental Studies

MEnvStudies

This is a faculty-wide, interdisciplinary course, administered by the Department of Safety Science. The course draws from schools, departments, and centres throughout the University and covers a model of environmental studies as an interactive process of three overlapping headings:

- an understanding of natural systems and processes at global, regional and local levels, and the technical assessment and measurement tools for understanding them;
- an appreciation of how human activities impact on the environment (environment as a resource, environmental change, pollution, effects on health, recreational use of the environment) and the methodologies for examining this impact (environmental impact assessment techniques, systems approaches and so on);
- the social context of the environment and human responses to environmental issues (philosophy, ethics, values and ideology, economics, decision making, policy, environmental planning and management, law and politics).

The Master of Environmental Studies is designed to provide students and graduates with:

- A conceptual framework for the study of environmental issues and problems, including:
- an understanding of natural systems and processes;
- an appreciation of how human activities impact on the environment;
- the ways in which these areas interact, including understanding of scientific, social, philosophical, economic, ethical, legislative and political concepts. Knowledge and skills in a range of environmental subject areas, including environmental assessment, environmental planning, environmentally oriented decision-making and the ways in which various disciplines may be integrated together.
- Experience in the design and conduct of projects in environmental studies.

The overall objective of the course is to provide opportunities for students to increase their skills in environmental management by extending their knowledge of environmental systems and processes. The course is one that has practical value which will help the careers of graduates.

Entry qualifications

The entry qualification for the Master of Environmental Studies degree is a four year honours degree or equivalent, in a field relevant to environmental studies. Applicants may

also be admitted if they have a three year degree plus another qualification at an acceptable level, or have other professional or academic attainments. In the past, the course has attracted students from a wide variety of backgrounds, including those with first degrees in geography, biological sciences, geology, ecology, civil engineering, chemistry, physics, law, health administration, agriculture, social science and archaeology.

Course requirements

Students enrolled on the Master of Environmental Studies Program are required to complete a course totalling 120 credit points made up of compulsory Core Subjects (48 credit points), Elective Subjects (36 credit points) and a Project (36 credit points). The structure of the course allows students to pursue specialised interests through the electives and the project, or to develop new areas of expertise.

Some subjects have prerequisites or assumed knowledge which are determined to be necessary for suitable progress through the subject. Students should seek advice from subject coordinators if they are in doubt as to whether they are qualified to take a subject.

Core subjects		CP
SESC9210	Research Methods	12
SESC9271	Environmental Planning and Assessment	12
SESC9272	Environment and Medicine	12
SESC9273	Environment and Law	12
SESC9936	Project (Environmental Studies)	36

All students must undertake an investigative project of 24 or 36 credit points. This project is expected to be complete within one University session (that is, six months). Students will require an academic supervisor for the duration of the project. Projects normally require the collection and analysis of data, leading to the preparation of a report of about 10,000 words (5,000-6,000 words in the case of a 24 credit point project). The project can be based on studies carried out at the student's place of work, or at some other suitable location.

The objective of the Project is for the student to demonstrate skills in research design, data acquisition and analysis, critical synthesis, and presentation of findings.

Elective Subjects

There is a very wide range of subjects offered by Schools across the entire University which are suitable for inclusion in the Master of Environmental Studies program.

Students may choose to take electives that:

- reinforce their own areas of expertise; or
- extend their knowledge and skills into new areas.

By carefully combining the choice of subjects, it is possible to create programs which are tailored to the needs of individual students. The Elective Subjects listed below are not exhaustive, and students may choose elective studies from all graduate programs available in the Faculty of Science and Technology, provided that they meet or can

satisfy any necessary prerequisites to enrol. These programs include: Earth Sciences, Planning and Assessment, Pollution, Ecology, Remote Sensing, Water Management, Conservation and Land Management, Urban and Social Environments and Safety Science.

Possible elective subjects		CP
BIOT7081	Environmental Biotechnology	20
CEIC5630	Industrial Water and Wastewater Engineering	12
CHEM7325	Toxicology, Occupational and Public Health	28
CIVL4306	Engineering and the Environment	10
CIVL9402	Transport, Environment, Community	24
CIVL9403	Theory of Land Use Transportation Interaction	12
CIVL9405	Urban Transport Planning Practice	12
CIVL9408	Transport Systems Design (Urban)	12
CIVL9788	Site Investigations	12
CIVL9790	Slope Instability	12
CIVL9799	Environmental Geomechanics	12
CIVL9851	Unit Operations in Public Health Engineering	12
CIVL9855	Water and Wastewater Analysis and Quality Requirements	12
CIVL9856	Water Treatment	12
CIVL9857	Wastewater Treatment and Disposal	12
CIVL9858	Water Quality Management	12
CIVL9859	Environmental Hydrology	12
CIVL9860	Investigation of Groundwater Resources	12
CIVL9861	Environmental and Engineering Geophysics	12
CIVL9862	Fluvial Hydraulics	12
CIVL9872	Solid Waste Management	12
CIVL9875	Hydrological Processes	12
CIVL9876	Water Resource Modelling	12
CIVL9880	Groundwater Modelling	12
CIVL9881	Hazardous Waste Management	12
CIVL9884	Environmental Engineering Science 1	12
CIVL9885	Environmental Engineering Science 2	12
CIVL9888	Environmental Management	12
CIVL9889	Environmental Economics and Law	12
CIVL9891	Groundwater Contamination and Remediation	12
CMED9500	Epidemiology	15
GEOG9210	Computer Mapping and Data Display	12
GEOG9230	Population, Health and the Environment	12
CMED9519	Demography in Community Medicine	10
CMED9612	Environmental Health	10
ECON5116	Environmental Economics	20
GEOG9130	Soil Studies for Arid Lands Management	12
GEOG9150	Remote Sensing Applications	12
GEOG9160	Directed Problems in Remote Sensing	12
GEOG9240	Principles of Geographical Information Systems	12
GEOG9241	Advanced Geographical Information Systems	12

		CP			CP
GEOG9280	Application and Management of Geographical Information Systems	12	SESC9350	Risk Management	12
GEOG9290	Image Analysis in Remote Sensing	1	SESC9353	Major Hazards Management	12
GEOG9300	Vegetation Management	12	SESC9531	Industrial and Environmental Noise	12
GEOG9310	River Management	12	SESC9544	Traffic Safety	12
GEOG9320	Soil Degradation and Conservation	12	SESC9553	Radiation Protection	12
GEOL6231	Coastal Environment Assessment	15	SESC9573	Fire and Explosion	12
GEOL9010	Groundwater Environments	12	SESC9810	Chemical Safety and Toxicology	12
GEOL9011	Hydrogeology	12	SESC9850	Management of Dangerous Materials	12
GEOL9030	Geological Engineering	12	SESC9904	Report	4
GEOL9033	Terrain Evaluation	12	SESC9908	Report	8
GEOL9051	Hydrogeochemistry	12	SESC9912	Special Project	12
GEOL9060	Environmental Geology	12	SCTS5303	Knowledge, Power and Public Policy	20
GMAT6532	Spatial Information Systems 1	7.5	SCTS5309	Analysing Environmental and Technological Controversies	20
GMAT7532	Spatial Information Systems 2	5			
GMAT9211	Introduction to Geodesy	12			
GMAT9212	GPS Satellite Mapping	12			
GMAT9532	Data Acquisitions and Terrain Modelling	12			
GMAT9600	Principles of Remote Sensing	12			
GMAT9604	Land Information Systems	12			
GMAT9606	Microwave Remote Sensing	12			
GSBE0503	Postgraduate Design and Methodology	10			
HEAL9371	Research and Evaluation Methods	15			
HEAL9421	Public Health	15			
INDC4120	Chemistry of the Industrial Environment	7.5			
INDC4130	Environmental Chemistry of Industrial Processes	5			
KCME4301	Environmental Management for the Mining Industry	12			
KCME4302	Environmental Assessments in Mining	12			
LAND9010	Environmental Heritage Studies	15			
LAND9111	Landscape Planning	15			
LAND9212	Landscape Planning Methods	15			
LAND9213	Land Systems and Management	15			
LAND9214	Visual Landscape Assessment	15			
LAND9215	GIS in Landscape Architecture	15			
LAWS3409	Environmental Law and Policy	30			
LAWS3410	Environmental Law	15			
MANF9410	Total Quality Management	12			
MINE1524	Mining Conservation	12			
PROF0003	Qualitative Research Methodology	15			
SESC9211	Introduction to Safety Engineering	12			
SESC9232	Introduction to OHS Law	12			
SESC9242	Effective Behaviour in Organisations	12			
SESC9260	Introduction to Occupational Health	12			
SESC9261	Occupational Hygiene	12			
SESC9262	Occupational Medicine	12			
SESC9265	Occupational Health Practice	12			
SESC9267	Research Methods in Laboratory Science	12			
SESC9271	Environmental Planning and Assessment	12			
SESC9274	Environmental Management Systems	12			

Other subjects may be taken on the approval of the Course Coordinator.

Centre for Advanced Numerical Computation in Engineering and Science

8790

Master of Computational Science

Staff Contact: Professor CAJ Fletcher

The MComputationalSc degree will provide thorough training in modern computational techniques in the discipline-specific areas: A) Environmental Modelling; B) Computational Chemistry; C) Computational Physics, through coursework and a focussed project in your major field.

Admission to the Masters program requires the equivalent of a 4-year degree in Science, Engineering or other mathematically-based discipline at a satisfactory level. Candidates must have adequate higher-level language (preferably Fortran) programming skills. The Masters program can be completed in one year of full-time study.

Students are required to complete, satisfactorily, 120 credits, as follows:

I) The two core subjects (ANCE8001, MATH5315, see Grad Dip)

II) One generic computational subject (see Grad Dip)

III) Two discipline-specific subjects offered by the Centre or the Faculties of Science and Engineering.

IV) One elective subject offered by the Centre or the Faculties of Science and Engineering.

V) Forty eight credit project supervised by academic members of the Centre and/or the Faculty of Science.

Subject Descriptions

Postgraduate Study

Descriptions of all subjects are presented in alphanumeric order within organisational units. For academic advice regarding a particular subject consult with the contact for the subject as listed. A guide to abbreviations and prefixes is included in the chapter 'Handbook Guide', appearing earlier in this book.

Anatomy

ANAT6151

Introductory Functional Anatomy

Staff Contact: Dr K Ashwell

CP7.5 S1 L2 T1 HPW3

Overview of basic human anatomy and physiology with an emphasis on structures and systems which are most vulnerable to chemical and physical trauma under industrial conditions, such as the eye, ear and skin. Other systems studied include the musculo-skeletal system, central and peripheral nervous systems, circulatory, respiratory, gastrointestinal, endocrine and urogenital systems.

Applied Geology

GEOL0004

Special Program Applied Geology

Staff Contact: Dr AC Dunlop, Mr GH McNally

CP120

Note/s: For programs 8022.1000, 8022.2000 and 8022.3000.

GEOL0005

Research Thesis Applied Geology Full-time

Staff Contact: Dr AC Dunlop

CP120

Note/s: For programs 1000 and 2000.

GEOL0006

Research Thesis Applied Geology Part-time

Staff Contact: Dr AC Dunlop

CP60

Note/s: For programs 1000 and 2000

GEOL0110

Geological Remote Sensing

Staff Contact: A/Prof GR Taylor

CP12 S1 L4 HPW3

The physics of various remote sensing techniques; interpretation of conventional aerial photography in exploration; Infrared remote sensing techniques; side looking airborne radar; theory and applications of Landsat imagery; enhancement techniques for satellite imagery; interpretation of Landsat photographic products and application to several case history areas. Integration of remote sensing information with the overall data base as applied to exploration.

GEOL0114

Project in Geological Remote Sensing

Staff Contact: A/Prof GR Taylor

CP48

Note/s: Restricted to program 8047.2000.

GEOL0300

Computing and Statistics for Geologists

Staff Contact: Dr DR Cohen

CP12 SS L2 T1

Introduction to the use of PC's, operating systems, communications and networks, common software packages.

An introduction to programming, spreadsheets, graphics software and the SYSTAT package. Fundamentals of statistics including types of data, population characterisation, tests of significance, analysis of variance and basic geostatistical methods.

GEOL0304

Data Processing Project 1

Staff Contact: A/Prof GR Taylor

CP24 SS

A minor project equivalent to 6HPW study for one session which will require the student to carry out detailed processing and analysis of a comprehensive data set for an exploration project that may relate to the student's field of employment.

GEOL0310

Image Processing of Spatial Data Sets

Staff Contact: A/Prof GR Taylor

CP12 SS L2 T1

Data sources and formats, remotely sensed, geophysical, geochemical and topographic. Image display systems; data pre-processing, image rectification, spatial filtering and enhancement techniques. Statistical analysis, classification and image display as a tool for data integration.

GEOL0314

Data Processing Project 2

Staff Contact: A/Prof GR Taylor

CP48 SS

A research project equivalent to 12 HPW study for one session which requires the student to carry out detailed processing, analysis and integration of a multi-attribute data set for an exploration project that may relate to the student's field of employment.

GEOL0320

Geostatistical Ore Reserve Estimation

Staff Contact: Dr DR Cohen

CP12

When to apply geostatistics; brief review of univariate statistics; bivariate statistics and correlation; exploratory data analysis; measures of spatial correlation: the variogram, the covariance; variogram calculation and how to obtain a good variogram; random function models and stationarity; desirable properties of estimators; estimation of variance; dispersion variance and uses; optimal weighted average estimator, ordinary kriging; recoverable reserve estimation, problems and solutions; application examples, coal, copper, gold; blasthole kriging for ore waste selection; geotechnics and the environment.

GEOL0330

Conceptual Models for Exploration Geology

Staff Contact: Dr AC Dunlop

CP12 SS L2 T1

The development and use of ore deposit models as a guide for exploration. Examples drawn from the major categories of deposit such as epithermal gold, greenstone associated gold, vein-type uranium, porphyry coppers, volcano-genic

massive sulphides, carbonate and shale-hosted lead-zinc and ultramafic hosted nickel sulphides. Exploration strategies and tactics; risk analysis and prospect evaluation.

GEOL0340

Geochemical Exploration Techniques

Staff Contact: Dr DR Cohen/Dr AC Dunlop

CP12 SS L2 T1

Regolith development and element mobility. Principles of exploration geochemistry and its role in mineral exploration. Detailed consideration of soil, rock and drainage sampling interpretation techniques. Consideration of appropriate analytical techniques. Problems related to Australian and other regional environments examined on the basis of case histories.

GEOL0350

Exploration Geochemical Data Processing

Staff Contact: Dr DR Cohen, Dr AC Dunlop

CP12 SS L2 T1

Graphical analysis of exploration geochemical data using boxplot, stem and leaf display and quantile plotting techniques; identification of anomalous observations. Correlation of geochemical variables; principal component analysis and identification of geochemical processes. Regression analysis and adjustment of background populations in geochemical data. Discriminant function analysis and factor analysis. Spatial filtering and definition of geochemical anomalies and regional distribution patterns of elements. Introduction to robust statistical methods. New developments in geochemical data processing. Data visualisation.

GEOL0360

Remote Sensing Applications in Geoscience

Staff Contact: A/Prof GR Taylor

CP12 SS L2 T1

The physics of various remote sensing techniques. Consideration of various sources of imagery; Landsat, TM, SPOT, aircraft scanners etc. Spectral properties of rocks, soils and vegetation. Geological applications of visible, infrared, thermal and multi-parameter microwave imagery in resource exploration, tectonic studies, geological hazard recognition and environmental monitoring. Mapping and data integration methodologies.

GEOL0370

Fundamentals of Exploration Geophysics

Staff Contact: Mr D Palmer

CP12 SS L2 T1

An introduction to the theory and application of geophysical methods to engineering, environmental, and groundwater studies. The methods covered include gravity, magnetic seismic refraction, shallow seismic reflection, DC electrical resistivity, electromagnetic, transient electromagnetic, radar, and geophysical well logging. Each method is described in terms of the fundamental physical principles, data acquisition and field techniques, data processing and presentation, and quantitative interpretation.

GEOL0380**Electrical Methods in Geophysical Exploration***Staff Contact: Mr D Palmer*

CP12 SS L2 T1

The relationships between geology and electrical geophysical properties; basic theory of resistivity, induced polarisation and electromagnetic methods. Evaluation of applications, survey design, instrumentation, data acquisition, interpretation and productivity. Computer methods of interpretation are emphasised by the extensive use of hands-on microcomputer tutorials. An introduction to recent advances in electrical geophysics: inversion, multi-electrode array resistivity, spectral induced polarisation, transient electromagnetics and ground probing radar.

GEOL0390**Data Processing for Fossil Fuel Resources***Staff Contact: A/Prof CR Ward*

CP12 SS L2 T1

Sedimentary basin analysis with special emphasis on the geology of coal deposits; coal deposit evaluation, data acquisition, computer processing, analysis and display.

GEOL9010**Groundwater Environments***Staff Contact: Dr J Jankowski*

CP12 S1

Physical properties of groundwater. Darcy flow; hydraulic conductivity – field and laboratory methods; storage and transmissivity; flow nets – local and regional flow systems. Drilling methods; well design and completion; well development; pumping tests and interpretation. Study of the detailed occurrence, methods of development and environmental problems associated with groundwater in aquifer systems of importance to Australia. Environments will include fractured rock systems (upland salinity); the Murray-Darling Basin; The Great Artesian Basin; Oceanic Islands and coastal aquifers and karstic aquifer systems.

GEOL9030**Geological Engineering***Staff Contact: Mr GH McNally*

CP12 S1

Geomechanical properties of intact rock, discontinuities and rock masses. Weathering processes and geotechnical consequences. Mechanical excavation and blasting. Rock support for shallow underground structures. Dam engineering, dam site geology, embankment zoning, foundation treatment and grouting, materials selection and specification. Foundation engineering.

GEOL9031**Engineering Geology of Surficial Materials***Staff Contact: Mr GH McNally*

CP12 S2

Geotechnical characteristics of alluvial, colluvial, eolian, coastal and residual soils; duricrusts and deep water weathering; problem soils (expansive, dispersive, collapsing, compressible and saline); stabilisation and

improvement of inferior materials; influence of Cainozoic climatic changes and geological history of regolith in Australia and adjacent areas.

GEOL9032**Soil and Rock Construction Materials***Staff Contact: Mr GH McNally*

CP12 S2

Location and assessment of sand, gravel, hard rock, brick clay, building stone and limestone; specification and testing of aggregate, ballast and roadbase; concrete and asphaltic materials; blasting, crushing and beneficiation; environmental considerations, blast monitoring and quarry reclamation; waste and synthetic materials.

GEOL9033**Terrain Evaluation***Staff Contact: Mr GH McNally*

CP12 S2

Introduction to photogeology and image interpretation, with emphasis on geotechnical applications; interpretation of geological structure, lithology and surficial deposits; terrain evaluation for engineering purposes, with Australian examples. Course content includes lectures, supervised practical work and individual assignments. Intended to complement GEOL0110 (Geological Remote Sensing), emphasising airphotos as a data source.

GEOL9040**Fundamentals of Geomechanics***Staff Contact: Mr GH McNally*

CP12 S1 L1.5 T1.5

Note/s: This subject is being revised. Intending students should contact Mr G H McNally.

Engineering mechanics, limit equilibrium, equilibrium of multiple bodies, stress and strain in two and three dimensions, equations of equilibrium and compatibility. Isotropic and anisotropic elasticity, plastic and viscous yield criteria and potential surfaces. Stereographic projection methods for rock mechanics. Geomechanical properties and classification of soils and rocks. Laboratory and field testing techniques for soils and rocks. Deformability and strength properties of rocks and shear strength of rock discontinuities. Stresses about rock openings and beneath point loads. Stress measurement in rocks.

GEOL9051**Hydrogeochemistry***Staff Contact: Dr J Jankowski*

CP12 S1

Chemical composition of natural and contaminated groundwaters; inorganic parameters in natural waters; methods of expressing concentration and representation of hydrochemical data; interpretation of chemical analyses, chemical types of waters; aqueous geochemistry, chemical thermodynamics, activities of ionic species, equilibrium reactions, non-equilibrium approaches, the carbonate system and pH control; chemical weathering, water-rock interactions; clay minerals and ion exchange, silicate equilibria, mass balance, oxidation and reduction, redox

equilibria, redox processes and reactions. Application of physical chemistry to groundwater systems. Geochemical evolution of groundwater. Introduction to hydrochemical modelling. Introduction to isotope studies; case studies in natural and polluted environments.

GEOL9052

Advanced Hydrogeochemistry

Staff Contact: Dr J Jankowski

CP12 S2

Note/s: Not offered in 1998.

Environmental isotopes; radioactive decay; stable and radioactive isotopes and their application to groundwater studies; bacteriology; basic principles of bacteriology and microbiology of polluted environments; biochemistry, advanced thermodynamics and kinetics; mass transport and mass balance studies in groundwater systems; computer methods in geochemical modelling including forward and inverse methods and geochemical modelling codes; case studies and application of computer codes in groundwater modelling; practical field measurement and use of field hydrochemical equipment; laboratory analysis and the use of the chemical laboratory equipment.

GEOL9060

Environmental Geology

Staff Contact: Mr GH McNally

CP12 S1 L3

Geology and urban planning; geological input to Environmental Impact Statements; soil and rock construction materials; ground subsidence due to mining and groundwater pumping; geological hazards; land degradation and problem soils; engineering geomorphology.

GEOL9070

Engineering Geophysics

Staff Contact: Mr D Palmer

CP12 S1 L2 T1

Note/s: Short field tutorials are included as part of this subject. Students will incur personal costs.

An introduction to the theory and application of geophysical methods to engineering, environmental, and groundwater studies. The methods covered include gravity, magnetic seismic refraction, shallow seismic reflection, DC electrical resistivity, electromagnetic, transient electromagnetic, radar, and geophysical well logging. Each method is described in terms of the fundamental physical principles, data acquisition and field techniques, data-processing and presentation, quantitative interpretation, and case histories.

GEOL9100

Remote Sensing of Groundwater Resources

Staff Contact: A/Prof GR Taylor

CP12 S1 L1.5 T1.5

The physics of various remote sensing techniques; interpretation of conventional aerial photography in exploration; Infrared remote sensing techniques; sidelooking airborne radar; theory and applications of Landsat imagery; enhancement techniques for satellite

imagery; interpretation of Landsat photographic products and application to several case history areas. Integration of remote sensing information with the overall database as applied to exploration. Remote sensing for hydrogeological mapping, recognition of aquifers and recharge, discharge zones, salinity mapping. Application of Landsat, TM, SPOT, RADAR and integrated information systems.

GEOL9110

Hydro and Environmental Geology

Staff Contact: Dr J Jankowski

CP7.5 S2 L2 T1

Prerequisite: GEOL5100

Note/s: This is a servicing subject taught within courses offered by other schools or faculties.

Hydrogeology: determination of intrinsic permeability in field and laboratory, tracer tests, finite difference modelling methods applied to groundwater flow, drilling methods for unconsolidate and consolidated deposits, piezometer design and installation, remote sensing methods for contaminated groundwater investigations, sampling methods.

Hydrogeochemistry: Chemical composition of natural and contaminated groundwater, inorganic parameters in groundwaters, chemical types of groundwaters, chemical reactions and processes, chemical evolution and chemical classification of groundwaters, chemical equilibrium, disequilibrium, acid-base chemistry, the carbonate system and pH control, oxidation and reduction.

GEOL9120

Groundwater Contaminant Transport

Staff Contact: Dr J Jankowski

CP7.5 S1 L2 T1

Prerequisites: GEOL9110

Note/s: This is a servicing subject taught within courses offered by other schools or faculties.

Weathering reactions and geochemical processes, ion exchange, salt sieving and brine development, dryland salinity, fresh water saline water interaction, application of stable and radioactive isotopes in groundwater studies, groundwater microbiology, corrosion and incrustation in groundwater bores, practical field and laboratory measurements, monitoring and sampling of contaminants in groundwater, sources and types of contaminants, groundwater quality and environmental standards, contaminant mass transport in groundwater chemical dispersion, chemical diffusion and retardation, Kd test, hydrogeochemical modelling, physical and empirical models, modelling of subsurface transport, trace metals in groundwater speciation and transport, restoration and clean-up.

GEOL9124

Groundwater Project

Staff Contact: Dr J Jankowski

CP36 S2

Study of similar content to GEOL9144 but at a smaller scale.

GEOL9144**Groundwater Research Project***Staff Contact: Dr J Jankowski*

CP48 S2

Note/s: Students undertaking field work may incur personal costs.

Research investigation consisting of one or more of; modelling, laboratory experiments, field work related to groundwater studies.

GEOL9444**Project in Engineering Geology***Staff Contact: Mr GH McNally*

CP24

Study of similar content to GEOL9464 but at a much smaller scale.

GEOL9454**Project in Engineering Geology***Staff Contact: Mr GH McNally*

CP36

Study of similar content to GEOL9464 but at a smaller scale.

GEOL9464**Project in Engineering Geology***Staff Contact: Mr GH McNally*

CP60

aspects of vegetation description and plant environment interactions.

BIOS9917**Alternative Higher Degree Qualifying Program***Staff Contact: A/Prof P Greenaway*

Full-time CP120

Part-time CP60

Similar in content and standard to BIOS4018 Biological Science Honours but designed specifically for students who cannot regularly attend the University.

BIOS9943**Alternative Higher Degree Qualifying Program***Staff Contact: A/Prof P Greenaway*

Full-time CP120

Part-time CP60

Similar in content and standard to BIOS4028 Botany Honours but designed specifically for students who cannot regularly attend the University.

BIOS9945**Alternative Higher Degree Qualifying Program***Staff Contact: A/Prof P Greenaway*

Full-time CP120

Part-time CP60

Similar in content and standard to BIOS4038 Zoology Honours but designed specifically for students who cannot regularly attend the University.

Biochemistry

BIOC6308**Alternative Higher Degree Qualifying Program***Staff Contact: Prof I Dawes*

CP120

Similar in content and standard to BIOC4318 Biochemistry Honours but designed specifically for students who cannot regularly attend the University.

Biological Science

BIOS3014**Ecological Studies in Arid Lands Management***Staff Contact: Dr D Croft*

CP 15 S2 L2 T4

Techniques in ecological studies of animal communities. Adaptations to an arid environment, environmental and social determinants. Behaviour, diet and condition of native and feral animals. Competition between native and introduced herbivores. Strategies in the management of arid zone wildlife. Concurrent studies in relevant units in the School of Biological Science are prescribed to cover

Biomedical Engineering

BIOM9012**Biomedical Statistics***Staff Contact: Dr R Odell*

CP16 S2 L3 T1

Probability and distributions. Estimation and hypothesis testing. Associations between disease and risk factors. Linear models; analysis of variance, simple and multiple regression, discriminant analysis. Distribution-free methods. Analysis of survival data. Experiment design.

Biotechnology

BIOT5013**Practical Biotechnology***Staff Contact: Prof P Rogers*

CP30 F T6

Illustration, demonstration and operation of laboratory-scale and pilot-scale equipment. Visits to appropriate industries. Experimental project or critical review.

BIOT7010**Reading List in Biotechnology (Microbiology)***Staff Contact: Prof N Dunn*

CP12 S1 or S2 T3

BIOT7020**Reading List in Biotechnology (Biochemistry)***Staff Contact: Prof N Dunn*

CP12 S1 or S2 T3

BIOT7030**Advanced Biotechnology***Staff Contact: Dr F Foong/Dr S Mahler*

CP24 F HPW3

Co-requisite: PHPH5471

This course will cover the production and characterisation of biopharmaceuticals. Production involving chemical and enzymatic peptide synthesis, recombinant production in *E.coli*, yeast, baculovirus and mammalian cells and associated purification processes will be covered. Regulatory considerations important in the validation of fermentation and recovery processes, the purity of final product, and the design of facilities will also be covered. Patent issues relevant to such products and other aspects of licensing business considerations will be addressed, as will case studies of current production processes.

BIOT7040**Biotechnology Principles***Staff Contact: Dr S Mahler*

CP32 S1 6 S2 2

This course is designed to provide students who have not previously studied biotechnology with sufficient training in the field to complete the MAppSc (Biopharmaceuticals). Aspects of the application of gene cloning techniques for the production of recombinant proteins from a range of host cells, growth, product formation and recovery of microbial products, bioreactor design and operation, monoclonal antibody and gene probe technology will be covered.

BIOT7050**Biopharmaceuticals Project (Major)***Staff Contact: Dr S Mahler*

CP64 F HPW 8

An experimental or technical investigation or design project in the general field of biotechnology.

BIOT7051**Applied Genetics***Staff Contact: Dr D Glenn*

CP20 S2 L2 T3

Isolation of commercially useful microorganisms. Mutagenesis and the isolation of mutants of the following types: auxotrophs; catabolic mutants; feedback inhibition and repression resistance; constitutive; catabolite repression resistance; resistance to antimicrobial agents and to viruses; extended enzyme substrate specificity; altered enzyme properties; changes in promoter and attenuator activity.

Techniques of genetic exchange: transformation; conjugation; transduction; cell fusion; sexual and parasexual cycles. The use of these techniques in strain construction.

Recombinant-DNA technology: plasmid and virus technology; cloning vectors for use in microorganisms, plant and animal cells. Strain construction using rec-DNA techniques. Properties of expression, excretion and genetic stability of constructs.

BIOT7060**Biopharmaceuticals Project (Minor)***Staff Contact: Dr S Mahler*

CP32 F HPW 4

A small experimental or design project, or an extensive literature review and analysis of a selected topic in biotechnology.

BIOT7061**Peptide and Protein Technology***Staff Contact: Dr F Foong*

CP20 S1 L2 T3

Industrial scale production of enzymes, peptide hormones, antibodies including monoclonal antibodies, vaccines; regulation of synthesis by environmental control and genetic manipulation; recovery and down-stream processing techniques; immobilization by entrapment and binding.

Applications of proteins in medical therapy and diagnosis and as analytical tools including ELISA and affinity chromatography: applications of enzymes in the food and beverage industries.

BIOT7071**Biochemical Engineering***Staff Contact: Prof P Gray*

CP20 S1 L2 T3

Design of bioreactors; range of biocatalysts from free enzymes to immobilized cells; heat and mass transfer, scale-up, economic feasibility studies as applied to bioprocesses; design of equipment and facilities for sterile operation and to meet recDNA guidelines; downstream processing, design and operation; instrumentation and control; use of computer-linked systems; mathematical simulation.

Detailed examples of bioprocesses including: amino acid production, single cell protein and liquid fuels, secondary metabolite production, growth and product formation of animal and plant tissue cultures. Patent and commercial aspects of bioprocesses.

BIOT7081**Environmental Biotechnology***Staff Contact: Dr J Foster*

CP20 S2 L2 T3

Environmental Biotechnology examines the way microbes decompose chemically complex materials. Applications include the use of bacteria and fungi to detoxify wastes, converting them to usable substances. Prevention of biodeterioration of valuable materials is also an important

area of study. Lectures cover biodegradation of minerals, metals, cellulose, aromatics, hydrocarbons and wastewater treatment. Students present research reviews and conduct experimental projects.

BIOT7091

Applied Cellular Physiology

Staff Contact: Dr F Foong

CP20 S2 L2 T3

Elemental and molecular composition of cells; formulation of growth media; stoichiometry of growth processes and product formation; metabolic regulation; stringent response; mechanisms of metabolite uptake and product release; maintenance energy; thermodynamics of cellular growth and activities. Effect of mutation on cellular physiology; recombinant-DNA products. Fermentation processes: inoculum preparation, physiology of selected processes.

BIOT7010

Reading List in Biotechnology (Microbiology)

Staff Contact: Prof N Dunn

CP12 S1 or S2 T3

BIOT7020

Reading List in Biotechnology (Biochemistry)

Staff Contact: Prof N Dunn

CP12 S1 or S2 T3

BIOT7110

Bioengineering Principles

Staff Contact: Prof P Rogers

CP12 S1 L3

A subject designed to provide an introductory course for students in the MAppSc Biotech program who have not previously undertaken any bioengineering studies.

Steady state and differential balances as a basis for quantification of complex real systems. Concepts in rate processes and kinetic analysis with application to biological systems. Experimental determination of rate data. Correlation of simple lumped rate processes and simultaneous distributed processes and the concepts involved in dimensionless numbers.

Lamina and turbulent flow. The structure of homogeneous and boundary layer turbulence flow in pipes and channels. Mixing theory. Process vessel reactor models.

Fluid viscosity, Newtonian and non-Newtonian fluids, convective and molecular transport processes. Heat and mass transport, film coefficients. Film, boundary layer, penetration and surface renewal theories.

Quantification of complex systems. Empirical and mechanistic models in biological systems.

BIOT7123

Biotechnology Project Minor

Staff Contact: Prof P Rogers

CP32 F T4

A small experimental or design project, or an extensive literature review and analysis of a selected topic in biotechnology.

BIOT8010

Graduate Seminars

Staff Contact: Department Office

CP8 F T2

Chemistry

Student enquiries should initially be directed to the Course Coordinator A/Prof P Southwell-Keely.

CHEM7115

Treatment of Analytical Data

F L1

Errors of measurement, the treatment, interpretation and comparison of sets of measurements, associated data and problems involving analysis of variance. Topics: description of sets of measurements, tests of significance, associated data, linear regression analysis; analysis of variance; biological assays, bacteriological counts, sampling problems.

CHEM7125

Food and Drugs 1

S1 L3 T3

This unit covers the basic chemistry of food constituents and the appropriate methods of analysis of food constituents. Materials covered include monosaccharides, oligosaccharides, polysaccharides, food gums, proteins and enzymes, oils and fats, vitamins, plant pigments and food colouring matter, essential oils and food flavouring agents, preservatives and food additives.

CHEM7225

Food and Drugs 2

F L1 T3

This unit is concerned with the chemistry and analysis of common drugs such as antibiotics, sulphonamides, analgesics, barbiturates etc. Special techniques in drug analysis are studied, e.g. affinity chromatography, immunoassays, radioimmunoassays, ELISA, HPLC using special phases, chiral columns, ISRP columns, hypercarb columns; capillary gas chromatography, flash chromatography. Further work on the chemistry and analysis of preservatives.

CHEM7325

Toxicology, Occupational and Public Health

F L1 T3

Important classes of toxic materials found in the environment; treatment of pesticide residues, industrial chemicals of various types, toxic gases, mould metabolites and bacterial toxins occurring in food, carcinogenic substances, toxic metals etc. Effects of these substances on living organisms, particularly people. Practical work: pesticide residue analysis, blood and urine analysis, gas sampling and analysis, trace metal determination and experiments on the animal metabolism of toxic substances.

CHEM7425**Instrumental Techniques in Food and Drug Analysis**
S2 L2 T4

Principles involved in modern instrumental techniques; detailed application and interpretation of results. UV-visible spectroscopy, Raman, IR and NIR spectroscopy; phosphorescence and fluorescence methods, mass spectroscopy, high and low resolution NMR spectroscopy. Qualitative and quantitative application of instrumental analysis to foods and drugs.

CHEM7555**Project Work in Food and Drug Chemistry**

Short laboratory projects and/or literature assignments in selected topics of Food, Drug and Biological Chemistry, including laboratory synthesis of drugs, analysis of drug mixtures, stability of drugs, synthesis and characterization of food additives, analysis of natural and synthetic food flavours etc. Computerized methods of searching the chemical literature, use of computer graphics to study molecular properties.

CHEM8101**Computational Chemistry**
C3 SS HPW3

Contents to be advised

Computational Science

ANCE8001**Computational Mathematics**

Staff Contact: CANCES
CP12 S1 HPW3

Discretization, linear algebra, ODE and PDE solvers, appropriate for contemporary computational engineering and scientific applications.

ANCE8002**Supercomputing Techniques**

Staff Contact: CANCES
CP12 S1 HPW3

For understanding and efficiently using vector and parallel supercomputers for contemporary computational engineering and scientific applications.

ANCE8003**Project (MComputationalSc Degree)**

Staff Contact: CANCES
CP48

Case study experience to give the student practice in applying the techniques learnt in specific subjects towards solving or computationally analyzing practical problems.

ANCE8101**Data Analysis and Visualization**

CP12 SS HPW3

Statistical data analysis, error assessment, spectral analysis and data filtering, recent development in data analysis techniques, data storage, organisation of technical data and data formats, graphic analysis of real data sets, graphic packages for data visualisation.

ANCE8102**Mesh Generation**

Staff Contact: CANCES
CP12 SS HPW3

Algebraic and PDE grid generation techniques for structured and unstructured grids. Exposure to techniques used in commercial packages, such as PATRAN. Relationship to pre-processing. Relationship to solution accuracy and error control.

ANCE8103**Fundamental Applied Computation**

Staff Contact: CANCES
CP12 SS HPW3

Basic computational skills for candidates with limited previous training, structured to provide an appropriate foundation for the core subjects. This subject is equivalent to the FACED program (self-contained computer-based learning modules for industry-based engineers and scientists).

ANCE8104**Advanced Computational Algorithms**

Staff Contact: CANCES
CP12 SS HPW3

This is a specialized advanced subject to cover: i) special algorithms for vector supercomputing; ii) special algorithms for parallel supercomputing; iii) special computational algorithms taught by visitors or UNSW staff.

ANCE9105**Computational Techniques for Fluid Dynamics**

Staff Contact: CANCES
CP12 SS HPW3

General and specific computational techniques for fluid flow behaviour occurring in industrial, geophysical and chemical processes etc.

ANCE8207**Advanced Computational Science**

Staff Contact: CANCES
CP12 SS HPW3

Special topics taught by visitors or UNSW staff.

ANCE8208**Physics and Modelling of the Atmospheric Boundary Layer**

CP12 SS HPW3

Theory of boundary layer flows; numerical modelling of turbulence and flow over complex terrain; boundary layer parameterisation; dispersion of pollutants and particulates.

Food Science and Technology

FOOD1507

Introductory Food Science

Staff Contact: Prof KA Buckle

CP7 S1 L1 S2 T1

An introduction to the history of food preservation and human nutrition. Current world food patterns, organisations and trade. Food development programs, regional and international agencies and activities. Parameters of food quality; food choice and social behaviour, food and society. Students present a seminar on aspects of food science in Session 2.

FOOD1517

Chemistry, Biochemistry and Physics of Foods

Staff Contact: Prof KA Buckle

CP10.5 S1 or S2 L2 T1

An introduction to the chemical, physical and biochemical properties of foods. Food proteins, lipids, carbohydrates, nucleic acids, vitamins, minerals, pigments. Food enzymes, main classes and factors affecting their activity. Food rheology and texture. Heat transfer in foods. Effect of processing upon the properties of foods. Basic techniques for the analysis of food components and properties.

FOOD1527

Principles of Food Preservation

Staff Contact: Prof KA Buckle

CP21 S1 L3 T3

Spoilage control by traditional and modern techniques. Technology of food preservation by heating, chilling and freezing, sun drying and dehydration, salt, sugar, acid, chemical preservatives, ionising radiations, modified atmospheres. Chemical and microbial stability of foods. Packaging requirements for preserved foods. An integrated program of laboratory and pilot plant exercises designed to illustrate the principles and procedures presented in the lecture course.

FOOD1537

Plant Food Products

Staff Contact: Dr JE Paton

CP7 S1 L2

Cereals: structure, composition, properties and uses of cereal grains with emphasis on wheat; processing and technology of wheat and rice. *Sugars*: sources, types, properties of sugars in foods; sugar milling and refining. *Fruit and vegetables*: nutrient composition; principles of post-harvest physiology, storage and handling. *Lipids*: sources and composition of fats and oils, methods of extraction and processing. *Non-microbial hazards in foods*: minerals, proteins, acids, goitrogens, cyanogens, carcinogens; spices and flavours. *Plant protein*: sources, composition, extraction and uses in foods with emphasis on soybean. *Tea, cocoa and coffee*: production, composition and processing.

FOOD1547

Animal Food Products

Staff Contact: Dr JE Paton

CP10.5 S1 L3

Nature and distribution of world animal food resources. *Meat*: muscle structure, function, slaughter, conversion of muscle to meat; chemical, biochemical factors in postmortem glycolysis; meat microbiology; chilling, freezing, curing, processing of meat and meat-derived products; processing equipment; meat marketing systems; nutritional and sensory properties of meats. *Milk and dairy products*: chemical, physical properties, microbiology of milk; technology of milk-derived products including cheese, fermented products, butter, frozen, chilled and dried milk-derived foods. *Marine products*: nature and distribution of world fishery resources; teleostean and elasmobranch species, spoilage mechanisms, quality assessment; preservation by chilling, freezing, salting, drying, smoking, marinating and fermentation; fish meal and fish protein concentrate. *Egg products*: structure and composition of the avian egg; changes during storage of whole eggs; egg quality assessment; functional properties of egg components; preservation of the intact egg; pulping, freezing and drying of whole egg pulp, yolk and albumen.

FOOD1557

Food Technology Laboratory

Staff Contact: Dr JE Paton

CP21 S2 T6

Prerequisite: FOOD1527, FOOD1537, FOOD1547 or their equivalent

A program of laboratory and pilot plant exercises integrating elements of the chemical, physical, sensory and microbiological analysis of foods and the impact of processing on these factors. The program is designed to demonstrate the application of laboratory methods to food systems.

FOOD1627

Technology of Cereal Products

Staff Contact: A/Prof M Wootton

CP7 S2 L2

Prerequisite: FOOD1537 or equivalent

World production of cereals: cultivation, diseases, harvesting and storage of cereal crops. Grain morphology and components, cereal quality, quality and yield improvements by breeding. Milling of wheat, flour types, flour testing, suitability for different purposes, flour component interactions in doughs, flour bleachers and dough improvers, baking technology. The use of non-wheat flours in bread and baked goods. Pasta products and breakfast cereals. Nutritional aspects of cereals. Starch-gluten separation, starch syrups. Malting, brewing, distilling and industrial alcohol production from cereals. Preparation, properties and uses of modified starches.

FOOD1637**Marine Products***Staff Contact: A/Prof M Wootton*

CP7 S2 L2

Prerequisite: FOOD1547 or equivalent

World fisheries, oceanographic factors and fish populations. Biochemistry and microbiology of growth, culture, harvesting and post-harvest handling. Cultivation of fish, molluscs, crustacea, modern and traditional methods. Biochemistry and microbiology of marine products in relation to freezing and preservation by the use of heat, chemicals and fermentation. Quality control parameters and fish inspection. Role of marine products in world nutrition. Possibilities for further exploitation of marine resources.

FOOD1647**Food Additives and Toxicology***Staff Contact: A/Prof M Wootton*

CP7 S1 L2

Functions, modes of action of food additives, consequences of use, ethical and legislative considerations. National, State and international attitudes and standards. Principles of toxicological testing, the evaluation of results.

FOOD1657**Postharvest Physiology and Handling of Fruit and Vegetables***Staff Contact: Dr JE Paton*

CP21 S1 L1 T5

Pre or Corequisite: FOOD1537 or equivalent

Biochemistry and physiology of metabolism in fresh fruit and vegetables; respiration measurements as an index of metabolism, maturation and senescence; concept of climacteric and non-climacteric produce; physiological and metabolic changes occurring during ripening. Effect of temperature on metabolism; constraints of high and low temperatures; role of humidity control and water loss in quality maintenance; use of atmosphere control to delay senescence and ripening. Physiological disorders of stored produce; microorganisms of importance to post-harvest tissue; physical and chemical methods of control; post-harvest disinfestation and quarantine measures. Examination of current commercial storage and marketing operations.

FOOD1667**Postharvest Storage of Foods***Staff Contact: Dr JE Paton*

CP21 S1 L2 T4

Prerequisite: FOOD1557 or equivalent

Pre-harvest considerations, post-harvest physiology and biochemistry, post-harvest factors affecting quality, methods of storage and handling, marketing strategies for selected food commodities.

FOOD1707**Seminar***Staff Contact: A/Prof H Greenfield*

CP7 F T1

Students present material arising from literature and/or laboratory assignments and/or plant investigations in the food and related industries. Critical assessments are made of the results of research in food science and technology.

FOOD1717**Major Research Project***Staff Contact: Prof KA Buckle*

CP63 F T9

A detailed investigation of a selected topic in food science and technology including submission of a project report. Available only to exceptional candidates.

FOOD1727**Research Project***Staff Contact: Prof KA Buckle*

CP42 F T6

An investigation of an aspect of food science and technology and submission of a project report.

FOOD1737**Minor Project***Staff Contact: Prof KA Buckle*

CP21 F T3

A study of an aspect of food science and technology and submission of a project report.

FOOD1747**Special Topics in Food Science and Technology***Staff Contact: Prof KA Buckle*

CP21 S1 or S2 T6

An individually supervised program of investigation in specialised aspects of food science and technology not otherwise offered. Embraces a literature review, laboratory work and/or industrial liaison as may be appropriate. Available only to appropriately qualified students.

FOOD1757**Special Topics in Food Science and Technology***Staff Contact: Prof KA Buckle*

CP10.5 S1 or S2 T3

An investigation similar to but shorter than that outlined in FOOD1747.

FOOD1767**Reading Assignment***Staff Contact: Prof KA Buckle*

CP3.5 SS T1

A reading assignment in an area supporting candidates' major disciplines or commodity interests. Presentation of a seminar may be required.

FOOD2507**Introductory Microbiology***Staff Contact: Prof GH Fleet*

CP14 S1 L2 T2

Note/s: Not offered in 1998.

This subject is designed as a prerequisite to FOOD2517 for students with very limited or no background in basic microbiology. It covers the fundamentals of microbial taxonomy, ecology, cytology and biochemistry and the basic technologies of microbial culture, isolation, enumeration and identification.

FOOD2517**Food Microbiology***Staff Contact: Prof GH Fleet*

CP14 S1 L2 T2

Prerequisite: FOOD2507 or other introductory microbiology subject

A lecture and laboratory program on the ecology, biochemistry, isolation, enumeration and identification of bacteria, yeasts, fungi and viruses associated with foods and beverages. *Food spoilage:* specific food/microorganism associations; taxonomy and biochemistry of major spoilage species; chemical and physical changes to food properties; control of spoilage of specific commodities. *Foodborne microbial disease:* foods as vectors of disease and food poisoning; statistics and epidemiology; ecology and taxonomy of foodborne pathogenic microorganisms; control and prevention by hygiene, microbiological standards and legislation. *Food fermentation:* microbial ecology and biochemistry of fermentations; fermentation of alcoholic beverages, bakery products, dairy products, meats, vegetables, cocoa beans, soy sauce; production of food ingredients and processing aids by fermentation. *Microbiological examination of foods:* sample preparation and sampling plans; sub-lethal injury; standard methods for determination of total plate counts, indicator organisms, foodborne pathogenic species, principal spoilage species. *Microbiological quality assurance:* specifications and standards; decision criteria; hazard analysis and critical control point (HACCP) concept; cleaning and sanitation.

FOOD2527**Microbiological Examination of Foods***Staff Contact: Prof GH Fleet*

CP21 S2 L2 T4

Prerequisite: FOOD2517 or equivalent

Detailed lecture and laboratory consideration of standard methods and new methods and technologies for the analysis of bacteria, yeasts and fungi in foods. Rapid cultural methods; immunoassay, DNA-probe, impedance, bioluminescence, image analysis, epifluorescence (DEFT), Petrifilm, computer identification of microorganisms. Measurement of cleaning and sanitation effectiveness. Sampling considerations. Interpretation of microbiological data in reference to specifications, standards, spoilage and public health risk. Detection and enumeration of specific microorganisms using new technologies.

FOOD2537**Microbiological Quality Assurance***Staff Contact: Dr JM Cox*

CP7 S1 L1 T1

Prerequisite: FOOD2507 or equivalent*Corequisite:* FOOD2527

A theoretical and practical consideration of the management of microbiological quality assurance. HACCP. Cleaning and sanitation. Microbiological specifications and regulations. Local and international approaches to obtaining safe food. Management and quality assurance in the microbiology laboratory.

FOOD2547**Food Microbiology Project***Staff Contact: Prof GH Fleet*

CP21 F T3

Prerequisite: FOOD2517

A study of an aspect of food microbiology and submission of a project report.

FOOD2557**Microbial Spoilage of Foods***Staff Contact: Dr JM Cox*

CP3.5 S2 L1

Prerequisite: FOOD2517

Consideration of major microbial groups responsible for spoilage yeasts, moulds, lactic acid bacteria, acetic acid bacteria, psychrotrophs, lipolytics, proteolytics. Specific commodity groups meat, dairy and fish products, fruits, vegetables. Impact of processing technologies on food spoilage and extension of shelf-life; biochemical basis of spoilage defects, taints; predictive considerations.

FOOD2567**Foodborne Microorganisms of Public Health Significance***Staff Contact: Dr JM Cox*

CP7 S2 L2

Prerequisite: FOOD2517*Corequisite:* FOOD2527

An advanced treatment of the ecology, epidemiology, properties, pathogenicity, methods of analysis, economic significance and control of pathogenic microorganisms in foods. *Salmonella*, *Shigella*, *Escherichia coli*, *Vibrio* sp., *Staphylococcus aureus*, *Bacillus* sp., *Clostridium perfringens*, *Clostridium botulinum*, *Yersinia*, *Listeria*, *Campylobacter*, *Aeromonas*, *Klebsiella*, viruses, fungi.

FOOD2577**Food and Beverage Fermentations***Staff Contact: Prof GH Fleet*

CP7 S2 L2

Prerequisite: FOOD2517

A detailed treatment of the microbial ecology, biochemistry, processing technology and quality parameters of fermented foods and beverages; cheese, yogurt, novel dairy products; meat sausages; bread, biscuit/cracker doughs; soybean products, soy sauce, tempe; traditional fermented products

of Asia and Africa; vegetables; cocoa beans; alcoholic beverages, beer, wine, champagne, distilled spirit.

FOOD2587

Microorganisms as Food Processing Aids and Ingredients

Staff Contact: Prof GH Fleet

CP3.5 S2 L1

Prerequisite: FOOD2517

This subject interfaces with biotechnology and considers the use of microorganisms as primary sources of processing aids and ingredients for food processing. The microbial production of vitamins, flavouring agents, amino acids, enzymes, pigments, thickening agents, fats and oils, modified proteins, organic acids. Use of microbial species as biocontrol agents to extend shelflife, as agents to improve the nutritive and therapeutic value of foods, immobilised cell and cell reactor technologies for conducting food and beverage bioconversions.

FOOD2597

Food Microbiology Seminar

Staff Contact: Dr JM Cox

CP7 S1 T1 S2 T1

Students present material arising from literature and/or laboratory assignments and/or plant investigations in the area of food microbiology. Critical assessments are made of the results of research in food microbiology.

FOOD2607

Food Microbiology Research Project

Staff Contact: Prof GH Fleet

CP42 F T6

An investigation of an aspect of food microbiology including a literature survey, experimental work and submission of a project thesis.

FOOD2617

Major Research Project in Food Microbiology

Staff Contact: Prof GH Fleet

CP63 F T9

A detailed investigation of a selected topic in food microbiology involving a literature survey, experimental work and submission of a project thesis. Available only to exceptional candidates.

FOOD3507

Introductory Nutrition

Staff Contact: A/Prof H Greenfield

CP10.5 S1 L2 T1

Role of nutrients in human structure and function. Effects of diet on growth and body size. Food habits, beliefs and choice; dietary patterns. Assessment of nutritional status; anthropometry, dietary intake studies, use of dietary recommendations, food groups, tables of food composition.

FOOD3517

Nutrition

Staff Contact: A/Prof H Greenfield

CP10.5 S2 L2 T1

Prerequisite: FOOD3507 or equivalent

Nutritional needs of vulnerable groups: infants, pregnant and lactating women, the aged. Dietary intolerance, disorders related to the affluent diet including coronary heart disease, dental caries, diabetes, hypertension and cancer. Problems of under-nutrition including protein, energy, mineral and vitamin deficiencies. Physiological and nutritional aspects of dietary fibre, alcohol and food intolerance. Measurement of nutrient intake using computer systems, on individual and group basis.

FOOD3527

Nutritional Evaluation of Foods

Staff Contact: Dr J Arcot

CP21 S1 L2 T4

Prerequisite: FOOD3517 or equivalent

Principles of nutrient analysis of foods by chemical and biospecific procedures. Sampling, quality assurance of analytical results, data scrutiny and compilation. Practical exercises in nutrient analysis of foods using bench, instrumental and biospecific techniques. Literature search.

FOOD3537

Public Health Nutrition

Staff Contact: A/Prof H Greenfield

CP7 S2 L2

Prerequisite: FOOD3527 or equivalent

Structure of the population. Food supplies, food consumption, food and nutrition policy, nutritional epidemiology. Population dietary references such as food balance sheets, nutrition monitoring and surveillance, dietary reference values. Food programs such as food fortification, supplementary feeding schemes, nutritional rehabilitation, nutritionally modified foods, nutritional regulations and standards, nutrition education, dietary and other nutrition interventions (ORT, family planning, infection control, growth monitoring). Principles and practice of applied nutrition programs. Evaluation of applied nutrition programs. Project work.

FOOD3547

Nutritionally Modified Foods and Ingredients

Staff Contact: Dr J Arcot

CP3.5 S2 L1

Prerequisite: FOOD3517 or equivalent

Special dietary and nutritionally modified foods. Modified viscosity foods, low allergen foods. Infant formulas, processed weaning foods, parenteral feeds, invalid foods, sports beverages. Intense sweeteners, fibrous ingredients, amino acids, micronutrients, fat replacers. Functional foods. Regulations and processes for nutritionally-modified foods. Literature search.

FOOD3557**Advanced Nutritional Science***Staff Contact: A/Prof H Greenfield*

CP7 S2 T2

Prerequisite: FOOD3527 or equivalent

Selected advanced topics e.g. nutrient bioavailability studies, nitrogen balance tests, vitamin load tests, sodium and potassium excretions, creatinine excretions, physical activity diaries, fitness assessment, biochemical assessment, design and evaluation of nutritional epidemiology studies, food intake studies, duplicate diet analyses.

FOOD4507**Food Engineering Principles***Staff Contact: Dr JL Paterson*

CP10.5 S2 L2 T1

Prerequisite: First year mathematics and physics or equivalents

Units and dimensions; system conversions; material, energy and momentum balance; steady state and transient heat transfer; insulation; heat exchangers; solid and fluid rheology; viscosity; pumps; mixing.

FOOD4517**Unit Operations in Food Engineering***Staff Contact: Dr RH Driscoll*

CP14 S2 L2 T2

Prerequisite: FOOD4507 or equivalent

Refrigeration; freezing; chilling and thawing; evaporation; dehydration; extraction; distillation; extrusion; comminution; filtration and separation; process control; packaging.

FOOD4537**Computing in Food Science***Staff Contact: Dr RH Driscoll*

CP7 S2 L1 T1

Prerequisite: An introductory statistics subject or equivalent

Introduction to the DOS operating system and WINDOWS. The use of statistical, graphics and other program packages to solve problems in food science and technology.

FOOD4557**Food Engineering Laboratory***Staff Contact: Dr JL Paterson*

CP10.5 S2 T3

Prerequisite: FOOD4587

Laboratory and pilot plant exercises illustrating the principles and procedures involved in food processing and food quality assessment.

FOOD4567**Food Engineering Field Work***Staff Contact: Dr JL Paterson*

CP10.5 S3 T1.5

Inspection of food processing factories, agricultural and food research establishments and food producing areas.

FOOD4587**Advanced Food Engineering A***Staff Contact: Dr RH Driscoll*

CP14 S1 L3 T1

Corequisite: FOOD4517 or equivalent

Extrusion of food products, membrane technology, refrigeration, chilling, freezing, thawing, tempering, cold room design, process control, numerical techniques and modelling.

FOOD4597**Advanced Food Engineering B***Staff Contact: Dr RH Driscoll*

CP14 S2 L3 T1

Corequisite: FOOD4517 or equivalent

Mechanical and chemical separation, evaporation, distillation, psychrometry, drying, dryers, mass/energy balances, calculation of drying time, commercial equipment, current drying research.

FOOD4607**Packaging and Production***Staff Contact: Dr JL Paterson*

CP14 S1 L3 T1

Chemical and physical properties of package materials; interaction between package and food; selection and evaluation of packaging materials and systems; package design criteria; printing; computers in packaging; modified atmospheres. Corrosion; scale-up; waste engineering; CIP systems; plant design.

Geography

GEOG9042**Environmental Impact Assessment***Staff Contact: Mr J Sammut*

CP12 S1 L2 T2

Environmental planning legislation and decision making processes in Australia with special reference to NSW. The content and structure of Environmental Impact Statements and the stages in the granting of development consent. Approaches to EIA with reference to the assessment of impacts on the natural, social and economic environments. Case studies exemplifying procedures, techniques, methods, and issues. Trends in EIA in Australia and selected other countries.

GEOG9150**Remote Sensing Applications***Staff Contact: Mr A Evans*

CP12 S1 L1 T2

The application of remotely-sensed data and information in the description, classification and assessment of earth resources and environmental conditions. Different types of remote sensing data and imagery, their attributes, acquisition and uses. Relevance of remote-sensing data

and imagery to a range of applications, including assessment of conditions of terrain, soils and surface materials; multi-temporal monitoring and inventory of rangelands, croplands and forests; rural and urban land use assessment; surveillance of surface water resources and sedimentation; appraisal of changes in the coastal zone. Use of remote sensing in environmental management and in environmental impact assessment.

GEOG9160

Directed Problems in Remote Sensing

Staff Contact: Mr A Evans

CP12 S2 T3

A detailed investigation of a particular aspect of remote sensing technology or an area of applications relevant to candidates interests and background.

GEOG9210

Computer Mapping and Data Display

Staff Contact: Prof B Garner

CP12 S1 L2 T2

Introduction to automated cartography and thematic mapping; theoretical and practical problems in displaying and mapping data by computer; review and application of selected computer mapping packages. MapInfo is used for cartographic manipulation and output.

GEOG9230

Population, Health and Environment

Staff Contact: A/Prof I Burnley

CP12 S2 L2 Not offered 1998

Relationship between environmental factors and disease morbidity and mortality is examined by consideration of the epidemiological transition in different countries, and the spatial and occupational-specific variation in disease incidence in Australia. Methodology for standardising, testing for significance and data quality.

GEOG9240

Principles of Geographic Information Systems

Staff Contact: School Office

CP12 S1 L1 T2

Study of selected geographic information systems; problems of data capture and display, data storage and manipulation, system design and development; cartographic displays and computer mapping. INFO is used for database management, and ARC/INFO and MAP for spatial data manipulation and display.

GEOG9241

Advanced Geographical Information Systems

Staff Contact: School Office

CP12 S2 L1 T2

Prerequisite: GEOG9240

Advanced topics and concepts in GIS research and development. Focus is primarily on vector-based systems. Topics include data models, structures and capture; vector editing and algorithms; errors and data accuracy. Practical exercises based on ARC/INFO; INFO is used for data base management.

GEOG9242

Transportation Applications of Geographical Information Systems

Staff Contact: Dr B Parolin

CP12 S2 L1 T2

Prerequisite: GEOG9240

This subject provides an overview and hands-on experience in the design, use, and interpretation of Transport Information Systems (GIS-T's). Topics covered include transportation layers, transportation related referencing systems, data structures, network structures, urban transportation planning models, logit and other spatial models. At the end of the subject, the student will have a sound working knowledge of transportation GIS and an ability to work directly with real problems in government and private sectors.

GEOG9250

Special Topic

Staff Contact: Dr MEC Sant

CP12 S1 or S2 T3

Selected topics may be pursued in the forum of individually supervised readings and assignments linked to studies in postgraduate programs offered through the School of Geography.

GEOG9280

Application and Management of Geographical Information Systems

Staff Contact: Prof B Garner

CP12 S1 L2 T1

The process and issues involved in an organisation acquiring, implementing and managing a GIS will be considered using real examples. Applications using GIS in the management of natural resources (forest, park, soil etc), human activities at the local, national and global scale will be critically reviewed. The course will involve field visits.

GEOG9290

Image Analysis of Remote Sensing

Staff Contact: Mr A Evans

CP12 S2 L1 T1

Techniques for extracting information from satellite imagery including image enhancement techniques, classification and feature recognition, statistical methods, and related procedures. Emphasis is on applications relating to vegetation cover and natural resource management. Practical work will be undertaken using the ERDAS image processing software.

GEOG9300

Vegetation management

Staff Contact: A/Prof M Fox

CP12 S2 L2 T1

Note/s: Fieldwork forms a compulsory part of this subject and students will incur personal costs.

The subject provides a background in theory and practice in vegetation management, particularly under Australian conditions. It covers the description and measurement of

vegetation, vegetation dynamics, vegetation response to perturbation and human impacts, theories, and modelling of vegetation change. A third of the subject is devoted to management strategies of selected vegetation types.

GEOG9310

River management

Staff Contact: Dr W Erskine

CP12 S2 L2 T1

Note/s: Fieldwork forms a compulsory part of this subject and students will incur personal costs.

The principles of river management including total or integrated catchment management, environmental impact assessment, in-stream uses and hydrogeomorphic behaviour. Issues covered include regulated rivers, inter-basin diversions, extractive industries, urbanisation, river engineering, legislative controls and institutional responsibilities. The course develops an understanding of how and why rivers respond to human activities and ways of ameliorating negative impacts. Field work is an essential part of the subject and the Nepean River will be used as a case study of management problems.

GEOG9320

Soil Degradation and Conservation

Staff Contact: A/Prof M Melville, Dr W Erskine

CP12 S2 L2 T1

Note/s: Fieldwork forms a compulsory part of this subject and students will incur personal costs.

Identification, assessment and analysis of the main processes of soil degradation, including the role of climate, vegetation, geomorphology and pedology in controlling the processes. Discussions of appropriate management strategies for reducing degradation and for reclaiming degraded landscapes. Topics include: surface wash, gully erosion, wind erosion, soil acidification, soil structure decline, salinisation, accumulation of toxins and desertification.

GEOG9330

Spatial Data Processing and Integration

Staff Contact: School Office

CP12 S1 L1 T2

Note/s: Not offered in 1998.

Geographical information systems and remote sensing have many similarities, including geometric rectification, incorporation of reference data into the analysis of GIS and remotely sensed data, accuracy assessment, the form and structure of the data, visual analysis of spatial data and digital processing methods (Boolean overlay, decision support systems, affine transformations and expert systems). These topics will be considered and applied in the laboratory using remotely sensed and GIS data. INFO is used for database management and ARC/INFO, ERDAS and MapInfo to demonstrate the practical application of the topics.

GEOG9512

Project

Staff Contact: Dr MEC Sant

CP48

An investigation of a problem in remote sensing or geographical information systems which involves an identifiable research component. Such an investigation should be related to the research interests of particular Schools within the Faculty of Science and Technology.

Marine Science

MSCI5001

Marine Environmental Monitoring and Assessment

Staff Contact: Director, Centre for Marine and Coastal Studies

CP12

This unit is designed to give each student an understanding of the various techniques used in monitoring a coastal environment. Physical, chemical, biological and geological methods are applied in a field situation. Field work is involved.

MSCI5002

Management of Marine Resources

Staff Contact: Director, Centre for Marine and Coastal Studies

CP6

This unit covers issues concerning exploitation of renewable and non renewable marine resources viewed from both economic and non economic frameworks. The management of marine resources with emphasis on fisheries and minerals is the central theme of the unit.

MSCI5003

Experimental Design and Analysis

Staff Contact: Director, Centre for Marine and Coastal Studies

CP6

Applications of statistics to marine science data. Probability, estimation statistics and tests of hypotheses. Experimental design, ANOVA, linear and multiple regression, multivariate analysis, non parametric methods. Emphasis is placed on the applications of computer software packages.

MSCI5004

Oceanographic Processes

Staff Contact: Director, Centre for Marine and Coastal Studies

CP12

The physical, biological and geological processes of the marine environment; the dynamics of ocean currents including surface waves, geostrophy, tides, upwelling subduction, basin scale gyres, El Nino: biological processes including primary formation of particulate matter, secondary production, biological cycles; geological processes.

MSCI5005**Topics in Marine Science**

Staff Contact: Director, Centre for Marine and Coastal Studies
CP48

Students choose 4 topics (each 4 hours per week for one session) from those listed below to make up the required contact hours per week. The topics chosen must be approved by the course co-ordinator: marine biology, aquaculture, zooplankton, marine botany, fisheries, coastal ecology, marine pollution, environmental microbiology, fluid dynamics, estuarine hydraulics, dispersion processes, instrumentation, coastal engineering, remote sensing, atmosphere-ocean dynamics, marine geology, coastal environmental assessment, aquatic chemistry, computers in chemistry, spectroscopic analysis, environmental chemistry, modern developments in chemical synthesis.

MSCI5006**Graduate Seminars in Marine Science**

Staff Contact: Director, Centre for Marine and Coastal Studies
CP12

A series of seminars of particular relevance to the practice of marine science. Includes both specialist topics in the disciplines that contribute to the marine sciences and detailed study and evaluation of case studies and contemporary issues in marine science.

MSCI5007**Marine Science Project**

Staff Contact: Director, Centre for Marine and Coastal Studies
CP24

A study of an aspect of marine science and submission of a project report. The project may be either experimental or theoretical in approach.

MSCI5008**Special Topic**

Staff Contact: Director, Centre for Marine and Coastal Studies
CP12

A special reading program and seminar course to cover perceived areas of special need. This subject is designed to meet the particular needs of individual students.

Materials Science and Engineering

MATS1092**Materials and Design 1**

Staff Contact: A/Prof AG Crosky
CP5 S2 L1 T1

An appreciation of the relationships between the properties of materials, component design, manufacturing and product performance. Materials selection as an integral part of

successful design. Long-term potential for materials improvement and substitution. Plant visits to selected materials processing plants.

MATS6005**Corrosion Project**

Staff Contact: School Office
CP30 F HPW6

A substantial project on some aspect of corrosion science or technology.

MATS6203**Materials and Design 2****Unit 1 Design for Corrosion Control (Unit 1 of MATS1203)**

Staff Contact: Prof DJ Young
CP5 S1 L1 T1

Electrochemical corrosion, types of corrosion, influence of alloying and heat treatment, influence of stress. Corrosion prevention, cathodic protection, passivation and inhibitors, selection of materials, designing against corrosion.

MATS6405**Graduate Materials Seminar**

Staff Contact: Prof CC Sorrell
CP10 F HPW2

Instruction in written and oral presentation of technical and scientific material at an advanced level, which involves a presentation by the candidate of a lecture on a selected topic.

MATS6475**Materials Science and Engineering**

Staff Contact: Prof CC Sorrell
CP15 F L2 T1

The characteristics of crystalline solids. Defect structure of crystals and influence of defects on their mechanical behaviour. Micromechanisms of elastic and plastic deformation. Microstructure and structure-property relationships of the main types of engineering materials (metals, ceramics, polymers and composites). Phase equilibria of alloys, microstructural control by thermomechanical processing and application to commercial engineering materials. Fracture mechanisms for ductile, brittle, creep, and fatigue modes of failure in service. Metallic corrosion and degradation of other classes of materials. Structure and properties of polymers. Mechanisms for the modification of properties. Structure and properties of ceramics. Composite materials. Design and development of materials for specific engineering applications. Appropriate laboratory and tutorial work.

MATS6485**Materials Technology**

Staff Contact: Prof CC Sorrell
CP15 F L1.5 T1.5

Material properties and their effect on component design, manufacturing, and product performance. Materials selection as an integral part of successful design. Long-term potential for materials improvement and substitution.

Plant visits to successful materials processing plants. Atomic and microstructural determination. X-ray production, absorption, and diffraction using powder and single crystal methods. Stereographic projections and crystal geometry. Application of diffraction methods to solid solutions and solubility limit, thermal analysis, stress measurement, and chemical stream analysis. Electron optics and analysis. Transmission and scanning electron microscopy. Energy-loss spectrometry. Microanalysis.

MATS6495

Corrosion Materials

Staff Contact: School Office

CP15 F L2 T1

Properties and efficient selection of materials for corrosion resistance. Applications in manufacturing, mining and process industries, in transportation equipment and in structures. Materials selection for service in particular environments.

MATS6535

Industrial Coatings for Corrosion Protection

Staff Contact: School Office

CP5 S1 L2

Special topics on heavy-duty organic, inorganic and metallic coatings used in atmospheric, marine and industrial environments.

MATS6545

Corrosion Technology

Staff Contact: School Office

CP15 F L3

Environmental fracture; corrosion in specific environments; corrosion of specific equipment types; principles of materials selection and design; surface preparation and maintenance coatings; polymeric materials and linings, inhibitors and electrochemical tests methods; cathodic protection.

MATS6555

Minor Graduate Materials Project

Staff Contact: Prof CC Sorrell

CP15 F HPW3

A small technical investigation or a design project, including a written report.

MATS6565

Major Graduate Materials Project

Staff Contact: Prof CC Sorrell

CP45 F HPW9

A substantial experimental or theoretical investigation, or design project, including a written thesis.

MATS7132

Structure and Properties of Metallurgical Phases

Unit 2 only

Staff Contact: A/Prof O Ostrovski

CP2.5 S1 or S2 L1

The atomistic and microscopic approach to melts in process metallurgy, liquid metals and slags. Relationships between

melt structure, mechanism and reaction kinetics in smelting and refining operations.

MATS7134

Structure and Properties of Metallurgical Phases

Unit 1 Structure and Properties of Solids

Staff Contact: School Office

CP7.5 S1 or S2 L1 T1

Application of defect solid state chemistry to materials preparation and reactivity. Non-stoichiometric and stoichiometric-dependent physical and chemical properties of metal compounds.

Unit 2 Structure and Properties of Melts

Staff Contact: A/Prof O Ostrovski

S1 or S2 L1

The atomistic and microscopic approach to melts in process metallurgy, liquid metals and slags. Relationships between melt structure, mechanism and reaction kinetics in smelting and refining operations.

MATS7144

Powder Metallurgy

Staff Contact: School Office

CP5S1 or S2 L1

Mechanisms of sintering in metals. Techniques of powder metallurgy, compaction, powder characteristics. Sintering in the presence of liquid phase, cementation, cermets. Preparation of super-alloys.

MATS7244

Advanced Electron Optics

Staff Contact: School Office

CP5 S1 or S2 L1 T1

See School for details.

MATS7470

Polymer Processing and Fabrication

Staff Contact: Dr S Bandyopadhyay

CP10 S1 L2 T2

Factors affecting quality and efficiency of extrusion, injection moulding and other fabrication techniques. Polymer viscous flow; viscometry; fluid flow and heat transfer in melt processing. Effect of polymer chemical structure, temperature and molecular weight upon flow properties. Computer simulation of polymer flow during processing.

MATS7480

Polymer Product Design

Staff Contact: Dr S Bandyopadhyay

CP5 S2 L2

Designing with polymeric materials. Selection and compounding of rubbers. Rubber modification of plastics. Polymer blending, mixing and recycling. Design of plastic and rubber components. Plant visits.

MATS7490**High Temperature Techniques**

Staff Contact: School Office
CP2.5 S1 or S2 L1

Experimental methods for the determination of thermophysical and thermochemical properties at elevated temperatures.

MATS7500**Mathematical Plasticity**

Staff Contact: School Office
CP2.5 S1 or S2 L1

Mathematical approaches to macroscopic plastic deformation; slip line field analysis, upper and lower bound techniques, finite element techniques. Application to estimation of loads and stresses developed during industrial deformation processes: rolling, drawing, bending.

MATS9421**Materials for Mining Engineers**

Staff Contact: Dr P Krauklis
CP10 S1 L2 T1 S2 L1

Session 1: Microstructure, phase equilibrium and properties of steels, light alloys, ceramics, polymer and composites. Metal forming by casting and mechanical working. Elastic and plastic deformation, recrystallisation, fracture, corrosion.

Session 2: Characterisation of materials by mechanical testing. Abrasive wear: gouging, high stress and low stress abrasion. Mitigation of abrasion. Abrasion resistant materials.

MATS9520**Engineering Materials**

Staff Contact: A/Prof AG Crosky
CP7.5 S1 L2 T1

Microstructure and structure-property relationships of the main types of engineering materials (metals, ceramics, polymers and composites). Micromechanisms of elastic and plastic deformation. Fracture mechanisms for ductile, brittle, creep and fatigue modes of failure in service; corrosion. Metal forming by casting and wrought processes. Phase equilibria of alloys; microstructural control by thermomechanical processing and application to commercial engineering materials. Laboratory and tutorial work includes experiments on cast and recrystallised structures, ferrous and non-ferrous microstructures and fracture and failure analysis.

MATS9530**Materials Engineering**

Staff Contact: Prof CC Sorrell
CP7.5 S1 or S2 L2 T1
Prerequisite: MATS9520

Materials used in Mechanical Engineering and related fields (Manufacturing Engineering Management, Aerospace Engineering, Naval Architecture) are discussed, with emphasis on the dependence of properties and performance on microstructure. Aspects of materials

selection during the design of engineering components, which affect the service performance in applications, where failure can occur by brittle fracture, corrosion, creep, or fatigue, will also be discussed.

MATS9640**Materials Science and Engineering for Electrical Engineers**

Staff Contact: Dr OC Standard
CP10 S2 L3 T1

Metallic, ceramic, organic, polymeric and composite materials and their technology for electrical engineering applications. Structures and structure property relations, phase equilibria and their effect on mechanical, electrical, magnetic, thermal and chemical properties. The shaping, treating and joining of materials. Aqueous and gaseous corrosion. Metallic glasses, superconductors, fast ion conductors. The role of materials science in the development of electrical energy systems.

MATS9650**Pyrometallurgical Processes**

Staff Contact: A/Prof O Ostrovski
CP5 S1 L2

Principles and development of pyrometallurgical processes and a review of the unit operations, roasting, sintering, smelting and refining for the treatment of ferrous and non-ferrous minerals.

MATS9712**Materials and Techniques in Design Craft 1**

Staff Contact: Prof CC Sorrell
CP10 S1 L2 T1

An introduction to the science and technology of materials, emphasizing relationships between structure, composition, and properties. Introduction to processing of metallic, ceramic, and fibrous materials. Materials recognition and design possibilities are discussed.

MATS9722**Materials and Techniques in Design Craft 2B**

Staff Contact: Prof CC Sorrell
CP7.5 S2 L1.5 T1.5

Casting, working, and surface finishing of metals and alloys. Soldering, brazing, and welding. Joining metals to glasses, ceramics, and gemstones.

MATS9732**Materials and Techniques in Design Craft 2C**

Staff Contact: Prof CC Sorrell
CP7.5 S2 L1.5 T1.5

Structures and properties of clays, non-clays, cements, porcelains, glazes, glasses, and other ceramics. Optical properties and colours of glasses, glazes, and gemstones. Forming and firing of ceramic bodies and reactions during firing. Kilns and oxidation/reduction effects.

Mathematics

Mathematics graduate subjects are not offered every year. Contact the School of Mathematics Office to see which subjects are offered in any particular year.

MATH5105

Numerical Analysis of Differential Equations

Staff Contact: School of Mathematics Office
CP12

Finite difference methods for the numerical solution of ordinary and partial differential equations. Initial value problems for first-order systems of ordinary differential equations – general one-step methods, extrapolation, Runge-Kutta methods, linear multistep methods, stability and backward-difference schemes for stiff problems. Time permitting, difference methods for parabolic and hyperbolic partial differential equations will be discussed.

MATH5110

Advanced Numerical Analysis

Staff Contact: School of Mathematics Office
CP12

Development and analysis of numerical methods for the computational solution of mathematical problems.

MATH5115

Topics in Numerical Analysis

Staff Contact: School of Mathematics Office
CP12

A selection of topics from: finite element methods, boundary element methods, approximation theory, integral equations and iterative techniques for matrix problems.

MATH5130

Advanced Mathematical Methods

Staff Contact: School of Mathematics Office
CP12

Fundamental methods for solution of problems in applied mathematics, physics and engineering.

MATH5155

Discrete Optimization

Staff Contact: School of Mathematics Office
CP12

Analysis, solution and application of optimization problems where the variables change discretely. Topics selected from: integer programming, network flows, scheduling problems, complexity theory, matroid theory, polyhedral combinations, and other areas of operations research.

MATH5165

Continuous Optimization

Staff Contact: School of Mathematics Office
CP12

Analysis, solution and application of optimization problems where the variables change continuously. Topics selected from: nonlinear programming, convex optimization,

nonsmooth analysis and optimization, variational inequalities and complementarity problems, infinite dimensional optimization, stochastic optimization, and numerical optimization.

MATH5170

Advanced Optimization

Staff Contact: School of Mathematics Office
CP12

Development, analysis and application of methods for optimization problems.

MATH5175

Topics in Optimization and Optimal Control

Staff Contact: School of Mathematics Office
CP12

Special topics in the analysis, solution and application of optimization and optimal control problems.

MATH5185

Topics in Modern Applied Mathematics A

Staff Contact: School of Mathematics Office
CP12

A selection of topics from optimization, optimal control and numerical analysis not offered in other graduate subjects.

MATH5205

Nonlinear Analysis

Staff Contact: School of Mathematics Office
CP12

The mathematical theory of nonlinear differential equations, whose behaviours may range from coherence to chaos. Major topics include soliton theory covering integrable partial differential equations and their method of solution using the inverse scattering method, asymptotic methods for nonlinear differential equations covering global techniques and singularity analysis, and functional and complex analytic methods of proving qualitative results for equations of physical interest.

MATH5215

Topics in Dynamics

Staff Contact: School of Mathematics Office
CP12

A selection of topics from: bifurcation theory, Hamiltonian systems, perturbation methods, the theory of solitons and chaotic systems.

MATH5245

Topics in Fluid Mechanics

Staff Contact: School of Mathematics Office
CP12

A selection of topics from: boundary layer theory, turbulent flows, stability theory, waves, viscous flows and computational techniques.

MATH5250**Advanced Fluid Dynamics**

Staff Contact: School of Mathematics Office
CP12

The mathematical modelling and theory of problems arising in the flow of fluids.

MATH5255**Waves**

Staff Contact: School of Mathematics Office
CP12

Hyperbolic waves, the first-order wave equation, Burgers equation, hyperbolic systems, gas dynamics and the wave equation. Dispersive waves, linear dispersive waves, wave patterns, linear and nonlinear theories of water waves, modulated waves including the weakly nonlinear theory, stability and wave resonances.

MATH5265**Atmosphere-Ocean Dynamics**

Staff Contact: School of Mathematics Office
CP12

The dynamics of large scale atmospheric and ocean circulation. Key concepts include geostrophy, potential vorticity, available potential energy and Ekman boundary layers and transport. Quasi-geostrophic models, eddies in the atmosphere and oceans and their role in the transport of heat and momentum and energy exchange. Windforced models for ocean gyres and the atmospheric circulation forced by meridional heating (including Hadley Cells). Additional topics may include tropical circulation and El Nino, air-sea exchange, climate change and the Greenhouse effect.

MATH5275**Topics in Modern Applied Mathematics B**

Staff Contact: School of Mathematics Office
CP12

A selection of topics from dynamics, fluid mechanics and oceanography not offered in other graduate subjects.

MATH5285**Ocean Modelling**

Staff Contact: School of Mathematics Office
CP12

Analytical and numerical modelling of ocean dynamics, and their interpretation. The course examines aspects of modelling of oceanic circulation using analytical and numerical modeling techniques. Theoretical analyses of the primitive equations will be used to identify individual physical processes such as surface Ekman layers, stratified flow over topography and wind-forced coastal currents under idealised conditions. A general numerical ocean model will be used to illustrate these results by comparison with the idealised analytical work, and by extension to more complex cases. Theoretical and practical aspects of model implementation will be considered including numerical stability, open boundary conditions, surface and convective mixed layer algorithms, as well as interpretation in the light of observations.

MATH5295**Atmospheric Modelling**

Staff Contact: School of Mathematics Office
CP12

Atmospheric dynamics and their simulation using numerical models. This course combines atmospheric dynamics and numerical modelling. It covers the following topics: derivation and interpretation of the equations governing the motion of the earth's atmosphere from the surface to just above the stratopause, the important types of wave motions supported by the governing equations, the use of scaling analysis to develop several distinct kinds of atmospheric models and the application of a range of numerical techniques to solving the equations governing these models. The last section will form the major part of the course, and will examine the various numerical algorithms in terms of accuracy, stability, consistency and efficiency. The choice of lateral boundary conditions also will be discussed in detail. During the course, computer laboratory sessions will be held and course participants will put together a working numerical model of their choice, from one of those introduced in the course. This model will be 'realistic' in the sense that it will produce 24 hour predictions of the state of the atmosphere using real (observed) data as initial and boundary conditions.

MATH5305**Computational Techniques**

Staff Contact: School of Mathematics Office
CP12

Topics covered are chosen from the following: stability of timestepping schemes, iterative methods for elliptic equations, including multigrid techniques, special treatment of nonlinear terms and outflow/radiation conditions. The emphasis is on finite differences, and the course involves a computer project.

MATH5315**Topics in Mathematical Computing**

Staff Contact: School of Mathematics Office
CP12

The design and implementation of accurate and efficient numerical methods, typically as programs in Fortran or C. Topics could include the use of advanced computer architectures such as vector and parallel processors.

Pure Mathematics**MATH5405****Automata and Formal Languages**

Staff Contact: School of Mathematics Office
CP12

Topics from: finite automata and regular languages, pushdown automata and contextfree languages, Turing machines and phase structure languages, computational complexity, $LL(k)$ and $LR(k)$ grammars.

MATH5415**Information and Coding**

Staff Contact: School of Mathematics Office
CP12

Topics from: error detecting and correcting codes, information and entropy, coding ergodic Markov processes, Shannon's Source Coding and Channel Coding theorems, perfect codes, Hamming codes, algebraic (B.C.H. and quadratic residue) codes, associated combinatorial structures, ciphers.

MATH5425**Fuzzy Logic and Neural Nets**

Staff Contact: School of Mathematics Office
CP12

Topics from: how fuzzy logic handles imprecise and vague concepts, fuzzy control theory, artificial neural nets and their learning algorithms, approximation by neural nets, supervised and unsupervised networks.

MATH5435**Applied Algebraic Computation**

Staff Contact: School of Mathematics Office
CP12

Introduction to Maple. Programming in Maple, with applications to include construction and analysis of computational algorithms. Manipulation of perturbation and Taylor series approximations to partial differential equations, manipulation of Taylor series approximations in the error analysis of discretised ordinary and partial differential equations.

MATH5505**Topics in Algebra**

Staff Contact: School of Mathematics Office
CP12

MATH5515**Topics in Analysis**

Staff Contact: School of Mathematics Office
CP12

MATH5525**Topics in Geometry**

Staff Contact: School of Mathematics Office
CP12

MATH5535**Topics in Number Theory**

Staff Contact: School of Mathematics Office
CP12

MATH5605**Operator Theory**

Staff Contact: School of Mathematics Office
CP12

Topics from: invariant subspaces, integral equations and Fredholm theory, functional calculus, decomposition theorems, Hankel and Toeplitz operators, operators on H_p spaces, Ergodic theory, semigroups.

MATH5615**Banach and Operator Algebras**

Staff Contact: School of Mathematics Office
CP12

Topics from: commutative Banach algebras and Gelfand theory, spectral theory of operators on Hilbert space, introduction to C^* and von Neumann algebras, relationship to group representations and ergodic theory.

MATH5625**Distributions and Partial Differential Equations**

Staff Contact: School of Mathematics Office
CP12

Topics from: derivatives, convolutions and Fourier transforms of distributions, weak solutions of differential equations, existence and uniqueness for the Cauchy problem, Holmgren's Theorem, elliptic boundary-value problems via the Schauder approach.

MATH5635**Dynamical Systems**

Staff Contact: School of Mathematics Office
CP12

Topics from: automorphisms of measure spaces, recurrence, ergodicity, entropy, conjugacy and orbit equivalence, topological dynamics with applications to number theory, fractals and chaos.

MATH5645**Number Theory**

Staff Contact: School of Mathematics Office
CP12

Topics from: elementary number theory, prime numbers, number theoretic functions, Dirichlet series, prime number theorem, continued fractions, diophantine approximation, quadratic reciprocity, algebraic number theory, class number theorem.

MATH5655**Homological Algebra**

Staff Contact: School of Mathematics Office
CP12

Topics from: concept of a category, additive and abelian categories, representable functors, exact sequences, homology, derived functors, Ext and Tor, relations with algebraic topology, derived categories, homological dimension.

MATH5665**Algebraic Topology**

Staff Contact: School of Mathematics Office
CP12

Topics from: functors and natural transformations, homotopy of maps, homotopy groups, covering spaces, simplicial and singular homology and cohomology, homological algebra.

MATH5675**Set Theory and Topology**

Staff Contact: School of Mathematics Office
CP12

Topics from: set theory, axiom of choice, ordinals and cardinals, topological spaces, compactness, quotient topologies.

MATH5685**Complex Analysis**

Staff Contact: School of Mathematics Office
CP12

Topics in advanced complex function theory chosen from the following: conformal mappings, analytic continuation, entire and meromorphic functions, elliptic functions, asymptotic methods, integral formulae, harmonic functions, Riemann surfaces.

MATH5695**Stochastic Differential Equations**

Staff Contact: School of Mathematics Office
CP12

Topics from: Brownian motion, Itô calculus, Malliavin calculus, Girsanov's theorem, Clark's theorem, the Harrison-Pliska model of option pricing.

MATH5705**Commutative Harmonic Analysis**

Staff Contact: School of Mathematics Office
CP12

Topics from: Fourier series and integrals for T_n and R_n , locally compact abelian groups, Pontrjagin duality, Plancherel Theory.

MATH5715**Non-Commutative Harmonic Analysis**

Staff Contact: School of Mathematics Office
CP12

Topics from: locally compact groups, Haar measure, homogeneous spaces, convolution algebras, representations, irreducibility, induced representations, Mackey theory, compact groups, Peter Weyl theory, nilpotent groups, Kirillov theory.

MATH5725**Lie Groups and Algebras**

Staff Contact: School of Mathematics Office
CP12

Topics from: revision of manifolds and linear algebra, topological groups, Haar measure, Lie groups, Lie algebras, substructures, classification of semi-simple complex Lie algebras, highest weight representations.

MATH5735**Advanced Algebra**

Staff Contact: School of Mathematics Office
CP12

Topics from: rings, commutative rings, factorization theory, modules, associative and Lie algebras, Wedderburn theory, category theory.

MATH5745**Group Theory**

Staff Contact: School of Mathematics Office
CP12

Topics from: abelian, nilpotent and solvable groups, further representation theory, Euclidean reflection groups, Chevalley groups, group homology and cohomology, group extensions.

MATH5755**Mathematical Foundations of Quantum Mechanics**

Staff Contact: School of Mathematics Office
CP12

Topics from: origin and interpretation of Schrödinger's equation, unbounded operators on Hilbert space, spectral theory, functional calculus and time evolution, the role of symmetry groups, irreducible and induced representations.

MATH5765**Algebraic Geometry**

Staff Contact: School of Mathematics Office
CP12

Topics from: algebraic curves, cohomology, Riemann-Roch theorem, elliptic curves, Jacobians, classical projective geometry, quadrics, cubic surfaces, Grassmanians, Schubert calculus, commutative algebra, modules, homological concepts, dimension.

MATH5775**Calculus on Manifolds**

Staff Contact: School of Mathematics Office
CP12

Topics from: manifolds, vector fields, flows, introduction to Morse theory, differential forms, Stokes theorem, de Rham cohomology.

MATH5785**Geometry**

Staff Contact: School of Mathematics Office
CP12

Topics from: axiomatic geometry, affine geometry, Desargues theorem, projective geometry, spherical and hyperbolic geometry.

Statistics**MATH5806****Applied Regression Analysis**

Staff Contact: School of Mathematics Office
CP12

Generalised linear models. Ridge regression. Analysis of residuals. Nonlinear regression.

MATH5815**Experimental Design 1***Staff Contact: School of Mathematics Office*

CP12

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory.

MATH5816**Mathematics of Security Markets 2***Staff Contact: School of Mathematics Office**Prerequisite: MATH5965*

CP12

More advanced applications of stochastic calculus to security markets.

MATH5825**Experimental Design 2***Staff Contact: School of Mathematics Office**Prerequisite: MATH5815*

CP12

Extensive treatment of random and mixed models. Combinatorial structure of designs, crossover and lattice designs, response surfaces.

MATH5826**Statistical Methods in Epidemiology***Staff Contact: School of Mathematics Office*

CP12

Measures and models of disease association, relative risks and odd ratios, attributable risk, interactions, Mantel-Haenszel formulae, confounding, logistic regression, survival analysis.

MATH5835**Stochastic Processes***Staff Contact: School of Mathematics Office*

CP12

Random Walk and Exponential Random Walk: interpretation in Mathematical Finance, martingales. Wiener Processes: calculation of functionals and distributions related to the Wiener process, reflection principle and barrier problem. Stochastic integration: Ito formula, calculations based on the Ito formula. Linear and bilinear stochastic differential equations: interpretation in Mathematical Finance, connections with partial differential equations, pricing of simple options. The Girsanov Theorem: linear barrier problem, examples of exotic options.

MATH5845**Time Series***Staff Contact: School of Mathematics Office*

CP12

Spectral estimates, discrete and continuous spectra. Periodogram analysis. Probability theory, special processes. Ergodicity and linear filters. Estimation and hypothesis testing.

MATH5855**Multivariate Analysis 1***Staff Contact: School of Mathematics Office*

CP12

Likelihood ratio tests for means, variances and structure. Discriminant, principal component, canonical and factor analysis. Computing will feature prominently.

MATH5865**Multivariate Analysis 2***Staff Contact: School of Mathematics Office*

CP12

The general linear hypothesis and analysis of dispersion. Tests based on roots, distribution theory.

MATH5875**Sample Survey Design***Staff Contact: School of Mathematics Office*

CP12

Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multistage sampling.

MATH5885**Sequential Analysis***Staff Contact: School of Mathematics Office*

CP12

The sequential probability ratio test OC and ASN functions. General theory of sequential tests. Sequential estimation.

MATH5895**Nonparametric Methods***Staff Contact: School of Mathematics Office*

CP12

Sign test, run tests, goodness of fit tests. Order statistics and range. Rank order statistics. Wilcoxon and signed rank tests, one and two-way rank analyses of variance. Rank correlation. Randomization theory and permutation tests. Paired comparisons. Censoring and truncation.

MATH5905**Statistical Inference***Staff Contact: School of Mathematics Office*

CP12

Decision theory. General theory of estimation and hypothesis testing.

MATH5915**Medical Statistics***Staff Contact: School of Mathematics Office*

CP12

Bioassay, generalised linear models, analysis of multivariate discrete data including loglinear model analysis of contingency tables, survival analysis, competing risks, hazard models for point processes.

MATH5925**Project**

Staff Contact: School of Mathematics Office
CP36

A thorough study of a set of statistical papers or some workplace problem of the student's choice.

MATH5935**Statistical Consultancy**

Staff Contact: School of Mathematics Office
CP12

This is a practical subject which introduces students to the general framework of statistical consulting and gives students experience in solving statistical problems arising in practice.

MATH5945**Categorical Data Analysis**

Staff Contact: School of Mathematics Office
CP12

Logistic models. Loglinear models. Multiway contingency tables. Ordered categories. Implementation of techniques in a statistical package.

MATH5955**Statistical Quality Control**

Staff Contact: School of Mathematics Office
CP12

Lot acceptance sampling plans. Acceptance inspection for continuous production. Process control charts. Multicharacteristic quality control. Economic design of control plans. Quality evaluation.

MATH5965**Mathematics of Security Markets 1**

Staff Contact: School of Mathematics Office
CP12

Derivative securities, forward and futures contracts, swaps. Option pricing using Black Scholes and binomial approaches. Stochastic models for asset dynamics, term structure of volatilities and interest rates. Introduction to Itô calculus, diffusion processes and stochastic differential equations.

MATH5975**Economic Quality Control Models**

Staff Contact: School of Mathematics Office
CP12

Prerequisite: MATH5955

Economic design of acceptance sampling plans. Economic design of process control charts. Quality evaluation. Tolerance design and tolerancing. Taguchi's online quality control. Online process parameter design, process improvement methods and preventive maintenance.

MATH5985**Industrial Designs**

Staff Contact: School of Mathematics Office
CP12

Prerequisite: MATH5815

The economics of reducing variation. Analysis of variance. Orthogonal arrays. Multiple level experiments. Special designs. Attribute data. Taguchi's offline quality control. Offline process parameter design.

MATH5045**Advanced Mathematics for Electrical Engineers**

Staff Contact: School of Mathematics Office
CP12

Boundary value problems in partial differential equations. Selected topics from complex variable analysis, integral transforms, and orthogonal functions and polynomials.

Medicine

CMED9610**Food and Nutrition Policy Studies**

Staff Contact: Ms L Bloomfield
CP10 S2 External

The relationship between population, health and the food and nutrition system, i.e. the production, distribution and consumption of food. Discussion of development of intersectorial policies and strategies addressing specific segments of the food and nutrition system to improve the health of vulnerable populations in developed and developing countries. Students will work through a case study and demonstrate their understanding by preparing, presenting and defending a proposed food policy for a specified population or community group.

Microbiology and Immunology

MICR6043**Alternative Higher Degree Qualifying Program**

Staff Contact: Prof A Lee
CP120

Similar in standard to MICR4013 Microbiology Honours, but designed for students who cannot regularly attend the University.

Oceanography

Administered by the School of Mathematics. Please contact Dr John Middleton.

OCEA5115

Experimental Project in Physical Oceanography CP72

A report of an experimental project, including recording, preparation, analysis and interpretation of field or laboratory data.

OCEA5125

Geophysical Fluid Dynamics CP15

Aspects of the physical features of the oceans. Includes ocean waves rotational and gravitational, tides, large scale wind driven ocean circulation, coastal dynamics, thermohaline circulations and mixing processes.

OCEA5135

Instrumentation CP6

Laboratory, moored, shipborne, airborne and space instrumentation commonly used in oceanographic experiments; their applications and limitations.

OCEA5145

Applied Time Series Analysis CP15

Classification of random processes, sampling for discrete analysis, Fourier analysis, spectra, filtering. Crossspectra, estimation and hypothesis testing, confidence limits, application to experiment planning. Emphasis on computer analysis of actual data.

OCEA5155

Theoretical Project in Physical Oceanography CP32

A theoretical project aimed at developing the prediction of oceanographical phenomena, tailored to meet individual student background but taken only by those students with a strong theoretical background.

Optometry

Initial contact for these subjects should be directly with the School of Optometry. All units are full year course.

OPTM8001

Advanced Clinical Optometry CP30

Clinical work on selected patients with special emphasis on advanced techniques and new developments. Optometric examination procedures including: gonioscopy,

slit lamp fundoscopy, binocular indirect ophthalmoscopy and scleral depression; ultrasonography; corneal topography; ocular photography; computerised visual field analysis; visual functions; low vision; optometric co-management; evaluation of binocular functions; geriatric and paediatric optometry; the clinical application of electrophysiological techniques. Assessments of new instruments, methods and treatments.

This subject is offered as either a domestic option at the University of New South Wales, or as an overseas option at the Pennsylvania College of Optometry in Philadelphia, USA. The overseas option involves a 4 week period at PCO; travel and accommodation costs are to be met by the candidate.

OPTM8002

Physiological Optics CP30

Note/s: Subject not offered in 1998.

Advanced pathophysiology of the anterior eye; physiology and pharmacology of the intraocular pressure. Physiology of the corneal epithelium, endothelium, stroma. Physiology and biochemistry of the tears. Modern studies in the development and physiology of ametropia. Perceptual organisation of the retinal image; neural networks in the retina and their mathematical analogs; visual transfer functions. Electrophysiological analysis of cortical processing; electrophysiological analysis of retinal function in normal and pathological cases. The electro-oculogram, electromyography. Advanced ocular biometry. Colour vision physiology and psychophysics. Temporal and spatial effects. Defective colour vision. Parafoveal colorimetry. Colour scales and colour spaces.

OPTM8003

Behavioural Optometry CP30

An integrated subject, in which binocular vision and pleorhoptics are studies from theoretical and clinical viewpoints. Clinical experience is provided by selected patients. Includes: the nature and control of eye movements and role in maintaining the perception of a stable visual world. Binocular and monocular subjective visual directions. The neurophysiological substrate of binocular vision and its phenomena. Stereopsis and its measurement. Accommodation, convergence, and oculo-motor imbalance. Laboratory and clinical methods of measuring eye position and visual directions. The aetiologies, measurements and treatment of strabismus, anomalous correspondence, eccentric fixation amblyopia.

OPTM8004

Advanced Contact Lens Studies CP30

Current concepts in anatomy and physiology of the cornea and tear film, and microbiology and pathophysiology in relation to contact lens wear. New developments in contact lens materials, design and lens care systems. Optics and fitting of contact lenses in relation to optics of the eye, corneal topography, and eyelid characteristics. lens

manufacturing techniques, patient screening, predictive testing, and advanced lens fitting techniques. Managing symptoms and adverse eye effects. Dealing with lens dehydration. Managing therapeutic and post-surgical cases. Contact lens interactions with medications and environmental agents. Special applications of contact lenses in research and industry. Future trends in industry R & D and marketing for contact lenses and associated products. Refractive surgery and alternative forms of vision correction.

OPTM8005

Advanced Contact Lens Practice

CP30

Note/s: Subject not offered in 1998.

New instrumentation for ocular evaluation and measurement. Anterior segment photography. Clinical comparison of contact lens and care system products. Bifocal, toric, and extended wear lens evaluation. Design, manufacture, verification, and modification of lenses, from the manufacturer's perspective. Lens fitting for sports vision, specialty cases, keratoconus, and cosmetic applications. AIDS management in contact lens practice. Patient instruction and management. Contact lens practice in the health care industry. Practice management, staffing, economics, inventory control, marketing. Application of quality and customer service concepts to contact lens practice.

OPTM8006

Occupational Optometry

CP30

Note/s: Subject not offered in 1998.

Visual and general ergonomics. Illuminating Engineering. Human factors engineering. Anthropometry. Task analysis. Physical and chemical hazards. Radiation effects and hazard analysis. Risk engineering. Workplace design and modification. Ocular and visual factors on specific tasks. Visual fitness. Vision screening. Legal aspects. Issues in common visually based activities. The subject matter will comprise consideration of subject matter at a higher level than in the undergraduate course in a seminar format and include up to half the time at work sites.

OPTM8007

Clinical Photography

CP30

Note/s: Subject not offered in 1998.

Introduction to clinical photography, cameras and lens systems, colour films, black-and-white films and filters, apparatus and accessories. Patient preparation and lighting. Copying, slide making, macrophotography. Computer hardware and software available for slide production for lecture presentation. Dark room techniques, anterior eye photography, and fundus photography with hydriatic and non-hydriatic equipment. Image analysis and its application to fundus interpretation, photo-refraction and corneal modelling systems and including medical imaging techniques such as CAT scans, NMI and PET. Video equipment, ophthalmic applications, editing and production

of videotapes. The subject matter will comprise of subject matter at a higher level than in the undergraduate course. Emphasis will be placed upon the development of practical skills and the application of the attained information to patient management.

OPTM8008

Project

CP30

An investigation into some aspect of Optometry or Visual Science.

OPTM8009

Ocular Therapy

CP30

Objectives: Familiarity with clinical pharmacology, biochemistry, pharmacology. Theory and practice of the use of ocular therapeutics in the treatment of eye disease.

Brief curriculum: Biochemistry and pharmacology of therapeutic and diagnostic drugs. Contemporary review of cardiovascular disease and common therapy. Clinical Pharmacology. Pharmacoepidemiology. Contemporary review of anterior eye microbiology. Nature and treatment of disease of the anterior and posterior eye. Treatment of uveitis and glaucoma. Co-management, pre and post surgery. Treatment of systemic-related eye disease. Refractive surgery. Clinical techniques.

Assessment: Clinical examination 20%, written examination 80%.

OPTM8010

Public Health Optometry

CP30

Note/s: Subject not offered in 1998.

Structure of the Australian health care system. Optometry's present and future role in the health care system. Comparative study of health care systems. Optometry in the multi-disciplinary health care system. Quality assurance in health care. Demography and epidemiology. Social issues and optometric involvement. Disease management. Law and ethics.

OPTM8011

Advanced Studies in Ocular Disease

CP30

Note/s: Subject offered by distance education only.

Application of basic sciences and pathology to the understanding of pathophysiological mechanisms in a range of ocular diseases. Basic sciences include cell biology, biochemistry, microbiology and immunology. Basic pathology includes inflammation, infection, immune disease, neurological disease, vascular disease and differentiation anomalies. Specific disease processes studied include diabetes and diabetic eye disease; presbyopia and cataract; anterior segment disease; glaucoma; dry eye disease; refractive surgery; diseases of the optic nerve; diseases of the vitreous & retina; macula diseases.

OPTM8012**Visual Neuroscience**

CP30

Note/s: Subject not offered in 1998.

Visual development, neural plasticity and critical periods. Non-visual influences on visual function. Visual neuro-pharmacology. The neuroscience of form, colour, motion and depth processing, spatial and temporal mechanisms, shape and object perception. Sub-cortical pathways. Parallel processing in the visual system: the magno and parvocellular systems. Parallel processing. Organisation of the cerebral cortex. Parietal function its inputs and vision. Frontal cortex and visually directed activities. Visual cognition. Cerebral lateralisation. Visuo-motor co-ordination. Accommodation and vision. After effects and apparent motion, interocular transfer, psychophysical constancies. Object recognition and primitives. Fixation and attention. Oculomotor system – saccades, voluntary eye movements, visual direction, nystagmus. Neuroscience of visually directed activities.

OPTM8014**Human Visual Development**

CP30

Note/s: Subject not offered in 1998.

Development of vision in relation to motor/ language/ mentation/laterality. Development of temporal concepts. Sequencing. Critical periods in vision and other modalities. Amblyopia and suppression.. Visual cognition and its development. Cortical plasticity in adults – a possibility for rehabilitation. Perceptual constancies. Visual attention and neglect in development. Organisation of the motor system. Motor system development disorders. Non-visual influences on the development of visual function.

Physics

Not all graduate subjects are necessarily offered in any one year. Initial contact should be made with A/Prof RJ Stening.

PHYS7611**Computational Physics***Staff Contact: School Office*

SS HPW3

Contents to be advised.

PHYS9583**Advanced Theoretical Physics***Staff Contact: A/Prof RJ Stening*

CP7.5 S3 HPW1

Prerequisite: none

A field theory approach to condensed matter physics. Field theory and critical phenomena, exactly soluble models, low-dimensional quantum spin models. Content may vary from year to year.

PHYS9683**Advanced Astrophysics***Staff Contact: A/Prof RJ Stening*

CP7.5 S3 HPW1

Prerequisite: none

Radio astronomy and interferometry; the structure of the galaxy; optical and infrared astronomy – instrumentation and data reduction; the extragalactic distance scale. Content may vary from year to year.

PHYS7159**Acoustic Theory**

Sources of acoustic radiation; simple, dipole, quadrupole, plane, impulsive source, random source, aerodynamic sources. Free field propagation in fluids, interference and diffraction, absorption, shock waves. Boundary effects: reflection and transmission at fluid/fluid and fluid/solid interfaces, fluid waveguides, solid waveguides. Reception and analysis; transducers. Fourier analysis, statistical methods, impulse measurement.

Psychology

PSYC6000**Alternative Higher Degree Qualifying Program***Staff Contact: Dr J Cranney*

CP120F

Refer to the School of Psychology for details.

PSYC7000**Research and Evaluation Methods***Staff Contact: Dr K Bird*

CP15 S1 HPW2

An examination of threats to the validity of casual inferences from randomised experiments, quasi-experiments and passive observational studies, with particular reference to field studies and programme evaluations. Statistical power analysis, the analysis of data from nonequivalent control group designs, interrupted time series analysis, and structural modelling.

PSYC7001**Psychological Assessment 1***Staff Contact: Dr P Atkins*

CP15 S1 HPW3

A theoretical basis, background information and practical skills in methods of assessment typically used in clinical and industrial psychology. Theory and research on interviewing, introduction to DSM IVR, assessment interviewing, assessment of intellectual functioning, test access and use and computerised testing, neuropsychological and organicity assessment, personality assessment and its use, assessment and goal attainment scaling, and ethical, legal and professional issues.

PSYC7002**Psychological Assessment 2***Staff Contact: Dr K Bird*

CP15 S2 HPW2

Prerequisite: PSYC7001

The psychometric foundations of psychological assessment. Classical and modern test theory. Item analysis and item response theory. Differential change measurement. Single case profile analysis, with applications to the WAIS-R and WISC-3. Applications of exploratory and confirmatory factor analysis to test construction and evaluation. Clinical and statistical prediction. Decision theoretic approaches to testing and assessment. The use of intraclass correlations to evaluate the reliability of ratings and other assessment methods.

PSYC7003**Graduate Colloquium***Staff Contact: School Office*

CP15 F HPW2

Participation in the Postgraduate Student Seminar and attendance at the School Colloquium.

PSYC7004**Professional and Ethical Issues***Staff Contact: Prof K McConkey*

CP15 S1 HPW2

An examination of the organisation and regulation of psychology as a profession, with particular emphasis on the ethical and legal requirements expected of a professional psychologist. Special attention given to the code of professional conduct and ethical dilemmas and issues that arise in the context of working with individuals, cultural groups, organisations, other professionals and the public at large. Topics dealing with contemporary issues explored in depth (e.g. marketing psychology, political influencing skills in large organisations, psychologists contribution to such areas as the environment, policing and law etc.).

PSYC7100**Psychology of Human Resources 1***Staff Contact: Dr S Schneider and Dr A Williamson*

CP15 S1 HPW2

General framework for understanding organisational settings and how social structures and procedures affect work motivation, job satisfaction, performance and health. Emphasis placed on the particular contribution which psychologists can make to such areas as job analysis and design, selection, and performance appraisal, interpersonal and intergroup relations, the socio-technical analysis of production systems, social influence, leadership style, job enrichment, and communication patterns.

PSYC7101**Psychology of Human Resources 2***Staff Contact: Dr S Schneider and Dr A Williamson*

CP15 S2 HPW2

Prerequisite: PSYC7100

An advanced examination of some topics covered in PSYC7100 Psychology of Human Resources 1 with a particular emphasis on the application of sound measurement and research principles to selection, job evaluation and work motivation. Special attention given to the application of social psychological principles to the work setting.

PSYC7102**Psychological Principles of Training***Staff Contact: Dr J Bright*

CP15 S2 HPW2

Relevant principles from learning theory and cognitive psychology applied to training in industry and retraining for new technology. Training for adaptability and transfer; the important role of automaticity and attitudes in training. Development of work related cognitive, motor and social skills, and the use of computerised packages. Research on the effectiveness of different methods of training.

PSYC7108**Research Thesis (Applied)***Staff Contact: Dr S Schneider*

CP90 F

Research thesis involving an investigation into some aspect of applied psychology.

PSYC7115**Vocational Interviewing and Counselling***Staff Contact: Dr G Huon*

CP15 S2 HPW2

The theory and practice of vocational interviewing and counselling, and approaches to career decision making and work adjustment throughout life. The role of occupational information and psychological tests, and the impact of work, leisure, retirement and unemployment on these areas will be considered. The specific problems of minority groups in these areas will be highlighted.

PSYC7116**Occupational Health and Stress***Staff Contact: Dr J Bright*

CP15 S2 HPW2

Note/s: Excluded PSYC7220

The impact of work on the individual. Models of stress, stress transmission and health. Health and safety legislation and interventions to promote health and safety through the design of work and of the work place.

PSYC7117**Advanced Topics in Applied Psychology**

Staff Contact: Dr A Williamson
CP15 S1 HPW2

Advanced treatment of established and emerging areas in applied psychology.

PSYC7118**Professional Practice (Applied) 1**

Staff Contact: Dr J Bright
CP15 S1

Attendance at weekly professional practice meetings and career development workshops (2 hours) and the completion of placements to a total of 250 hours.

PSYC7119**Professional Practice (Applied) 2**

Staff Contact: Dr J Bright
CP15 S2

Prerequisite: PSYC7118

Attendance at weekly professional practice meetings and career development workshops (2 hours) and the completion of placements to a total of 250 hours.

PSYC7120**Professional Practice (Applied) 3**

Staff Contact: Dr J Bright
CP15 S1

Prerequisite: PSYC7119

Note/s: Excluded PSYC7105

Attendance at weekly professional practice meetings and career development workshops (2 hours) and the completion of placements to a total of 250 hours.

PSYC7121**Professional Practice (Applied) 4**

Staff Contact: Dr J Bright
CP15 S2

Prerequisite: PSYC7120

Note/s: Excluded PSYC7105

Attendance at weekly professional practice meetings and career development workshops (2 hours) and the completion of placements to a total of 250 hours.

PSYC7204**Child Clinical Psychology**

Staff Contact: A/Prof P Lovibond
CP15 S1 HPW2

Description, assessment and treatment of child and adolescent psychopathology. Role of constitutional and environmental factors in behavioural and emotional dysfunction. Theoretical bases of behavioural, cognitive, and family treatment approaches. Integrated cognitive behavioural management programs.

PSYC7206**Research Thesis (Clinical)**

Staff Contact: Dr R Bryant
CP90 F

A research thesis involving an investigation into some aspect of clinical or community psychology.

PSYC7209**Developmental Disabilities**

Staff Contact: A/Prof J Taplin
CP15 S2 HPW2

An essentially practical subject focusing on childhood disorders, such as mental retardation, infantile autism, physical and sensory handicaps, specific learning difficulties, and hyperactivity. Methods of assessment include standardised tests of child development, behavioural checklists and interviews, and observation of present behaviour. Behavioural change procedures that may be effective in the treatment and management of the behavioural problems in question.

PSYC7210**Human Neuropsychology**

Staff Contact: Dr S McDonald
CP15 S2 HPW3

Neural bases of human behaviour, with particular emphasis on clinical applications. Issues in assessment and rehabilitation, functional analysis of each cerebral lobe, and particular disorders such as the dementias and aphasia.

PSYC7212**Experimental Clinical Psychology 1**

Staff Contact: Dr R Bryant
CP15 S1 HPW4
Corequisite: PSYC7213

An introduction to clinical practice and covers the major anxiety and mood disorders. Topics covered include: interviewing, diagnosis, mental state examination, case formulation, and introduction to treatments.

PSYC7213**Experimental Clinical Psychology 2**

Staff Contact: A/Prof P Lovibond
CP15 S1 HPW2
Corequisite: PSYC7212

Models and research strategies for understanding psychopathology and clinical interventions. Specific disorders are analysed in detail to illustrate more general themes: the relationship between genetic and environmental factors in aetiology, the integration of laboratory and clinical evidence, and the status of biological, behavioural and cognitive models of dysfunction and treatment.

PSYC7214**Experimental Clinical Psychology 3***Staff Contact: Dr J Henry*

CP15 S2 HPW4

Prerequisites: PSYC7212 and PSYC7213

A continuation of the problem-oriented approach begun in PSYC7212 and deals with a number of common psychological problems and approaches to their treatment. Topics covered include: social skills, psychopharmacology, eating disorders, and personality disorders.

PSYC7215**Experimental Clinical Psychology 4***Staff Contact: Dr R Bryant and Dr J Henry*

CP15 S1 HPW2

Prerequisite: PSYC7214

The assessment and management of a range of disorders including schizophrenia, post-traumatic stress disorders, and dissociative disorders.

PSYC7216**Professional Practice (Clinical) 1***Staff Contact: Dr R Bryant and Dr J Henry*

CP15 S1

Attendance at weekly clinical meetings (1 hour) and skills training workshops (2 hours).

PSYC7217**Professional Practice (Clinical) 2***Staff Contact: Dr J Henry*

CP15 S2

Prerequisite: PSYC7216

Attendance at weekly clinical meetings (1 hour) and skills training workshops (2 hours), and supervised work with clients in the Psychology Clinic (70 hours for session).

PSYC7218**Professional Practice (Clinical) 3***Staff Contact: Dr R Bryant and Dr J Henry*

CP15 S1

Prerequisite: PSYC7217

Note/s: Across PSYC7218 and PSYC7219 students must complete three field placements, one must be at least 27 days while the other two are completed in at least 36 days (800 hours total).

Attendance at weekly clinical meetings (1 hour), supervised work with clients in the Psychology Clinic (70 hours for session) and field placements.

PSYC7219**Professional Practice (Clinical) 4***Staff Contact: Dr J Henry*

CP15 S2

Prerequisite: PSYC7218**Note/s:** See note under PSYC7218.

Attendance at weekly clinical meetings (1 hour), supervised work in the Psychology Clinic (70 hours for session) and field placements.

PSYC7220**Psychology of Health and Illness***Staff Contact: Dr J Henry*

CP15 S2 HPW2

Prerequisite: PSYC7214**Note/s:** Excluded PSYC7116.

Applications of psychological principles, derived from human and animal research, to human health, including health promotion, risk factor reduction, and the psychological assessment and management of medical illnesses, with a special focus on chronic illnesses.

Safety Science**SESC9011****Physical Principles of Safety***Staff Contact: Ms Sharon Walt*

CP12

Solid mechanics: Force systems, friction equilibrium and stability, linear and rotational motion, energy, momentum, collisions, simple machines, stress strain relationships, bending stress, applications in safety and biomechanics. Fluid mechanics: properties of fluids, static and dynamic pressure in flowing systems, laminar and turbulent flow, friction losses. Forces on submerged objects, buoyancy, ship stability. Hydraulic and pneumatic systems. Applications in biomechanics, safety and ventilation.

SESC9012**Statistics for Health and Safety Scientists***Staff Contact: Ms Dianne Gardner*

CP12

The subject is designed to provide an introduction to the theory of statistics and to those statistical techniques which are relevant to planning and management of health and safety services. The subject covers statistical methods which are a prerequisite to the study of epidemiology, risk management, ergonomics and behavioural studies. Topics include analysis of frequency distributions elementary probability theory, Binomial, Normal and Poisson distributions, elementary sampling theory, statistical decision theory and Hypothesis testing, t test, Chisquare test and elementary correlation theory. Illustrative data is drawn from statistics relevant to health and safety.

SESC9210**Research Methods (Project Students)***Staff Contact: Mr Roger Hall*

CP12

This subject covers issues in research methodology including research problem formulation, null and alternative hypotheses, qualitative and quantitative research designs, statistical inference and the analysis of quantitative data. Students will be expected to be able to recognise and avoid common methodological problems in research. The subject

will not provide a detailed coverage of statistical theory but a basic understanding of statistics is required.

SESC9211

Introduction to Safety Engineering

Staff Contact: Dr Tony Green

CP12

Assumed knowledge: SESC9011 or PHYS1022

The engineering improvement of potentially hazardous workplace situations with reference to the following: safety management, safety audits, basic safety practice, management of dangerous materials; fire and explosion; ventilation; radiation protection; electrical safety; machine dangers and machine guarding; construction safety; transport safety; environmental safety; plant safety assessment; safety issues in different industries.

SESC9224

Principles of Ergonomics

Staff Contact: Dr Kamal Kothiyal

CP12

Assumed knowledge: Basic statistics and mechanics

The subject will give an introduction to ergonomics, emphasizing the principles of designing user-centred, human-machine-environment systems. Topics include: definition of and justification for ergonomics, design and human error, human capabilities and limitations, controls and displays, design of human-machine- environment systems, job design and work organisation, introduction to anthropometry, design of workplaces, introduction to manual handling and the physical environment, and, introduction to product design and human-computer interaction.

SESC9232

Introduction to Occupational Health and Safety Law

Staff Contact: Head of School

CP12

The concept of law: the creation and interpretation of statutes: the judicial and court systems: locus standi: common law and equity: basic principles of legal liability (civil and criminal): basic principles of administrative law and the liability of the Crown: the common law of employment: statutory regulation of employment: compulsory arbitration of industrial disputes. Outline of occupational health, safety and compensation legislation of the Australian States. Actions under the common law.

SESC9242

Effective Behaviour in Organisations

Staff Contact: Ms Dianne Gardner

CP12

Human behaviour as a major system factor in occupational safety and health. Learning and safety programs. Attitudes and attitude change. Safety compliance individual and group factors affecting compliance. Work motivation and safety practice. Accident proneness and personnel selection. Individual differences in attitudes to work. Planning and implementing organisational change.

SESC9260

Introduction to Occupational Health

Staff Contact: A/Prof Chris Winder

CP12

This subject provides an outline of the inter-relationships between the roles of some of the occupational health and safety disciplines (notably occupational hygiene, occupational medicine, epidemiology and toxicology) as well as studies of some common occupational hazards, their outcomes on health and possible options for workplace control.

SESC9261

Occupational Hygiene

Staff Contact: A/Prof Chris Winder

CP12

Assumed knowledge: SESC9260

This subject deals with practical considerations of recognising, evaluating and controlling workplace hazards. Topics include the role of the occupational hygienist; types of workplace hazards (such as particulates, gases and vapours, chemicals, noise, radiation, temperature, biohazards); workplace assessment and monitoring; and methods for the control of hazards (such as ventilation and personal protection).

SESC9262

Occupational Medicine

Staff Contact: A/Prof Chris Winder

CP12

Assumed knowledge: SESC9260

This subject provides sessions on significant occupational diseases of the respiratory system, skin, eye, musculo-skeletal system and reproductive system, as well as occupational cancer and infectious diseases. The subject also covers other occupational medicine principles and activities, including assessing risks to worker health, health surveillance, health promotion and rehabilitation.

SESC9264

Assessment of the Workplace Environment

Staff Contact: Dr Kamal Kothiyal

CP12

Assumed knowledge: SESC9261

An experimental and workplace assessment based subject, where students will be required to assess physical and chemical hazards encountered in the occupational environment.

SESC9265

Occupational Health Practice

Staff Contact: Dr Boban Markovic

Assumed knowledge: SESC9262

A workplace assessment based subject, where students will be required to report on occupational health problems following visits to a number of diverse industrial sites.

SESC9267**Research Methods in Laboratory Science***Staff Contact: Dr Boban Markovic*

CP12

Assumed knowledge: SESC9810

A laboratory based subject which will provide the basic requirements of laboratory based research, especially in chemical safety and applied toxicology. The subject covers literature review, methodology, experimental design, data collection and analysis, discussion and presentation skills. Assessment will be made through preparation of a major project report.

SESC9271**Environmental Planning and Assessment***Staff Contact: Dr Boban Markovic*

CP8

This subject is a core element for the Graduate Diploma and Masters of Environmental Studies courses and provides the conceptual framework for understanding interactions between humans, nature, philosophy, law, politics, ethics and decision making and how this related to environmental planning and assessment. Also available as SESC8271 (distance learning).

SESC9272**Environment and Medicine***Staff Contact: A/Prof Chris Winder*

CP8

Aspects of medicine bearing upon physiological consequences of pollutants. Metabolic mechanisms; chemical interactions, synergism and antagonism; photosynthesis and phytotoxicity. Ozone depletion and greenhouse effects. Morbidity and mortality surveys. Studies of particular pollutants and environmental contaminants.

SESC9273**Environment and Law***Staff Contact: A/Prof Chris Winder*

CP8

Resources in law for the preservation of the environment. Types of legislation: local government, town planning, environmental and common law; administrative infrastructure, problems and actions. The North American experience. Economic and sociological factors.

SESC9274**Environmental Management Systems***Staff Contact: Dr Boban Markovic*

CP12

Assumed knowledge: SESC9271

This subject is designed to define the central role of environment in management strategies. It describes the development of different approaches to fulfill the demands of the environment while considering not only the current legislative requirements but also customer requirements, competitive pressure and safety aspects of the firms respectively. Available as a short course.

SESC9343**Innovation, Productivity and Safety***Staff Contact: Ms Dianne Gardner*

CP12

Behaviour of people in organisation, Individuals, groups and organisations: Planning for innovation and change; Dealing with human problems, including resistance to change; Human capabilities and limitations in the physical, perceptual and cognitive reactions with the operating system. The cost benefit of failsafe design (in relation to human operators) vs post design training. Operator efficiency and operator safety. The human barriers to designing and operating the system with these joint priorities. Recent advances in defining and controlling human error and their implications for equipment design and for management and training systems.

SESC9350**Risk Management***Staff Contact: Prof Jean Cross*

CP12

This subject gives an overview of Risk Management following the format of the Draft Australian Standard in Risk Management. Tools and techniques applicable to each step of the risk management process are discussed using examples applicable to the class. The same risk management process is applied to manage a very wide range of business issues including health and safety, the environment, finance and project management. This subject is therefore relevant as part of a wide variety of post-graduate courses and students from any postgraduate course are accepted if numbers permit. The student selects examples for exercises to suit the industry and role in which they work (or intend to work). At the end of the subject students should be able to use risk management tools applicable to their specific interest and have an awareness of tools used in other industries and applications.

SESC9353**Major Hazards Management***Staff Contact: Dr Tony Green*

CP12

The subject discusses the management of major hazardous facilities. Australian and overseas legislation is discussed, together with the preparation of safety reports, environmental impact assessment and emergency planning. Analysis techniques that are required for these assessments will be discussed and include, HAZOP, Fault Tree, Event Trees, Probabilistic risk assessment, risk contours, modelling of major hazard events such as plume dispersal, fire and explosion modelling.

SESC9354**Issues in Safety Management***Staff Contact: Ms Dianne Gardner*

CP12

This subject covers a range of issues in the management of risks in industry. It covers the planning, implementation and evaluation of risk management programs. Theoretical

issues and practical applications in areas such as decision making, best practice, cost-benefit analysis, program implementation and program evaluation are covered and applied to health and safety, project management and other industrial risks. Case studies, discussion and other interactive approaches ensure active participation of class members. Students are expected to play an active role in class, to participate in discussions, to question and to share their own experiences and insights with others. From time to time, guest lecturers will be invited to present subject material. Also available as SESC8354 (distance learning)

SESC9424

Applied Ergonomics

Staff Contact: Mr Roger Hall

CP12

Prerequisite: SESC9224 or equivalent

This subject will focus on the application of ergonomics principles to real world problems and the difficulties involved. It assumes a knowledge of the principles of ergonomics and will provide in-depth knowledge and skills in ergonomics research methodology - analysing the exact nature and extent of the problem, and evaluating the outcome of solutions to the problem. Topics include: the scientific method, ergonomics methodologies, analysis techniques, benefit-cost case studies, product liability issues, participatory ergonomics, mock trial, case studies and a site visit.

SESC9425

Physical Ergonomics

Staff Contact: Dr Kamal Kothiyal

CP12

Assumed knowledge: SESC9224 or equivalent

The focus of this subject is on the physical capabilities of humans at work and the effect of the physical environment on human performance. Measurement of relevant physical parameters and design and evaluation by computer. Topics include; applied anthropometry, workspace and workstation design, biomechanical models, emg measurement, manual materials handling, work physiology, fatigue, the visual, auditory and thermal environments, and the effect of vibration.

SESC9426

Ergonomics and New Technology

Staff Contact: Mr Roger Hall

CP12

Assumed knowledge: SESC9224 or equivalent

The focus of this subject is on ergonomic issues related to the design and implementation of new technology. Cognitive aspects of human-computer interaction, human error and software design, useability and its assessment, user interface design, evaluation techniques, guidelines and standards, and the introduction of new systems into organisations.

SESC9523

Plant and Construction Safety

Staff Contact: Dr Kamal Kothiyal

CP12

Assumed knowledge: SESC9011 or PHYS1022

Strength of materials, materials failure. Machinery contact dangers; machine guarding; safety during maintenance. Materials handling safety; cranes, slings, forklift trucks, conveyors. Construction safety; ladders, scaffolds, form-work, excavations. Structural failures, fracture, pressure vessels, non-destructive testing.

SESC9531

Industrial and Environmental Noise

Staff Contact: Head of School

CP12

The course covers the physical, perceptual and legislative aspects of noise in an industrial and environmental context. Descriptive properties, propagation, loudness and frequency: Measurement, decibels, Hertz, octaves, time and frequency weighting, spectral analysis; Perception, loudness, annoyance, phones dB(A) Leq Lbgt: Anatomy and function of the ear: Industrial deafness, Audiometry exercise in measuring hearing levels. Instrumentation, meters, filters, analysers and sound sources; Propagation in different environments, reverberant, free field, behaviour in different medium. reflection, absorption, transmission, barriers and enclosures; Industrial Noise NSW Hearing Conservation regulations, measurement and assessment of risk and control of industrial noise. Environmental Noise, NSW Noise Control Act. Exercise in the measurement and control of environmental noise. Effects of aircraft and traffic noise and policy directions. Components of an environmental impact statement.

SESC9544

Traffic Safety

Staff Contact: Dr Andrew McIntosh

CP12

This subject aims to provide students with an introduction to nature and scope of road safety and provide an understanding of the interdisciplinary and integrated approach required to implement improvements in roads and traffic safety. Subject areas include identification of road safety problems, strategic planning, road and road environment safety, ergonomics, signals, signs, lighting, road user safety, knowledge, attitudes, compliance and practices, vehicle and equipment safety, road safety school education, road safety campaigns and program evaluation.

SESC9551

Experimental Biomechanics

Staff Contact: Prof Noel Svensson

CP12

Objectives and ethics of biomechanical experimentation, statistical evaluation of results. Experimentation involving movement analysis, exercise physiology, muscular activity, mechanical properties of skeletal materials, anthropometric surrogates.

SESC9553**Radiation Protection***Staff Contact: Dr Ronald Rosen*

CP12

Assumed knowledge: SESC9211 or SESC9213

Principles and practices of radiation protection for both ionising and non ionising radiation. Radiation physics, detection and measurement; background radiation; biological effects of radiation; dose limits; technical controls for radioactive sources and irradiating apparatus. Codes of safe practice; radiological monitoring and personal dosimetry; storage, transport and disposal of sources; environmental impact; administrative controls; emergency procedures; control of nonionising radiation. Practical work and site visit.

SESC9573**Fire and Explosion***Staff Contact: Dr Tony Green*

CP12

This subject introduces students to the principles of combustion associated with fire and explosion hazards. The first section covers gas and liquid fires including the importance of the environment, control and regulation. The second section covers building fires and is mainly about solid combustibles, their control and regulation. The third section cover consequence analysis, risk analysis for major hazards and emergency and recover planning. All three workshops have case studies and group sessions on specific problems.

SESC9810**Chemical Safety and Toxicology***Staff Contact: A/Prof Chris Winder*

CP12

Assumed knowledge: SESC9260

This subject provides an outline of the toxicological, occupational hygiene and environmental aspects of chemical hazards and exposures.

SESC9850**Management of Dangerous Materials***Staff Contact: A/Prof Chris Winder*

CP12

Assumed knowledge: 1st year Chemistry

This subject covers chemicals legislation, regulatory assessment of chemicals, chemical information (labels/MSDS), workplace management of chemical safety (Workplace assessment, exposure control, storage of chemicals, personal protection, monitoring), emergency preparedness, pollution, management of hazardous wastes and disposal.

SESC9904**Report***Staff Contact: Course Coordinator*

CP4

A four credit point report on a topic in safety science.

SESC9908**Report***Staff Contact: Course Coordinator*

CP8

An eight credit point report on a topic in safety science.

SESC9912**Special Report***Staff Contact: Course Coordinator*

CP12

A 12 credit point Special Report, only for students enrolled in the Graduate Diploma courses.

SESC9924**Minor Project***Staff Contact: Course Coordinator*

CP24

SESC9936**Project***Staff Contact: Dr Andrew McIntosh*

CP36

SESC9948**Project***Staff Contact: Professor Jean Cross (Safety Science)**Staff Contact: A/Prof Chris Winder (Environmental Studies)**Staff Contact: Mr Roger Hall (Ergonomics)*

CP48

SESC9972**Major Report***Staff Contact: Professor Jean Cross (Safety Science)**Staff Contact: A/Prof Chris Winder (Environmental Studies)**Staff Contact: Mr Roger Hall (Ergonomics)*

CP72

Textile Technology

TEXT5001**Textile Technology Dissertation***Staff Contact: Prof Mike Pailthorpe*

CP7.5 F T1.5

Students review a particular aspect of textile technology, by conducting a literature survey and conferring with experts. The review is presented orally to the staff and students of the department, and submitted in written form.

TEXT5003**Textile Technology***Staff Contact: Prof Mike Pailthorpe*

CP7.5 F T1.5

Students gain an overview of textile technology by reviewing the technology relating to one or more textile products, through a series of tutorials and exercises.

TEXT5101**Fibre Science A**

Staff Contact: Prof Ron Postle
CP15 S1 L4 T2

Fibre classification and raw materials. Polymer requirements for fibre formation. Introduction to fibre structure and morphology. Physical and chemical properties of textile fibres. Production of natural and man-made fibres. Necessary and desirable attributes of textile fibres. Fibre mechanical properties, structure and physical properties of wool keratin. Laboratory classes on fibre identification and fibre microscopy.

TEXT5102**Fibre Science B**

Staff Contact: Prof Ron Postle
CP10 S2 L2 T2

Fibre microscopy. Electron microscopy. Fibre reflection and lustre. X-ray Morphological and fine structure of fibres. Crystallography. Polymer crystallisation. Molecular structure of proteins. Optical properties and fibre orientation. Infra-red spectroscopy. Fibre rheology. Mechanical properties. Moisture sorption and swelling. Addition and condensation polymerization. Chemical constitution and reactivity of man-made fibres. Introduction to high technology fibres. Laboratory experiments on fibre and electron microscopy, x-ray diffraction and infra-red spectroscopy, fibre structure and viscoelasticity.

TEXT5201**Textile Quality Control**

Staff Contact: Prof Mike Pailthorpe
CP5 S2 L1 T1

User-serviceability testing. Fibre content and care labelling. Process and quality control. Consumer problems.

TEXT5301**Yarn Technology A**

Staff Contact: Dr Xungai Wang
CP12.5 S1 L3 T3

The preparation of staple fibres for yarns and non-woven fabrics: processes for tow conversion, opening, cleaning, blending, carding, drawing, and combing. Short-staple, worsted and woollen preparation systems. Computer blend selection; drafting theory; theory and measurement of irregularity; levelling of slivers.

TEXT5302**Yarn Technology B**

Staff Contact: Dr Xungai Wang
CP12.5 S2 L3 T2

Properties of yarns. Introduction to geometry and mechanics of twisted structures. Staple yarn forming by ring, rotor and unconventional spinning methods. Twisting and winding processes. Throwing and texturing of continuous filament yarns. On-line monitoring of production and quality; automation. Measurement of yarn properties.

TEXT5401**Fabric Technology A**

Staff Contact: Dr John Curiskis
CP12.5 S2 L3.5 T1.5

Principles of weaving. Mechanisms of shedding, picking, and beating up. Secondary and auxiliary mechanisms of looms. Cam, dobby and jacquard shedding. Shuttle, projectile, rapier and jet weft insertion. Multiphase weaving, circular weaving. Woven cloth construction principles and weave representation; basic weave structures. Leno and narrow fabric weaving. Woven pile fabric constructions; tufting. Yarn preparation for weaving. Mechanics of woven fabric formation.

TEXT5402**Fabric Technology B**

Staff Contact: Dr John Curiskis
CP12.5 S1 L3.5 T1.5

Principles of knitting. Techniques of loop formation in weft and warp knitting; essential machine mechanisms. Knitted cloth construction principles and knitted structure representations; basic knitted structures. Techniques of jacquard needle selection and loop transfer for extended design effects in weft knitting; derivative weft knitted structures. Shaped weft knitted structures, including fully-fashioned knitting, hosiery manufacture, integral knitting techniques. Use of multiple guide bars, part-set threading, and auxiliary mechanisms for extended design effects in tricot and raschel warp knitting; derivative warp knitted structures. Double needle bed warp knitted. Mechanisms of knitted fabric formation. Stitch-bonded and non-woven fabric manufacture.

TEXT5501**Finishing Technology A**

Staff Contact: Prof Mike Pailthorpe
CP12.5 S1 L3 T2

Objects of finishing and typical flow diagrams for wool and cotton. The principles and technology of textile finishing processes for protein and cellulosic fabrics, including the removal of impurities and discolouration, the elimination or minimisation of deficiencies in properties, the development of specific properties. Properties of surfactant solutions, micelle formation, surfactants as emulsifiers and detergents. Practical exercises in bleaching, wool milling and shrinkproofing. Analysis of hard water by titration.

TEXT5502**Finishing Technology B**

Staff Contact: Prof Mike Pailthorpe
CP12.5 S2 L2 T3

Wet and dry fabric finishing. The application of special finishes including flame retardant finishes, crease resistant and antistatic finishes, etc. Fabric setting. Dimensional stability and its measurement. The drying of textile materials. Recent developments in finishing technology.

TEXT5601

Colour Science

Staff Contact: Prof Mike Pailthorpe

CP10 S1 L2 T1

Aspects of colour, colour mixing and colour vision. Absorptiometry, spectrophotometry and tristimulus colorimetry. Measurement and specification of colour and colour difference. Applications of colour measurement. Computer aided colour match prediction.

TEXT5602

Colouration Technology

Staff Contact: Prof Mike Pailthorpe

CP10 S2 L2 T2

Classification of dyes and pigments and their methods of application. General properties of dyes, dyeing auxiliaries and after-treatments. Assessment of colour-fastness properties of dyes and pigments. Mill water supplies and their treatment. Aspects of dye-house effluent treatment. Textile printing methods. Textile dyeing machinery. Recent developments in dyeing and printing technology.

Conditions for the Award of Degrees

First Degrees

Rules, regulations and conditions for the award of first degrees are set out in the appropriate **Faculty Handbooks**.

For the list of undergraduate courses and degrees offered see Table of Courses by Faculty (Undergraduate Study) in the *Calendar*.

The following is the list of *higher degrees, graduate diplomas and graduate certificates* of the University, together with the publication in which the conditions for the award appear.

Higher Degrees

For the list of graduate degrees by research and course work, arranged in faculty order, see *UNSW Courses (by faculty)* in the *Calendar*.

Title	Abbreviation	Calendar/Handbook
Higher Degrees		
Doctor of Science	DSc	Calendar
Doctor of Letters	DLitt	Calendar
Doctor of Laws	LLD	Calendar
Doctor of Education	EdD	Arts and Social Sciences
Doctor of Juridical Science	SJD	Law
Doctor of Medicine	MD	Medicine
Doctor of Philosophy	PhD	Calendar and all handbooks
Master of Applied Science	MAppSc	Engineering Science
Master of Architecture	MArch	Built Environment
Master of Archives Administration	MArchivAdmin	Commerce and Economics
Master of Art	MArt	College of Fine Arts
Master of Art Administration	MArtAdmin	College of Fine Arts

Title	Abbreviation	Calendar/Handbook
Master of Art and Design Education	MArtDesEd	College of Fine Arts
Master of Art Education(Honours)	MArtEd(Hons)	College of Fine Arts
Master of Arts	MA	Arts and Social Sciences
	University College	
Master of Arts (Honours)	MA(Hons)	Arts and Social Sciences
Master of Art Theory	MArtTh	College of Fine Arts
Master of Biomedical Engineering	MBiomedE	Engineering
Master of Building	MBuild	Built Environment
Master of the Built Environment	MBEnv	Built Environment
Master of the Built Environment (Building Conservation)	MBEnv	Built Environment
Master of Business Administration	MBA	AGSM
Master of Business Administration (Executive)	MBA(Exec)	AGSM
Master of Business and Technology	MBT	Engineering
Master of Chemistry	MChem	Science*
Master of Clinical Education	MClinEd	Medicine
Master of Commerce (Honours)	MCom(Hons)	Commerce and Economics
Master of Commerce	MCom	Commerce and Economics
Master of Community Health	MCH	Medicine
Master of Community Paediatrics	MCommPaed	Medicine
Master of Computational Science	MComputationalSc	Science*
Master of Computer Science	MCompSc	Engineering
Master of Construction Management	MConstMgt	Built Environment
Master of Couple and Family Therapy	MCFT	Arts and Social Sciences
Master of Defence Studies	MDefStud	University College
Master of Design(Honours)	MDes(Hons)	College of Fine Arts
Master of Education	MEd	Arts and Social Sciences
Master of Educational Administration	MEdAdmin	Arts and Social Sciences
Master of Engineering	ME	Science*
		Engineering
		University College
Master of Engineering <i>without supervision</i>	ME	Science*
		Engineering
Master of Engineering Science	MEngSc	Engineering
		Science*
		University College
Master of Environmental Engineering Science	MEnvEngSc	Engineering
Master of Environmental Studies	MEnvStudies	Applied Science
Master of Equity & Social Administration	MEqSocAdmin	Arts and Social Sciences
Master of Fine Arts	MFA	College of Fine Arts
Master of Health Administration	MHA	Medicine
Master of Health Personnel Education	MHPed	Medicine
Master of Health Planning	MHP	Medicine
Master of Higher Education	MHEd	Professional Studies
Master of Housing Studies	MHS	Arts and Social Sciences
Master of Industrial Design	MID	Built Environment
Master of Information Management	MIM	Commerce and Economics
Master of Information Science	MInfSc	Engineering
Master of Information Studies	MInfStud	Commerce and Economics
Master of International Social Development	MIntSocDev	Arts and Social Sciences
Master of Medicine	MMed	Medicine
Master of Landscape Architecture	MLArch	Built Environment
Master of Landscape Planning	MLP	Built Environment
Master of Laws	LLM	Law

Title	Abbreviation	Calendar/Handbook
Master of Management Economics	MMgtEc	University College
Master of Mathematics	MMath	Science*
Master of Marine Science	MMarineSc	Science†
Master of Medicine	MMed	Medicine
Master of Mining Management	MMinMgmt	Engineering
Master of Music	MMus	Arts and Social Sciences
Master of Music (Honours)	MMus(Hons)	Arts and Social Sciences
Master of Music Education (Honours)	MMusEd(Hons)	Arts and Social Sciences
Master of Optometry	MOptom	Science*
Master of Policy Studies	MPS	Arts and Social Sciences
Master of Project Management	MProjMgt	Built Environment
Master of Public Health	MPH	Medicine
Master of Psychological Medicine	MPM	Medicine
Master of Psychology (Applied)	MPsychol	Science†
Master of Psychology (Clinical)	MPsychol	Science†
Master of Real Estate	MRE	Built Environment
Master of Real Property	MRProp	Built Environment
Master of Safety Science	MSafetySc	Science
Master of Science	MSc	Built Environment Engineering Medicine Science*† University College
Master of Science <i>without supervision</i>	MSc	Science* Built Environment Engineering
Master of Science (Industrial Design)	MSc(IndDes)	Built Environment
Master of Science and Society	MScSoc(Hons)	Arts and Social Sciences
Master of Social Work	MSW	Arts and Social Sciences
Master of Sports Medicine	MSPMed	Medicine
Master of Statistics	MStats	Science*
Master of Surgery	MS	Medicine
Master of Taxation	MTax	ATAX
Master of Technology Management	MTM	Science* Commerce and Economics Engineering
Master of Town Planning	MTP	Built Environment
Master of Urban Development and Design	MUDD	Built Environment

Graduate Diplomas

Graduate Diploma	GradDip	AGSM Built Environment Arts and Social Sciences Commerce and Economics Engineering Medicine Science*†
Advanced Taxation	GradDipAdvTax	ATAX
Arts	GradDipArts	Arts and Social Sciences
Couple and Family Therapy	GradDipC/F Therapy	Arts and Social Sciences
Clinical Education	GradDipClinEd	Medicine
Community Paediatrics	GradDipCommPaed	Medicine
Defence Studies	GradDipDefStud	University College
Design	GradDipDes	College of Fine Arts
Education	DipEd	Arts and Social Sciences

Title	Abbreviation	Calendar/Handbook
Environmental Studies	GradDipEnvironStud	Science
Equity and Social Administration	GradDipEq&SocAdmin	
Higher Education	GradDipHEd	Arts and Social Sciences
Health Personnel Education	GradDipHPED	Professional Studies
Housing Studies	GradDipHS	Medicine
Information Management – Archives/Records	GradDipIM-Archiv/Rec	Arts and Social Sciences
Information Management – Librarianship		Commerce and Economics
Industrial Management	GradDipIM-Lib	Commerce and Economics
International Social Development	GradDipIndMgt	Engineering
Land Administration	GradDipIntSocDev	Commerce and Economics
Music	GradDipLandAdmin	Engineering
Paediatrics	GradDipMus	Arts and Social Sciences
Pharmaceutical Sciences	GradDipPaed	Medicine
Professional Ethics	GradDipPharmSc	Medicine
Real Estate	GradDipEthics	Arts and Social Sciences
Sports Medicine	GradDipRE	Built Environment
Taxation Studies	GradDipSpMed	Medicine
Valuation	GradDipTaxStud	ATAX
	GradDipVal	Built Environment

Graduate Certificates

Arts	GradCertArts	Arts and Social Sciences
Commerce	GradCertCom	Commerce and Economics
Design	GradCertDes	College of Fine Arts
Health Administration	GradCertHealthAdmin	
		Medicine
Higher Education	GradCertHEd	Professional Studies
Management Studies	GradCertMgtStud	University College
Music	GradCertMus	Arts and Social Sciences
Pharmaceutical Sciences	GradCertPharmSc	Medicine
Safety Science	GradCertSafetySc	Science

**Faculty of Science and Technology.*

†Faculty of Life Sciences.

Doctor of Philosophy (PhD)

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty or board (hereinafter referred to as the Committee) to a candidate who has made an original and significant contribution to knowledge.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor with Honours from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment as a candidate for the degree.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be lodged with the Registrar at least one month prior to the date at which enrolment is to begin.
- (2) In every case before making the offer of a place the Committee shall be satisfied that initial agreement has been reached between the School* and the applicant on the topic area, supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the guidelines for promoting postgraduate study within the University.
- (3) The candidate shall be enrolled either as a full-time or a part-time student.
- (4) A full-time candidate will present the thesis for examination no earlier than three years and no later than five years from the date of enrolment and a part-time candidate will present the thesis for examination no earlier than four years and no later than six years from the date of enrolment, except with the approval of the Committee.
- (5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.
- (6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.
- (7) The research shall be supervised by a supervisor and where possible a co-supervisor who are members of the academic staff of the School or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression

4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.
- (i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.
- (ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis

5. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.
- (2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.
- (3) The thesis shall comply with the following requirements:
 - (a) it must be an original and significant contribution to knowledge of the subject;
 - (b) the greater proportion of the work described must have been completed subsequent to enrolment for the degree;
 - (c) it must be written in English except that a candidate in the Faculty of Arts and Social Sciences may be required by the Committee to write a thesis in an appropriate foreign language;
 - (d) it must reach a satisfactory standard of expression and presentation;

(e) it must consist of an account of the candidate's own research but in special cases work done conjointly with other persons may be accepted provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may not submit as the main content of the thesis any work or material which has previously been submitted for a university degree or other similar award but may submit any work previously published whether or not such work is related to the thesis.

(5) Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the four copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

6. (1) There shall be not fewer than three examiners of the thesis, appointed by the Committee, at least two of whom shall be external to the University.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee that one of the following:

(a) The thesis merits the award of the degree.

(b) The thesis merits the award of the degree subject to minor corrections as listed being made to the satisfaction of the head of school.

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the higher degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to submit the thesis for re-examination as determined by the Committee within a period determined by it but not exceeding eighteen months.

(4) After consideration of the examiners' reports and the results of any further examination of the thesis, the Committee may require the candidate to submit to written or oral examination before recommending whether or not the candidate be awarded the degree. If it is decided that the candidate be not awarded the degree, the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

Fees

7. A candidate shall pay such fees as may be determined from time to time by the Council.

"School" is used here and elsewhere in these conditions to mean any teaching unit authorised to enrol research students and includes a department where that department is not within a school, a centre given approval by the Academic Board to enrol students, and an interdisciplinary unit within a faculty and under the control of the Dean of the Faculty. Enrolment is permitted in more than one such teaching unit.

Master of Chemistry (MChem) and Master of Mathematics (MMath)

1. The degree of Master of Chemistry or Master of Mathematics by formal coursework may be awarded by the Council to a candidate who has satisfactorily completed a program or advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate fouryear degree of Bachelor with Honours Class 2 or higher from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of a candidate shall be four academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of this time may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Marine Science (MMarineSc)

1. The degree of Master of Marine Science by formal coursework may be awarded by the Council to a candidate who has satisfactorily completed a program or advanced study.

Qualifications

2. The Master of Marine Science degree course is available to graduates in science who have completed a four year degree. Others may be admitted if they have submitted evidence of such academic and/or professional attainment as may be approved by the appropriate Faculty on the recommendation of its Higher Degree Committee. Applicants with other qualifications may be admitted after completion of a qualifying program approved by the appropriate Faculty. The program shall be of one year duration (full-time) or two years part-time.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

- (2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.
- (3) A candidate shall also be required to undertake a project on an approved topic.
- (4) The project shall be supervised under appropriate arrangements approved by the Director, Centre for Marine Science.
- (5) The progress of a candidate shall be reviewed at least once annually by the Centre for Marine Science and as a result of its review the Centre may cancel enrolment or take such other action as it considers appropriate.
- (6) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of a candidate shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of this time may be granted by the Higher Degree Committee.

Fees

- 4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Engineering (ME) and Master of Science (MSc)

- 1. The degree of Master of Engineering or Master of Science by research may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

Qualifications

- 2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.
- (2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the degree.
- (3) When the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant, before being permitted to enrol, to undergo such examination or carry out such work as the Committee may prescribe.

Enrolment and Progression

- 3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least one calendar month before the commencement of the session in which enrolment is to begin.
- (2) In every case, before permitting a candidate to enrol, the head of the school in which the candidate intends to enrol shall be satisfied that adequate supervision and facilities are available.
- (3) An approved candidate shall be enrolled in one of the following categories.
 - (a) full-time attendance at the University;
 - (b) part-time attendance at the University;
 - (c) external not in regular attendance at the University and using research facilities external to the University.
- (4) A candidate shall be required to undertake an original investigation on an approved topic. The candidate may also be required to undergo such examination and perform such other work as may be prescribed by the Committee.

(5) The work shall be carried out under the direction of a supervisor appointed from the full-time members of the University staff.

(6) The progress of a candidate shall be reviewed annually by the Committee following a report by the candidate, the supervisor and the head of the school in which the candidate is enrolled and as a result of such review the Committee may cancel enrolment or take such other action as it considers appropriate.

(7) No candidate shall be granted the degree until the lapse of three academic sessions in the case of a full-time candidate or four academic sessions in the case of a part-time or external candidate from the date of enrolment. In the case of a candidate who has been awarded the degree of Bachelor with Honours or who has had previous research experience the Committee may approve remission of up to one session for a full-time candidate and two sessions for a part-time or external candidate.

(8) A full-time candidate for the degree shall present for examination not later than six academic sessions from the date of enrolment. A part-time or external candidate for the degree shall present for examination not later than ten academic sessions from the date of enrolment. In special cases an extension of these times may be granted by the Committee.

Thesis

4. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the original investigation.

(2) The candidate shall give in writing two months notice of intention to submit the thesis.

(3) The thesis shall present an account of the candidate's own research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses.

(6) It shall be understood that the University retains the three copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

5. (1) There shall be not fewer than two examiners of the thesis, appointed by the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the merits of the thesis and shall recommend to the Committee that:

- (a) the candidate be awarded the degree without further examination; or
- (b) the candidate be awarded the degree without further examination subject to minor corrections as listed being made to the satisfaction of the head of the school; or
- (c) the candidate be awarded the degree subject to a further examination on questions posed in the report, performance in this further examination being to the satisfaction of the Committee; or
- (d) the candidate be not awarded the degree but be permitted to resubmit the thesis in a revised form after a further period of study and/or research; or
- (e) the candidate be not awarded the degree and be not permitted to resubmit the thesis.

(3) If the performance at the further examination recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to represent the same thesis and submit to a further oral, practical or written examination within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the reports of any oral or written or practical examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate be not awarded the degree the Committee shall determine whether or not the candidate may resubmit the thesis after a further period of study and/or research.

Fees

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Engineering (ME), Master of Science (MSc) and Master of Surveying (MSurv) *without supervision*

1. The degree of Master of Engineering or Master of Science or Master of Surveying without supervision may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

Qualifications

2. A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales with at least three years relevant standing in the case of Honours graduates and four years relevant standing in the case of Pass graduates, and at a level acceptable to the Committee.

Enrolment

3. An application to enrol as a candidate for the degree without supervision shall be made on the prescribed form which shall be lodged with the Registrar not less than six months before the intended date of submission of the thesis. A graduate who intends to apply in this way should, in his or her own interest, seek at an early year the advice of the appropriate head of school* with regard to the adequacy of the subject matter and its presentation for the degree. A synopsis of the work should be available.

Thesis

4. (1) A candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.

(3) The thesis shall present an account on the candidate's own research. In special cases work done jointly with other persons may be accepted, provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the three copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

5. (1) There shall be not fewer than two examiners of the thesis, appointed by the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

(2) Before the thesis is submitted to the examiners the head of the school in which the candidate is enrolled shall certify that it is *prima facie* worthy of examination.

(3) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee that:

- (a) the candidate be awarded the degree without further examination; or
- (b) the candidate be awarded the degree without further examination subject to minor corrections as listed being made to the satisfaction of the head of the school; or
- (c) the candidate be awarded the degree subject to a further examination on questions posed in the report, performance in this further examination being to the satisfaction of the Committee; or
- (d) the candidate be not awarded the degree but be permitted to resubmit the thesis in a revised form after a further period of study and/or research; or
- (e) the candidate be not awarded the degree and be not permitted to resubmit the thesis.

(4) If the performance at the further examination recommended under (3)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to represent the same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(5) The Committee shall, after consideration of the examiners' reports and the results of any further examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate be not awarded the degree the Committee shall determine whether or not the candidate may resubmit the thesis after a further period of study and/or research.

Fees

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Applied Science (MAppSc)

1. The degree of Master of Applied Science by formal course work may be awarded by the Council to a candidate who has satisfactorily complete a program of advanced study.

Qualifications

2. (1) A candidate of the degree shall:

(a) have been awarded an appropriate degree of Bachelor of four full-time years duration (or the part-time equivalent) from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Life Sciences (hereinafter referred to as the Committee), or

(b)(i) have been awarded an appropriate degree of Bachelor of three full-time years duration (or the part-time equivalent) from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee and

(ii) have undertaken appropriate postgraduate studies of the full-time year's duration (or the part-time equivalent) at the University of New South Wales or studies considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects including the submission of a report on a project, and pass such assessment as prescribed. The project shall be under the supervision of an academic staff member and shall be assessed by two examiners (for a major project).

(3) The progress of a candidate shall be reviewed at least once a year by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate and four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate, eight sessions for a part-time candidate, and ten sessions for an external candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Environmental Studies (MEnvStudies)

1. The degree of Master of Environmental Studies by formal course work may be awarded by the Council to a candidate who has satisfactorily complete a program of advanced study.

Qualifications

2. (1) A candidate of the degree shall:

(a) have been awarded an appropriate degree of Bachelor of four full-time years duration (or the part-time equivalent) from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee), or

(b)(i) have been awarded an appropriate degree of Bachelor of three full-time years duration (or the part-time equivalent) from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee and

(ii) have undertaken appropriate postgraduate studies of the full-time year's duration (or the part-time equivalent) at the University of New South Wales or studies considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects including the submission of a report on a project, and pass such assessment as prescribed. The project shall be under the supervision of an academic staff member and shall be assessed by two examiners (for a major project).

(3) The progress of a candidate shall be reviewed at least once a year by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate and four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate, eight sessions for a part-time candidate, and ten sessions for an external candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Mathematics (MMath)

See Master of Chemistry above for these degrees.

Master of Optometry (MOptom)

1. The degree of Master of Optometry or Master of Physics by formal coursework may be awarded by the Council to a candidate who has satisfactorily completed a program or advanced study.

Qualifications

2.(1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor of four full-time year's duration (or the part-time equivalent) from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undertake such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of a candidate and eight sessions for a part-time candidate. In special cases an extension of this time may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Psychology (Applied) (MPsychol(Applied)) and Master of Psychology (Clinical) (MPsychol(Clinical))

1. The degree of Master of Psychology (Applied) or Master of Psychology (Clinical) by formal coursework and thesis may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study. The degree shall be awarded at the Pass level or with the grade of Honours Class 1 or with the grade of Honours Class 2 (two divisions).

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor with Honours in Psychology from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution, at a level acceptable to the Higher Degree Committee of the Faculty of Life Sciences (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar by 1 November of the year before the year in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of four academic sessions from the date of enrolment in the case of a full-time candidate or six sessions in the case of a part-time candidate. The maximum period of candidature shall be six academic sessions from the date of enrolment for a full-time candidate and ten sessions for a part time candidate. In special cases a variation of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Safety Science (MSafetySc)

1. The degree of Master of Safety Science may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee).
- (2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.
- (3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodge with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.
- (2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed. The program of advanced study shall total a minimum of 45 credits. The number of credits allocate for each subject shall be determined by the Committee on the recommendation of the Course Director (hereinafter referred to as the head of the school).
- (3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.
- (4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be six academic sessions from the date of enrolment for a full-time candidate and ten sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee

48 credit point Project Report

4. (1) The program of advanced study may include a 48 credit point project on an approved topic.
- (2) The work shall be carried out under the direction of a supervisor appointed from the full-time academic members of the University staff.
- (3) The candidate shall give in writing to the Registrar two months notice of intention to submit a report on the project.
- (4) Three copies of the project report shall be presented in a form which complies with the requirements of the University for the preparation and submission of project reports for higher degrees.
- (5) It shall be understood that the University retains the three copies of the project report submitted for examination and is free to allow the project report to be consulted or borrowed.

Subject to the provisions of the Copyright Act, 1968, the University may issue the project report in whole or in part, in microfilm or other copying medium.

Examination of 48 credit point Project Report

5. (1) There shall be not fewer than two examiners of the project report, appointed by the Committee.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the project and shall recommend to the Committee that:

(a) the project report be noted as satisfactory; or

(b) the project report be noted as satisfactory subject to minor corrections being made to the satisfaction of the head of the school; or

(c) the project report be noted as unsatisfactory but that the candidate be permitted to resubmit it in a revised form after a further period of study and/or research; or

(d) the project report be noted as unsatisfactory and that the candidate be not permitted to resubmit it.

(3) The Committee shall, after considering the examiners' reports and the candidate's results of assessment in the prescribed formal subject, recommend whether or not the candidate may be awarded the degree. If it is decided that the project report is unsatisfactory the Committee shall determine whether or not the candidate may resubmit it after a further period of study and/or research.

Fees

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Science (MSc), Master of Science (MSc) *without supervision*

See Master of Engineering above for these degrees.

Master of Statistics (MStats)

1. The degree of Master of Statistics by formal coursework may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded a degree of Bachelor with major studies in statistics from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of three academic sessions from the date of enrolment in the case of a full-time candidate or six sessions in the case of a part-time candidate. In the case of a candidate who has been awarded a degree of Bachelor with Honours in statistics the Committee may approve remissions of up to one session for a full-time candidate and two sessions for a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Certificate in Safety Science (GradCertSafetySc)

1. A Graduate Certificate in Safety Science may be awarded by the Council to a candidate who has satisfactorily completed an approved program of study.

Qualifications

2. (1) A candidate for the Graduate Certificate shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science and Technology (hereinafter referred to as the Committee).

(2) An applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the Graduate Certificate.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the Graduate Certificate shall be made on the prescribed form which shall be lodged with the Registrar by the advertised closing date, which shall be set at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the certificate shall be required to undertake subjects and pass any assessment prescribed.

(3) The progress of a candidate shall be reviewed by the end of two sessions by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) The normal duration of the course is one academic session from the date of enrolment in the case of a full-time student or two sessions in the case of a part-time. For an open

learning or external candidate the normal duration is two sessions from the date of enrolment. In special cases a variation of these times may be approved by the head of school.

Fees

4. Candidates shall pay such fees as may be determined from time to time by Council.

Master of Technology Management MTM

1. The degree of Master of Technology Management by formal course work may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level considered acceptable to the Course Committee¹. This is normally either:

(a) a four year degree, or,

(b) a three year degree plus *either* another qualification at an acceptable level, *or*, other academic or professional attainments (including relevant work experience).

(2) An applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol in the degree.

If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require that the applicant undergo such assessment, or carry out such work, as the Committee may prescribe before permitting enrolment.

Enrolment and Progression

3. An application to enrol as a candidate for a degree shall be made on the prescribed form which shall be lodged with the registrar at least two calendar months before the commencement of the Session in which enrolment is to begin.

A candidate for the degree shall be required to undertake such formal subjects and pass such assessments as prescribed.

The progress of a candidate shall be reviewed at least once annually by the Committee and, as a result of its review, the committee may cancel enrolment or take such other action as it considers appropriate.

No candidate shall be awarded the degree until the lapse of at least two academic sessions from the date of enrolment in the case of full time enrolment or four academic sessions in the case of part time enrolment. The maximum period of enrolment shall be 4 academic sessions for a full time candidate and 8 academic sessions for a part time candidate. In special cases variations to these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Diploma (GradDip GradDipEnvironStud or DipFDA)

1. A Graduate Diploma may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the diploma shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee).

(2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the diploma.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for diploma shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the diploma shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the diploma until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

The scholarships listed below are available to students whose courses are listed in this book. Each Faculty Handbook contains in its scholarships section the scholarships available for study in that Faculty. Travel scholarships are shown separately. Applicants should note that the scholarships and their conditions are subject to review and the closing dates for awards may vary from year to year.

Scholarship information is regularly included in the University publication 'Uniken/Focus' and updated on the UNSW Web site <http://www.unsw.edu.au/information>.

Students investigating study opportunities overseas should also consult Study Abroad which is published by UNESCO and is available in the University library. The British Council (02 9326 2365) may be of assistance for information about study in Britain. The Australian-American Education Foundation (02 6247 9331) or the U.S. Consulate General Educational Advising Centre (02 9373 9230) can provide information about study in America. Information may also be obtained from the embassy or consulate of the country in which the study is proposed and from the proposed overseas institution. Details of overseas awards and exchanges administered by the Department of Employment, Education, Training and Youth Affairs (DEETYA) can be obtained from the Awards and Exchanges Section, DEETYA, PO Box 826, Woden, ACT 2606.

KEY

- L** Students with Australian Citizenship or Permanent Resident status can apply.
- I** International students can apply.

Postgraduate scholarships for research or coursework are identified with the following codes:

- R** Available for study by research (normally Masters by Research or PhD).
- C** Available for study by coursework (normally Masters by Coursework or Graduate Diploma).

The scholarship information is normally provided in the following format:

- Amount
- Duration
- Conditions

Unless otherwise stated, application forms are available from the Scholarships and Student Loans Unit, c/- the Student Centre (Lower Ground Floor, Chancellery). Applications normally become available four to six weeks before the closing date.

Undergraduate Scholarships

Following are details of scholarships available to undergraduate students at UNSW. The scholarships are listed according to the year of study for which the scholarship is available (i.e. scholarships for first year students; scholarships for second or later year students; scholarships for Honours year students) or whether they are available to undertake travel, and then also by Faculty and course (e.g. scholarships in Science or Engineering). If students from more than one Faculty are able to apply

the scholarship is listed in the General Scholarships section.

For further information contact:

**The Scholarships and Student Loans Unit
The University of New South Wales
Sydney 2052 Australia**

Tel (02) 9385 3100/3101/1462

Fax (02) 9385 3732

Email: scholarships@unsw.edu.au

Scholarships for students entering the first year of an undergraduate course

General First Year

The Alumni Association Scholarships (I,L)

- Up to \$1,500 pa
- 1 year, renewable subject to satisfactory progress

The scholarships are available to students enrolled in any year of a full-time undergraduate course. Candidates must be the children or grandchildren of alumni of the University of New South Wales. Applications close early January.

The Australian Development Co-operation Scholarship (ADCOS) (I)

- Tuition fees. Some students may be eligible for airfares and a stipend.
- Determined by normal course duration

This award is for international students from selected countries only. Information and application forms can only be obtained from the Australian Education Centre or Diplomatic Post in the home country. The award conditions and entitlements vary depending on the home country. The closing date is normally early in the year before the year of study.

The Australian Vietnam Veterans Trust Education Assistance Scheme (L)

- \$3,500 pa
- Duration of the course

Applicants must be children of a Vietnam veteran and under the age of 25 at the time of application. The award is subject

to the same income test as AUSTUDY. Applicants can be undertaking any year of a Bachelors course. Applications and further information are available from the Australian Vietnam War Veterans Trust National Office, PO Box K978, Haymarket NSW 2000. Tel (02) 9281 7077. Applications close 31 October.

The Ben Lexcen Sports Scholarships (I,L)

- \$2,000 pa
- 1 year with possibility of renewal

The scholarships are available to students who are accepted into a course of at least two years duration. Prospective applicants should have an outstanding ability in a particular sport and are expected to be an active member of a UNSW Sports Club. Applications close late January.

The Co-Op Program (L)

- \$10,400 pa and between 9 and 20 months industry training
- The duration of the course subject to satisfactory progress

The scholarships are offered by industry groups through the University for most disciplines in Applied Science, Commerce and Economics and Engineering. Scholars are selected by interview with emphasis placed on achievements in community and extra-curricular activities as well as communication and leadership skills. A minimum TER of around 90 is expected. The Co-Op application form is available from school Careers Advisers or the Co-op Office on (02) 9385 5116. Applications close September 30 with interviews held at the end of November and beginning of December.

The Girls Realm Guild Scholarships (L)

- Up to \$1,500 pa
- 1 year with the prospect of renewal subject to satisfactory progress and continued demonstration of need

The scholarships are available to female students under 35 years of age who are enrolling in any year of a full-time undergraduate course. Selection is based on academic merit and financial need. Applications close 25 March.

The Ian Somerville Scholarships (I,L)

- Up to \$3,000
- 1 year

The scholarships are available to immediate family members (i.e. children, parents, brothers or sisters) of UNSW staff members or their married or de facto partners. Applicants must be full-time students enrolling in any year of an undergraduate course leading to the degree of Bachelor at UNSW. Selection will be based on academic merit, aptitude and commitment to the proposed course. Consideration may be given in cases of hardship or disadvantage. Applications close 31 January.

The John Niland Scholarships (L)

- \$5,000
- 1 year

The scholarship provides assistance to enhance the opportunity of students from country high schools in Australia to enrol in an undergraduate program of study at UNSW. Applicants will be students who complete the HSC (or its counterpart matriculation requirement) in the top five percent of their state-wide cohort, having been enrolled at a country high school in Australia. Selection will be based on academic merit, potential to contribute to the wider life of the University and consideration of social and/or economic circumstances which might otherwise hinder successful transition to UNSW. Applications close 30 October.

The Malcolm Chaikin Scholarship (L)

- \$15,000 pa
- Renewable for the duration of the course subject to satisfactory progress

The scholarship is available to students entering the first year of a Bachelor of Science or Engineering in the Faculties of Life Sciences, Science and Technology, or Engineering. Selection will take into account academic merit and interview performance. Applications close early January.

The National Health and Medical Research Council (NHMRC) Training Scholarship for Aboriginal Health Research (L,R)

- \$15,637–\$23,257 pa (depending on qualifications)
- Up to 3 years

Applicants must be undertaking an undergraduate or postgraduate degree which includes, or leads to, research relevant to Aboriginal health. Applications will be assessed in terms of previous qualifications and experience with particular weight given to prior knowledge and experience of Aboriginal culture and health. Applications close late July.

The New South Scholarships (L)

- \$5,000 pa
- Up to 3 years subject to satisfactory progress

The scholarships are available to students commencing the first year of undergraduate study at UNSW. The Scholarships will be awarded taking into account academic achievement, including potential for study in a discipline of the University. No application form is required. As all students who attempt the HSC (or equivalent) will be automatically considered for the scholarship, no application is needed. The award is extremely competitive and it is expected that the successful applicant(s) will be in the top 2% of candidates.

The Ngunnagan Club Scholarship (L)

- Up to \$2,000
- 1 year

The scholarship is available to students enrolled at an Australian country high school who complete the HSC (or its counterpart matriculation requirement) in the top five per cent of their state cohort. Applicants should complete an official application form by 31 October in the year prior to their intended enrolment at UNSW. Final performance in the HSC (or its counterpart matriculation) examination should be reported to the Scholarships and Student Loans Unit once known.

UNSW-HECS Equity Awards (L)

- HECS liability
- Duration of the course, subject to satisfactory progress

In 1997, the scholarships were offered for full-time undergraduate study to applicants who achieved a TER of at least 90 in the HSC (or equivalent), and were in receipt of ABSTUDY or full AUSTUDY, and expected to be in receipt of these benefits while studying at UNSW. Applications from such students in 1997 closed in early December 1996. UNSW Access Scheme applicants were automatically considered. The conditions for the 1998 awards have not yet been determined. More information should be available in November 1997.

The Vice-Chancellor's Equity Scholarships (L)

- \$1,500 pa
- 1 year

In 1997, over 40 scholarships were awarded for financially disadvantaged students commencing full-time undergraduate study. Applicants must have applied, and be deemed eligible, for the UNSW Access Scheme, with financial disadvantage as one of the grounds for eligibility. Selection was also based on academic merit. The conditions for the 1998 awards have not yet been determined. More information should be available in November 1997.

The WS and LB Robinson Scholarship (L)

- Up to \$6,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must have completed their schooling in Broken Hill or have parents who reside in Broken Hill. Applicants should be undertaking a course related to the mining industry, for example courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering or science. A letter of application should be sent to Pasminco Mining, PO Box 460, Broken Hill, NSW 2880. Applications close 30 September each year.

Faculty First Year

Faculty of Life Sciences

The Faculty of Life Sciences Scholarships (L)

- Up to \$3,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

A number of scholarships are available and carry the title of Faculty Scholar. The scholarships are available to full-time students enrolling in one of the disciplines of the Faculty of Life Sciences. Applications close at the end of January.

Food Science and Technology

The Coca-Cola South Pacific Export Corporation Scholarship (L)

- Up to \$1,800 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must not be more than 22 years of age on 1 December of the year preceding the year in which the award commences. Applicants must be eligible for admission to Year 1 of the full-time degree course in Food Science and Technology. Applications normally close at the end of January.

The George Weston Foods Scholarship (L)

- Up to \$1,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Food Science and Technology. Applications normally close at the end of January.

Faculty of Science and Technology

The School Scholarships (Chemistry, Geography, Mathematics and Physics and Department of Applied Geology) (L)

- Up to \$2,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Up to six scholarships are available to full-time students enrolled in the Schools of Chemistry, Mathematics or Physics. Application forms are available from the Faculty Office or the Scholarships and Student Loans Unit. Applications normally close mid-February.

The Science and Technology Faculty Scholarships (L)

- Up to \$3,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Six scholarships are available and carry the title of Faculty Scholar. The scholarships are available to full-time students enrolled in one of the disciplines of the Faculty of Science and Technology. Students undertaking the combined Bachelor of Science/Bachelor of Arts course may also apply. Application forms are available from the Faculty Office or the Scholarships and Student Loans Unit. Applications normally close mid-February.

Ceramic Engineering

The Australasian Ceramic Society Scholarship (L)

- Up to \$400 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Ceramic Engineering. Applications normally close at the end of January.

The CSR Building Scholarship (L)

- Up to \$1,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Ceramic Engineering. A new scholarship is only offered when the current scholarship recipient completes his/her course. It is expected that a new award will be available in 1999. Applications normally close at the end of January.

The Clay Brick Association Scholarship (L)

- Up to \$2,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Ceramic Engineering. A new scholarship is only offered when the current scholarship recipient completes his/her course. Applications normally close at the end of January.

The Thomson Family Scholarship (L)

- Up to \$1,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Ceramic Engineering. Applications normally close at the end of January.

The Monier PGH Scholarship (L)

- Up to \$1,000 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must be eligible for admission to Year 1 of the full-time degree course in Ceramic Engineering. Applications normally close at the end of January.

Chemistry

The John Ragnar Anderson Memorial Scholarships (L)

- Up to \$1,000 pa
- Up to three years subject to satisfactory progress

Two scholarships are available to assist students in their first year of full-time undergraduate study in the School of Chemistry. They will be awarded on the basis of academic merit. Applications close 31 March.

Metallurgy

The CSIRO Division of Minerals Scholarship in Metallurgical Engineering (L)

- \$2,500 pa
- 4 years, subject to satisfactory progress

The scholarship is available to a full-time student enrolled in Year 1 of the course leading to a Bachelor of Metallurgical Engineering (Process Metallurgy) degree. Selection is based on academic merit and personal qualities. Applications close early December.

The Sir Rupert Myers Scholarship (I,L)

- Up to \$2,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

The scholarship is available to students who are permanent residents of Australia or whose parents are permanent residents of Australia. Applicants must be eligible for admission to Year 1 of the full-time degree course in Metallurgy or Metallurgical Engineering. Applications normally close at the end of January.

Physics

The CSIRO Division of Telecommunications and Industrial Physics Scholarship (L)

- Up to \$1,000 pa
- Duration of the course subject to satisfactory progress

The scholarship is available to a full-time student entering the first year of the Engineering Physics program in the Advanced Science course, leading to a Bachelor of Science degree. The scholarship will be awarded on a recommendation from the Head of School of Physics. There is no application form.

The Siemens Plessey Electronic Systems Scholarship (L)

- Up to \$1,000 pa
- Duration of course subject to satisfactory progress

The scholarship is available to a full-time student entering the first year of the Engineering Physics program in the Advanced Science course, leading to a Bachelor of Science degree. The scholarship will be awarded on a recommendation from the Head of School of Physics. There is no application form.

Scholarships for students in their second or later year of study

General Second Year or Later

The Alumni Association Scholarships (I,L)

- Up to \$1,500 pa
- 1 year, renewable subject to satisfactory progress

The scholarships are available to students enrolled in any year of a full-time undergraduate course. Candidates must be the children or grandchildren of alumni of the University of New South Wales. Applications close early January.

The Australian Vietnam Veterans Trust Education Assistance Scheme (L)

- \$3,500 pa
- Duration of the course

Applicants must be children of a Vietnam veteran and under the age of 25 at the time of application. The award is subject to the same income test as AUSTUDY. Applicants can be undertaking any year of a Bachelors course. Applications and further information are available from the Australian Vietnam War Veterans Trust National Office, PO Box K978, Haymarket NSW 2000. Tel (02) 9281 7077. Applications close 31 October.

The Ben Lexcen Sports Scholarships (I,L)

- \$2,000 pa
- 1 year with possibility of renewal

The scholarships are available to students who are accepted into a course of at least two years duration. Prospective applicants should have an outstanding ability in a particular sport and are expected to be an active member of a UNSW Sports Club. Applications close late January.

The Girls Realm Guild Scholarship (L)

- Up to \$1,500 pa
- 1 year with the prospect of renewal subject to satisfactory progress and continued demonstration of need

The scholarships are available only to female students under 35 years of age who are enrolling in any year of a full-time undergraduate course. Selection is based on academic merit and financial need. Applications close 25 March.

The Dried Fruits Research and Development Council (DFRDC) Studentships and Student Awards (I,L)

- Up to \$3,000 for Studentships, up to \$1,000 for Student Awards

The Studentships assist students to undertake research projects in the final year studies of a Bachelors degree (applications close April 15), or to undertake a research project during the summer vacation (applications close October 15). The Student Awards are provided for excellence in student research projects related to the dried fruit industry. Further information and applications are available from the Executive Officer, Dried Fruits Research and Development Council, Box 1142, Mildura VIC 3502. Tel (050) 221515, Fax (050) 233321.

The Esso Australia Ltd Geosciences Scholarship (I,L)

- Up to \$3,000
- 1 year

The scholarship is for a full-time student seeking to undertake study in the final year (Stage 4) of a Bachelor of Science degree in Applied Geology or an equivalent Honours year, majoring in geology or geophysics. The successful applicant is expected to have an interest in petroleum related studies i.e. sedimentology, biostratigraphy, seismic/magnetic/gravity geophysical studies, basin studies, palynology or palaeontology. Selection is based on academic merit, the benefit the student will gain by being awarded the scholarship and can include consideration of financial need. Applications close 30 November.

The Ian Somerville Scholarships (I,L)

- Up to \$3,000
- 1 year

The scholarships are available to immediate family members (i.e. children, parents, brothers or sisters) of UNSW staff members or their married or de facto partners. Applicants must be full-time students enrolling in any year of an undergraduate course leading to the degree of Bachelor at UNSW. Selection will be based on academic merit, aptitude and commitment to the proposed course. Consideration may be given in cases of hardship or disadvantage. Applications close 31 January.

The National Health and Medical Research Council (NHMRC) Training Scholarship for Aboriginal Health Research (L,R)

- \$15,637–\$23,257 pa (depending on qualifications)
- Up to 3 years

Applicants must be undertaking an undergraduate or postgraduate degree which includes, or leads to, research relevant to Aboriginal health. Applications will be assessed in terms of previous qualifications and experience with particular weight given to prior knowledge and experience of Aboriginal culture and health. Applications close late July.

The Nicholas Catchlove Scholarship in Flying (L)

- \$10,000 pa
- 1 year

The scholarship will be awarded to provide a final year student with the opportunity to undertake further flying training to prepare for a career in the aviation industry. Applicants must be proposing to undertake the final year of an appropriate course and hold a Commercial Pilot's Licence. Selection will be based on academic merit, reasons for undertaking the course, financial need, commitment to flying and to the course, demonstrated ability and leadership qualities, and interview performance. Applications close October.

The NSW Farmers Association E.L. O'Brien Scholarship (L)

- Up to \$2,000 pa
- 1 year

The NSW Farmers Association is offering a scholarship for a student entering Year 4 of the Wool and Pastoral Sciences course. Applicants must be members, or children of members of the Association. Applications close early March.

The NSW Ministry for the Arts Scholarships (L,R,C)

- \$5,000–\$25,000 (depending on the award)

The NSW Government offers a number of scholarships and awards to writers, artists and scholars living in NSW. Further information is available from the New South Wales Ministry for the Arts, GPO Box 5341, Sydney NSW 2000. Tel (02) 9228 3533, Fax (02) 9228 4722.

The RGC Scholarship in Economic Geology (L)

- \$5,000
- 1 year

The scholarship is available to a student entering Stage 4 of the Applied Geology course or an Honours year in geology in the Science course, undertaking a field project relevant to economic geology. Letters of application and

requests for information should be directed to RGC, Gold Fields House, 1 Alfred St, Sydney NSW 2000. Applications close 31 January.

The Sam Cracknell Memorial Scholarships (I,L)

- Up to \$1,500 pa
- 1 year

Applicants should have already completed at least 2 years of a degree or diploma course and be enrolled in a full-time course during the year of application. Selection is based on academic merit, participation in sport both directly and administratively and financial need. Applications close 31 March.

The Spruson and Ferguson (Patent Attorneys) Scholarship for Innovation (L)

- At least \$1,000
- 1 year

The scholarship is available to students undertaking the final year of an undergraduate course in any school of the Faculty of Science and Technology or the Faculty of Engineering. Selection will be based on academic merit and the innovative nature of the proposed final year project. Applicants are required to submit an application and a 200 word outline of their proposed research topic. Applications close 7 March.

The Telstra Education Fellowships (L)

- \$7,500
- 1 year

Applicants must be entering the final year of study in the disciplines of computer, electrical or electronic engineering, computer science or human factors. Students may also have the opportunity to undertake up to 12 weeks non-compulsory vacation employment. Further information is available from the Fellowship Applications Officer, Telstra Research Laboratories, Box 249, Rosebank MDC, Clayton Victoria 3169. Email: c.zaman@trl.telstra.com.au. Applications normally close at the end of July.

The W.S. and L.B. Robinson Scholarship (L)

- Up to \$6,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must have completed their schooling in Broken Hill or have parents who reside in Broken Hill. Applicants should be undertaking a course related to the mining industry, for example courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering or science. A letter of application should be sent to Pasminco Mining, PO Box 460, Broken Hill, NSW 2880. Applications close 30 September each year.

Faculty Second Year or Later

Faculty of Life Sciences

Biological Science

The Alton and Neryda Fancourt Chapple Biological Science Scholarship (I,L)

- \$1,000
- 1 year

The scholarship is available to an undergraduate student in Year 3 (final year) of the Bachelor of Science (Advanced) or Bachelor of Science degree program, majoring in any program in the School of Biological Science at UNSW. Selection will be based on academic merit. Applications close 30 April.

Honours Year Scholarships

General Honours Year

The Alumni Association Scholarships (I,L)

- Up to \$1,500 pa
- 1 year, renewable subject to satisfactory progress

The scholarships are available to students enrolled in any year of a full-time undergraduate course. Candidates must be the children or grandchildren of alumni of the University of New South Wales. Applications close early January.

The Apex Foundation for Research into Intellectual Disability Studentships (I,L)

- \$1,000

The studentships are available to students preparing a thesis related to intellectual disability. Applications should be in the form of a letter which includes a curriculum-vitae and thesis plan and must be supported by a letter from the Head of School/Department. Applications should be sent to the Honorary Secretary, Apex Foundation Studentships, PO Box 311, Mt Evelyn Vic 3796. Applications close 31 May.

Faculty of Science and Technology

Metallurgy

The Pasminco Scholarship (L)

- Up to \$1,000 pa
- 1 year

One scholarship is available for a student entering Year 4 of the Bachelor of Metallurgical Engineering. A letter of application should be sent direct to the School of Materials Science and Engineering. Applications close early March.

The Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART) Student Award (I,L)

- \$1,000 for attendance at the annual conference

Applicants can be Honours students from any discipline. The award provides assistance for a student to attend the annual conference. Applications are available from ANZCCART, PO Box 19 Glen Osmond, SA, 5064. Tel (08) 303 7325. Applications close July.

The Australian Vietnam Veterans Trust Education Assistance Scheme (L)

- \$3,500 pa for the duration of the course

Applicants must be children of a Vietnam veteran and under the age of 25 at the time of application. The award is subject to the same income test as AUSTUDY. Applicants can be undertaking any year of a Bachelors course. Applications and further information are available from the Australian Vietnam War Veterans Trust National Office, PO Box K978, Haymarket NSW 2000. Tel (02) 9281 7077. Applications close 31 October.

The Ben Lexcen Sports Scholarships (I,L)

- \$2,000 pa
- 1 year with the possibility of renewal

The scholarships are available to students who are accepted into a course of at least two years duration.

Prospective applicants should have an outstanding ability in a particular sport and are expected to be an active member of a UNSW Sports Club. Applications close late January.

The Esso Australia Ltd Geosciences Scholarship (I, L)

- Up to \$3,000
- 1 year

The scholarship is for a full-time student seeking to undertake study in the final year (Stage 4) of a Bachelor of Science degree in Applied Geology or an equivalent Honours year, majoring in geology or geophysics. The successful applicant is expected to have an interest in petroleum related studies i.e. sedimentology, biostratigraphy, seismic/magnetic/gravity geophysical studies, basin studies, palynology or palaeontology. Selection is based on academic merit, the benefit the student will gain by being awarded the scholarship and can include consideration of financial need. Applications close 30 November.

The Girls Realm Guild Scholarships (L)

- Up to \$1,500 pa
- 1 year with the prospect of renewal subject to satisfactory progress and continued demonstration of need

The scholarships are available only to female students under 35 years of age who are enrolling in any year of a full-time undergraduate course. Selection is based on academic merit and financial need. Applications close 25 March.

The Grains Research and Development Corporation (GRDC) Undergraduate Honours Scholarship (I,L)

- \$6,000 (i.e. \$5,000 to the student and \$1,000 to the host School/Department).
- 1 year

Applicants must be undertaking a full-time Honours program. Study in an area of significance to the grains industry will be viewed favourably. A letter of application, including a curriculum-vitae, academic record, letter of support from the Head of School/Department and two referees' supporting statements, should be sent to GRDC Undergraduate Honours Scholarship, PO Box E6, Queen Victoria Terrace, Canberra ACT 2600. Tel (02) 62725528. Applications close late November.

The Great Barrier Reef Marine Park Authority Research Support (I,L)

- \$1,500

Applicants must be undertaking a full-time Honours year or PhD research project that could contribute to the planning and managing work undertaken by the Great Barrier Reef Marine Park Authority. Applications and further information may be obtained from the Executive Officer, Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville QLD 4810. Tel (077) 818811. Applications close mid-December.

The Ian Somerville Scholarships (I,L)

- Up to \$3,000
- 1 year

The scholarships are available to immediate family members (i.e. children, parents, brothers or sisters) of UNSW staff members or their married or de facto partners. Applicants must be full-time students enrolling in any year of an undergraduate course leading to the degree of Bachelor at UNSW. Selection will be based on academic merit, aptitude and commitment to the proposed course. Consideration may be given in cases of hardship or disadvantage. Applications close 31 January.

The National Health and Medical Research Council (NHMRC) Training Scholarship for Aboriginal Health Research (L,R)

- \$15,637–\$23,257 pa (depending on qualifications)
- Up to 3 years

Applicants must be undertaking an undergraduate or postgraduate degree which includes, or leads to, research relevant to Aboriginal health. Applications will be assessed in terms of previous qualifications and experience with particular weight given to prior knowledge and experience of Aboriginal culture and health. Applications close late July.

The NSW Ministry for the Arts Scholarships (L,R,C)

- \$5,000–\$25,000 (depending on the award)

The NSW Government offers a number of scholarships and awards to writers, artists and scholars living in NSW. Further information is available from the New South Wales Ministry for the Arts, GPO Box 5341, Sydney NSW 2000. Tel (02) 9228 3533, Fax (02) 9228 4722.

The RGC Scholarship in Economic Geology (L)

- \$5,000
- 1 year

The scholarship is available to a student entering Stage 4 of the Applied Geology course or an Honours year in geology in the Science course and undertaking a field project relevant to economic geology. Letters of application and requests for information should be directed to RGC,

Gold Fields House, 1 Alfred St, Sydney NSW 2000.
Applications close 31 January.

The River Basin Management Society Ernest Jackson Memorial Research Grants (I,L)

- Up to \$2,000

Grants are available to assist students undertaking research projects in any field of study allied to river basin management. Applications close April.

The RSPCA Alan White Scholarship (I,L)

- \$2,500

Applicants should be undertaking original research to improve the understanding and welfare of animals. A letter of application should be sent to the Executive Officer, RSPCA Australia, PO Box E369, Queen Victoria Terrace, Canberra ACT 2600. Tel (02) 62311437. Applications close 31 March.

The Sam Cracknell Memorial Scholarship (I,L)

- Up to \$1,500 pa
- 1 year

Applicants should be full-time students who have already completed at least 2 years of a degree or diploma course. Selection is based on academic merit, participation in sport both directly and administratively, and financial need. Applications close 31 March.

The University Honours Year Scholarships (I,L)

- \$1,000
- 1 year

A number of scholarships will be awarded on the basis of academic merit for students entering an 'add-on' honours year, i.e. the honours year in a degree course which is normally a pass degree but which has the option of a further year of study at Honours level. Applications close 30 November.

The WS and LB Robinson Scholarship (L)

- Up to \$6,500 pa
- 1 year renewable for the duration of the course subject to satisfactory progress

Applicants must have completed their schooling in Broken Hill or have parents who reside in Broken Hill. Applicants should be undertaking a course related to the mining industry, for example courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering or science. A letter of application should be sent to Pasminco Mining, PO Box 460, Broken Hill, NSW 2880. Applications close 30 September each year.

Faculty Honours Year

Faculty of Science and Technology

The HC & ME Porter Memorial Scholarship (I,L)

- Up to \$3,000
- 1 year

The scholarship is available to a full-time student undertaking an Honours year in Chemistry, Mathematics or Physics in the Faculty of Science and Technology. Applications close 20 December in the year prior to the proposed Honours year.

Mathematics

The Buchwald Award in Applied Mathematics (I,L)

- Up to \$400 pa
- 1 year

One scholarship is available for a student in the final year of the Honours course in Applied Mathematics. Applications close 31 March.

The George Szekeres Award (I,L)

- \$300 pa
- 1 year

The scholarship is available to students entering the final year of the Honours course in Pure Mathematics. Applications close 31 March.

Travel Scholarships

General Travel

The Arthur Anderson Study Abroad Scholarship (L)

- Up to \$2,500

The scholarship is to provide financial assistance to undergraduate students to undertake a period of study/research in Arthur Anderson offices in Singapore. Applicants must be full-time students undertaking study in law, commerce, or economics. Applicants must normally be intending to undertake the final year of study and to complete the travel prior to completion of the final year. Applications are also open to students undertaking an official exchange program with relevant universities in Asia who are able to undertake research/study in the Singapore office of Arthur Anderson. Applications normally close 31 July in the year prior to the final year of study.

The Association of International Education Japan (AIEJ) Short-Term Student Exchange Promotion Program (Inbound) Peace and Friendship Scholarships (I,L)

- 50,000 yen (settling-in allowance), 100,000 yen per month, plus airfare
- Ten months to one year

Applicants must be accepted by a Japanese university under a student exchange program agreement with UNSW. Students must initially apply directly to a Japanese university through the International Student Centre at UNSW. The Japanese host university will recommend candidates to AIEJ and students must apply as directed by the host university. Applications close February, May and September each year.

The Association of International Education Japan (AIEJ) Short-Term Student Exchange Promotion Program (Inbound) Scholarships (I,L)

- 50,000 yen (settling-in allowance), 80,000 yen per month, plus airfare
- Six months to one year

Applicants must be accepted by a Japanese university under a student exchange program agreement with UNSW. Students must initially apply directly to a Japanese university through the International Student Centre at UNSW. The Japanese host university will recommend candidates to AIEJ and students must apply as directed by the host university. Applications close February, May and September each year.

The AT&T Leadership Award (I,L,R,C)

- US\$5,000

The award is open to students who will be commencing full-time undergraduate or postgraduate study in the United States between January and September in the year of application. The scholarship is open to students from the following Asia/Pacific countries: Australia, China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. Information and applications are available from the U.S. Consulate General, USIS, Level 59 MLC Centre, 19–20 Martin Place, Sydney NSW 2000. Tel (02) 9662 3016. Applications close 15 September.

The Australia-Korea Foundation/National Korean Studies Centre Exchange Scholarships (L)

- Up to \$2,500

The Scholarships provide financial assistance to undergraduate students who have been accepted as exchange students by a Korean university. Information and applications are available from the Programs Coordinator, National Korean Studies Centre, PO Box 218, Hawthorn Vic 3122. Email: nksc@swin.edu.au. Applications close early January.

The Australia-Korea Foundation Undergraduate Bursaries (L)

- \$1,000
- 1 year

Bursaries are available for students commencing the first year of an undergraduate course intending to study Korean language. Information and applications are available from the Programs Coordinator, National Korean Studies Centre, PO Box 218, Hawthorn Vic 3122. Email: nksc@swin.edu.au. Applications close in December.

The Cambridge and Harvard Travel Scholarships (L)

- \$15,000 contribution towards fees, travel and living expenses
- One-off payment

The scholarship will be awarded by the Vice-Chancellor on the basis of recommendations from the Deans of the Faculties. Candidates must have an impressive record, having completed at least 2 years full-time (or the part-time equivalent) of an undergraduate course at the University of New South Wales. Applications for travel to

Harvard University are available from the Scholarships and Student Loans Unit. Applications close mid-November for travel the following year. Cambridge Travel Scholarships have not yet been finalised.

Churchill Fellowships (L)

- Tuition, travel and living allowances

Churchill Fellowships provide financial support for Australian Citizens to undertake study, training or projects overseas that offer special advantage over those in Australia. Fellowships will not normally be awarded for higher academic or formal qualifications. Applicants must be over 18 years of age. Further information and applications are available from the Chief Executive Officer, The Winston Churchill Memorial Trust, 218 Northbourne Ave, Braddon ACT 2612. Tel (02) 6247 8333. Applications close late February.

DAAD – The German Academic Exchange Service Scholarships (L)

Application forms for the following scholarships are available from the Consulate General of the Federal Republic of Germany, PO Box 204, Woollahra NSW 2025.

One-Semester German Studies Scholarships

- DM1,000 a month living allowance, travel assistance of DM2,500 and the health insurance contribution
- One semester

Applicants must be in their third year of German Studies. Applications close 1 July.

Deutschlandkundlicher Winterkurs

- DM3,500 to assist with travel and living expenses and course fees

Undergraduate and postgraduate students from all fields with at least two years University level German (with a better than B average) may apply for this scholarship. The students should be aged from 19 to 32 and proposing to undertake the 8 week German studies course (in German) at the University of Freiburg. The course provides language instruction and concentrates on historical and cultural aspects of contemporary Germany for students with some knowledge of German and a background in German Studies. Applications close 1 August.

The International Exchange Travel Scholarships (L)

- Up to \$1,500 pa
- 1 year

The scholarships were established to encourage UNSW students to participate in the University's formal international exchange programs. Students must be undergraduates embarking on a period of study overseas which will count toward their UNSW degree. Awards will be granted on the basis of academic merit. Further

information is available from the International Student Centre. Tel (02) 9385 5333.

The Japanese Government (Monbusho) Scholarships (L)

Scholarships are available to Australian citizens for study in Japan in the following areas: Japanese Studies, In-Service Training for Teachers, Research, Undergraduates. Applicants must be willing to study the Japanese language and receive instruction in Japanese. Further information and applications are available from Monbusho Scholarships, Embassy of Japan, 112 Empire Circuit, Yarralumla ACT 2600. Tel (02) 6273 3244, Fax (02) 6273 1848. Applications close April (for Japanese Studies and Teacher Training) and July (for Research and Undergraduate scholarships).

The Malcolm Chaikin Overseas Exchange Scholarship (L)

- \$3,000
- 1 year

A scholarship is available for a third year student in a Science or Engineering degree program in the Faculty of Life Sciences, Science and Technology or Engineering. Applicants must be undertaking an overseas exchange program through the International Student Centre. Applications close late June. It is expected that the first scholarship will be awarded in 1999.

The Mitsui Education Foundation Scholarship (L)

A one month scholarship to Japan is available to a young Australian national to help promote goodwill between the two countries. Candidates should be full-time undergraduate students aged between 20 and 24, and preferably in their third or fourth year. The successful student will travel to Japan during November and December. Application forms close mid-July.

The NSW Travelling Art Scholarship (L)

- \$25,000

The scholarship is available to an emerging visual artist to undertake a course of study or training overseas for one or two years. Guidelines and applications are available from the NSW Ministry for the Arts, GPO Box 5341, Sydney 2001. Tel (02) 9228 5533. Applications normally close in July.

Queen's Trust Grants (L)

- Up to \$15,000

The Queen's Trust provides grants to Australian Citizens aged 18-28 years, for the pursuit of excellence in their chosen fields. Projects are supported for the advancement of Australian youth, development of community leadership

and/or other skills which will be of benefit to Australia. Information and applications may be obtained from the Queen's Trust. Tel 1800 033 625. Applications close late April.

The RC Sutton/Jardine Matheson Scholarship (L)

- Up to \$1,000

The scholarship is to provide financial assistance to undergraduate students to undertake a period of study/research in R.C. Sutton/ Jardine Matheson offices in Asia. Applicants must be full-time students undertaking study in law, commerce, or economics. Applicants must normally be intending to undertake the final year of study and to complete the travel prior to completion of the final year. Applications are also open to students undertaking an official exchange program with relevant universities in Asia who are able to undertake research/study in an Asian office of R.C. Sutton/ Jardine Matheson. Applications normally close 31 July in the year prior to the final year of study.

The Rotary Foundation Ambassadorial Scholarships (I,L)

The Rotary Foundation offers scholarships to study or train in another country where Rotary clubs are located. Applicants must have completed at least two years of a university or college course, or have completed high school and have been employed for at least two years. Applicants must also be citizens of a country in which there is a Rotary club. Information regarding scholarship availability, closing dates and applications should be obtained from the applicant's local Rotary club.

The Sir Charles Mackerras/Australia–Britain Society Music Scholarship (L)

- 8,000 pounds sterling

The scholarship is open to outstanding young conductors, composers and répétiteurs, aged between 21 and 30 who are likely to be influential leaders in the field of music, to undertake study in the United Kingdom or the Czech republic for at least six months. Applicants must be Australian Citizens or Permanent Residents. Application forms are available from the British Council, PO Box 88, Edgecliff NSW 2027. Tel (02) 9326 2022, Fax (02) 9327 4868, Email: bcsydney@sprint.com.au. Applications close early November.

The STA Travel Grant (I,L)

- Up to \$1,500 (in 1998) and up to \$3,000 from 1999

Applicants must be undertaking study leading to a degree or diploma of the University and be members of the University Union. The grant is awarded on the basis of significant contribution to the community life of the University involving a leadership role in student affairs and the University Union and the relevance and merit of the

proposed travel to the student's academic program or University Union activities. Applications close mid-April.

The Swedish Institute Guest Scholarships (I, L)

- SEK 7,000 per month living allowance
- 9 months (1 academic year)

The scholarships are open to students and researchers who wish to travel to Sweden for study or research which cannot equally well be pursued in countries other than Sweden. Applicants must establish contact with a Swedish University willing to accept the applicant for the proposed studies. Initial requests for application forms must be made in writing, and should include name and address, nationality, educational background, work experience, knowledge of any languages, statement of the purpose of the study or research in Sweden, and a copy of a letter of invitation from a Swedish University Department. Applications are available from the Swedish Institute, Department for Educational and Research Exchange, PO Box 7434, S-103 91, Stockholm, Sweden. Email: grantinfo@si.se. Requests for application forms must reach the Swedish Institute before 1 December.

The Swiss Confederation Scholarships (L)

A scholarship may be available from The Swiss Confederation for art studies (for example, painting, graphic design, sculpture, music) for one academic year. The scholarship will be awarded on the basis of academic merit and the possibilities for study in Switzerland. Applicants must have been born after 1 January 1962. The scholarship can only be allocated after the candidate has been accepted by a Swiss art school or conservatory. Applicants will be required to pass a language test in German or French. Applications close 1 December.

The Yokohama Scholarship Awards (L)

- JPY 120,000 per month undergraduate, JPY 150,000 per month for postgraduate students, tuition fees, airfare plus allowances
- Up to 4 years (undergraduate), 1 year for Japanese language study, 2 years Masters, 3 years PhD

Applicants must be Australian Citizens who have submitted their application to, or been accepted by a Japanese university and be able to communicate in Japanese (or be willing to undertake intensive study of the Japanese language). All disciplines are eligible except for subjects in medicine, veterinary science and dentistry. The scholarship will be granted subject to the applicant's final acceptance by the chosen Japanese university. Original application forms only will be accepted and are available from the Scholarships and Student Loans Unit or from the Yokohama Scholarship Foundation. Tel (07) 5588 0880, Fax (07) 5588 0842. Applications close with the Foundation in early October.

Vacation Scholarships

Some Schools may offer scholarships for the long vacation period from December to February each year. Students should contact the relevant School office for information.

General Vacation

The Australian Kidney Foundation Vacation Scholarships (I,L)

- Up to \$800
- 6–8 weeks

The scholarships are open to undergraduate students currently in Medicine or other courses related to Biological Science, who will have completed at least one year of full-time study. Research projects undertaken must be related to the kidney and the urinary tract, and carried out at university departments during the summer vacation period. Applications close early September.

The CSIRO Division of Marine Research Vacation Scholarships (I,L)

- Up to \$450 per week plus travel expenses
- 8 weeks between December and February

Applicants must be full-time undergraduate students who have completed not less than three years of their course. Research projects will be undertaken with the CSIRO Division of Marine Research at either Hobart, Cleveland or Marmion. Applications close early September.

The Dried Fruits Research and Development Council (DFRDC) Studentships (I,L)

- Up to \$3,000 for Studentships, up to \$1,000 for Student Awards

The Studentships assist students to undertake research projects during the summer vacation. Further information and applications are available from the Executive Officer, Dried Fruits Research and Development Council, Box 1142, Mildura VIC 3502. Tel (050) 221515, Fax (050) 233321. Applications close 15 October.

The Heart Foundation Vacation Scholarships

Scholarships are available for tenure during the long vacation period for research projects related to cardiovascular function and disease. Applicants should normally have completed at least two years of an appropriate degree course in the biological sciences. Preference will be given to applicants who have had little

or no laboratory experience. Application guidelines become available from the Scholarships and Student Loans Unit in late July. Applications close early September.

The National Multiple Sclerosis Society of Australia Summer Vacation Scholarships (L,R)

- \$200 per week
- 6–8 weeks between November and March

The scholarships are open to undergraduate students who will have completed three years of an Honours degree in medicine, science, biological or health sciences. Research projects undertaken must be relevant to multiple sclerosis and carried out at university departments during the summer vacation period. Applications close mid-August.

The Novo Nordisk Student Research Scholarship (I,L)

- Between \$1,000 and \$1,500
- 6–9 weeks over the vacation period

Scholarships are available for diabetes-related research, at the Department of Endocrinology, Prince of Wales Hospital. The scholarship is open to students enrolled at any tertiary institution in Australia, however preference will be given to students enrolled in an undergraduate degree in Science or Medicine at UNSW. Selection will be based on interest in research into diabetes mellitus and academic performance. Further information is available from A/ Professor Bernie Tuch, Prince of Wales Hospital, Tel (02) 9382 4814. Applications close 31 October.

Faculty Vacation

Faculty of Science and Technology

Chemistry

The School of Chemistry Summer Vacation Scholarships (I,L)

- Up to \$250 per week
- Up to 8 weeks

Summer Vacation Scholarships are available to undertake research with staff members of the School of Chemistry. Students completing 1st year may receive a total of up to \$500, for up to 4 weeks. Students in 2nd or 3rd year may receive up to \$250 per week for 8 weeks. Further

information is available from Dr D.N. Duffy, Executive Assistant, School of Chemistry, UNSW. Tel (02) 9385 4693, Fax (02) 9385 6141, Email: d.duffy@unsw.edu.au

Mathematics

Vacation Scholarships in Mathematics (I,L)

- \$300 per week
- At least 6 weeks

Vacation scholarships are available for research in the School of Mathematics. Applicants should be enrolled in third year mathematics or statistics and be interested in further study. Scholarships may also be available for exceptional second year students. Further information is available from Dr Alex Opie, School of Mathematics, UNSW. Tel (02) 9385 2955, Email: a.opie@unsw.edu.au. Applications close mid-October.

Postgraduate Scholarships

Following are details of scholarships available to postgraduate students at UNSW. The scholarships are listed by Faculty and course (e.g. scholarships in Science or Engineering) or whether they are available to undertake travel. If students from more than one Faculty are able to apply the scholarship is listed in the General Scholarships section.

For further information contact:

**The Scholarships and Student Loans Unit
The University of New South Wales
Sydney 2052 Australia**

Tel (02) 9385 3100/3101/1462

Fax (02) 9385 3732

Email: scholarships@unsw.edu.au

General

Main programs of assistance for postgraduate study

The Australian Postgraduate Awards (APA) (L,R)

- \$15,888 pa (1998 rate). Other allowances may also be paid.
- Up to 2 years for a Masters, 3 years for a PhD degree. PhD students may apply for up to 6 months extension in certain circumstances

Applicants must have graduated, or be proposing to graduate in the current academic year, with Honours 1 or equivalent. The scholarships are available to undertake a Masters by Research or PhD. Students with Permanent Resident status should normally have lived in Australia continuously for 12 months. Applications close late October.

The Australian Development Co-operation Scholarship (ADCOS) (I, R, C)

- Tuition fees. Some students may be eligible for air fares and a stipend
- Determined by normal course duration

This award is for international students from selected countries only. Information and applications can only be obtained from Australian Diplomatic Posts or Australian Education Centres in the home country. Conditions and entitlements vary depending on the home country.

The Overseas Postgraduate Research Scholarships (OPRS) (I,R)

- Tuition fees and medical cover only
- 2 years for a Masters by Research, 3 years for a PhD degree

Eligibility is confined to postgraduate students who are citizens of countries other than Australia or New Zealand, to undertake a research degree at UNSW. Applications close late September.

Other General

The Anthony Rothe Scholarship (I,L,R)

- \$28,000 pa plus allowances
- Up to 3 years

Applications are open to postgraduate students eligible to undertake a PhD. The proposed research must be related to the causes, prevention, treatment or cure of leukaemia and allied blood disorders. Information and applications are available from The Secretary, Anthony Rothe Memorial Trust, c/- Brigden & Partners, GPO Box 2564, Sydney NSW 2001. Applications close late August.

The Apex Foundation for Research into Intellectual Disability Research Grants (I,L,R)

Grants may be awarded for new or existing research projects in any discipline concerned with the causes, diagnosis, prevention or treatment of intellectual disability and allied conditions. Applications can be obtained from the Hon. Secretary, Apex Foundation for Research into Intellectual Disability Limited, PO Box 311, Mount Evelyn VIC 3796. Applications close late July.

The Arthritis Foundation of Australia Rheumatology Research & Professional Education Awards (L,R)

- \$15,000–\$22,000 pa
- 1 year with a possible 2 year extension

Scholarships are available to support research projects into arthritis, osteoporosis and other musculoskeletal disorders. Applicants must be enrolled in studies leading to a Masters by Research or PhD. Further information and applications are available from The Arthritis Foundation of Australia, GPO Box 121, Sydney NSW 2001. Tel (02) 92212456, Fax (02) 92322538. Applications close early June.

The Asthma Foundation of New South Wales Research Scholarships (I,L,R)

- To be determined
- 1–3 years

The scholarships are available for research into areas related to asthma including the basic medical services and clinical or psychological investigations. Further information is available from The Asthma Foundation of NSW, Suite 1 "Garden Mews", 82–86 Pacific Highway, St Leonards NSW 2065. Applications close early August.

The Australian Brewers Foundation Alcohol Related Medical Research Postgraduate Scholarships (I,L,R)

- Similar to the NHMRC (see NHMRC entry)
- 1 year

Similar to the NHMRC. The scholarships are available to support research into the medical, social and public health aspects of moderate, hazardous or harmful alcohol consumption. Information and application are available from ABF – Medical Research Advisory Committee. Tel (02) 955 26688, Fax (02) 9552 1369. Applications close mid-September.

The Australian Coral Reef Society (ACRS) Inc Student Grants (I,L,R,C)

- \$1,000 (plus \$1,500 Walker prize for the best proposal)

The grant is open to students at any Australian University who are enrolled in a PhD or MSc involving research on coral reefs. Recipients must be a member of, or be willing to join the ACRS. Applications normally close late November.

The Australian Federation of University Women (I,L,R,C)

Each year the Federation offers to its members a number of awards for study in Australia and overseas. Details of awards are included in a booklet available from the Australian Federation of University Women Inc, 8th Floor, Dymocks Building, 428 George Street, Sydney NSW 2000. Tel (02) 9232 5629.

The Australian Institute of Nuclear Science and Engineering (AINSE) Postgraduate Research Awards (I,L,R)

- \$7,500 supplement to an APA or equivalent scholarship and \$5,500 pa for facility costs plus allowances
- Up to 3 years

The Institute offers awards for postgraduate students whose research projects are associated with nuclear science or its applications. Applicants must be in receipt of an APA or equivalent scholarship and have completed (or expect to

complete) a Bachelor of Engineering or Bachelor of Science with Honours. At least one month per year must be spent at the Institute at Lucas Heights, NSW. Applications close early December.

The Australian Kidney Foundation Medical Research Scholarship (I,L,R)

- Similar to the National Health and Medical Research Council research scholarships (see NHMRC entries under General)
- Up to 3 years

The scholarships are available to medical graduates proposing to undertake an MD or PhD with a research area related to the kidney and urinary tract. Information is available from Aust Kidney Foundation, GPO Box 9993, Deakin ACT 2600. Tel (02) 6282 2913, Fax (02) 6285 2060. Applications close 1 September.

The Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART) Student Award (I,L,R,C)

- \$1000 for attendance at the annual conference

Applicants can be postgraduate students from any discipline. The award provides assistance for a student to attend the annual conference. Applications are available from ANZCCART, PO Box 19, Glen Osmond, SA, 5064. Tel (08) 303 7325. Applications close July.

The Australian Pain Relief Association and Australian Pain Society PhD Scholarship (L,R)

- \$16,750 pa plus allowances
- Up to 3 years subject to satisfactory progress

Applicants must hold an Honours 1 degree and be proposing to undertake a PhD in the mechanism, diagnosis, treatment or epidemiological features of acute or chronic (including cancer) pain. Further information and applications are available from the Australian Pain Society Secretariat, PO Box 629, Willoughby NSW 2068. Tel (02) 9439 6744. The award is offered bi-annually. Applications close early November.

The Australian Society for Microbiology (L,R,C)

The Australian Society for Microbiology (ASM) provides prizes and awards ranging from \$100 to \$10,000, for study, research and projects related to Microbiology. More information can be obtained from the ASM National Office, Unit 23/20 Commercial Rd, Melbourne VIC 3004. Tel (03) 9867 8699, Fax (03) 9867 8699.

The Australian Spinal Research Foundation Postgraduate Research Awards (I,L,R)

- Equivalent to Australian Postgraduate Award (see APA entry under General)
- Up to 2 years for a Masters by Research or 3 years for a PhD degree

Applicants must be undertaking a Masters by Research or PhD in an area designed to contribute to an understanding of the anatomical and physiological mechanisms underlying chiropractic care or the clinical efficiency of chiropractic care and management procedures. Information and applications are available from Aust. Spinal Research Foundation, PO Box 1047, Springwood Qld 4127. Tel (07) 3808 4098, Fax (07) 3808 8109, Email: t.flack@qut.edu.au. Applications close mid October.

The Community Health and Anti-Tuberculosis Association – The Harry Windsor Biomedical and Medical Research Scholarship (L,R)

- \$23,257 pa (Medical postgraduates), \$15,637–\$20,180 pa (Biomedical Science postgraduates) plus allowances
- Up to 3 years

Applicants must be proposing to undertake full-time postgraduate medical research in the areas of tuberculosis, respiratory disease (particularly community aspects) or the health of disadvantaged people. Only original application forms will be accepted and are available from The Executive Officer, Community Health and Anti-Tuberculosis Association, PO Box 84, Darlinghurst, NSW 2010. Fax (02) 9360 5520. Applications close 15 August.

The Cooperative Research Centre for Eye Research and Technology (CRCERT) Postgraduate Research Scholarship (I,L,R)

- \$15,321–\$19,827 pa (depending on the type of research)
- 3 years

The scholarship is available for full-time PhD studies in subjects such as optometry, microbiology, biochemistry, optics, materials science, polymer chemistry and immunology. For information about application procedures applicants should initially contact Dr Mark Wilcox, CRCERT, University of New South Wales, Sydney 2052. Tel (02) 9385 0222.

The Clean Air Society of Australia and New Zealand Inc Postgraduate Research Award (I,L,R,C)

- \$5,000 pa
- 1 year, with a possible 1 year extension

The scholarship is open to students enrolled in a Masters degree program with a significant research component connected with air quality. Applications close early February.

The CSIRO Division of Fisheries Supplementary PhD Awards (L,R)

- \$10,000 pa
- Up to 3 years

This scholarship is a supplement to any primary scholarship (e.g. APA) for PhD study in marine studies, environmental studies, zoology, botany, broadly-based life sciences, economics and mathematics. Applications close early March.

The Dairy Research and Development Corporation (DRDC) Postgraduate Education Program (L,R)

Awards to undertake full-time postgraduate research degrees are available in a wide range of disciplines including dairy manufacturing, farm research, economics and marketing, and agricultural extension. New and experienced applicants are welcome to apply. Guidelines and applications are available from the Scholarships and Student Loans Unit or DRDC, PO Box 8000, Glen Iris VIC 3146. Tel (03) 9889 0577. Applications close 31 October.

The Forest and Wood Products Research and Development Corporation (FWPRDC) Scholarships (L,R)

- Up to \$25,000 pa
- Up to 3 years

The scholarships are open to students undertaking a postgraduate research degree at an Australian University. Selection is based on academic merit and the relevance of the project to FWPRDC Programs. Further information and applications are available from the Executive Director, FWPRDC, PO Box 157, Bond University Qld 4229. Fax (07) 5578 7911. Applications close early October.

The Garnett Passe and Rodney Williams Memorial Foundation Research Scholarships in Otolaryngology (I,L,R)

- \$15,364 pa for science graduates, \$22,850 pa for medical graduates, plus allowances
- 3 years

The scholarships are available to medical or science graduates for research in Otolaryngology or in related fields of biomedical science. Applicants must be enrolled in a postgraduate degree in Australia or New Zealand. Information and applications are available from the Garnett Passe and Rodney Williams Memorial Foundation, Pelham House, 165 Bouverie St, Carlton VIC 3053. Tel (03) 9349 2622, Fax (03) 9349 2615. Applications normally close in August.

The Gerontology Foundation Grant-In-Aid (I,L,R,C)

- Up to \$5,000 for a specific research project

A Grant-In-Aid is awarded to students who have not had their work published in a refereed journal and who have not won any research grants in open competition. The grant supports a proposed scientific investigation topic specified by the Foundation. Information and applications are available from The Executive Officer, Gerontology Foundation of Australia Inc, PO Box 199, Annandale NSW 2038. Applications normally close in late July.

The Gowrie Scholarship Trust Fund (L,R,C)

- \$4,000 pa
- 2 years

Applicants must be members of the Forces or children (or grandchildren or lineal descendants) of members of the Forces who were on active service during the 1939–45 War. Tenable at tertiary institutions in Australia and overseas. Applications close early October.

The Grains Research and Development Corporation (GRDC) Junior Research Fellowship (L,R)

- \$21,000 pa plus up to \$3,000 to the supporting institution, some conference/workshop attendance allowances
- Up to 3 years

Applicants must be undertaking full-time PhD studies in fields of high priority to the grains industry. Applications close mid-October.

The Great Barrier Reef Marine Park Authority Research Support (I,L,R)

- \$1,500

Applicants must be undertaking a full-time PhD research project that could contribute to the planning and managing work undertaken by the Great Barrier Reef Marine Park Authority. Applications and further information may be obtained from the Executive Officer, Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville QLD 4810, Tel (077) 818811. Applications close mid-December.

The Harold G Conde Memorial Fellowship (L,R,C)

- \$5,000 pa subject to the availability of funds
- Up to 3 years

Applicants should be honours graduates. The Fellowship is a supplementary award to be held in conjunction with another scholarship and is for postgraduate study or research in a field related to the electricity industry. Applications close early April.

The Julian Small Foundation Annual Research Grant (I,L,R)

- Up to \$5,000

Applications are open to postgraduate students involved in the study of law, or industrial relations. Selection will be based on a research proposal which outlines how the research will advance the thinking and practice in the area of employment law and industrial relations in Australia. Applications close mid-August.

The June Opie Fellowship (I,L,R,C)

- NZD\$10,000
- 1 year

The award is administered by the University of Auckland and is available to citizens and permanent residents of Australia, Canada and New Zealand, and is designed as an incentive for students of high academic achievement who have a severe disability. It is primarily intended for those who plan to undertake postgraduate study with a view to preparing themselves for a role in the professions, in politics or more particularly in university teaching and research and who have disability issues as a continuing interest. Applications close with the University of Auckland early October.

Land and Water Resources Research and Development Corporation (LWRRDC) Postgraduate Research Scholarships (I,L,R)

- \$20,000 pa plus \$5,000 for operating expenses
- 2 years for Masters, 3 years for a PhD degree

General Research Scholarships are available for research that will lead to better management, sustainable use and conservation of land, water and vegetation resources in Australia. Irrigation Research Scholarships are specifically for research that will lead to better management, sustainable use and conservation of natural resources within the irrigation industries. Applications are available from the Scholarships and Student Loans Unit or LWRRDC, GPO Box 2182, Canberra ACT 2601. Tel (02) 62573379. Applications close early October.

The Lionel Murphy Postgraduate Scholarship (L,R,C)

- \$15,000 pa for study in Australia, up to \$30,000 for study overseas
- 1 year

Applicants must be intending to undertake a postgraduate degree in Law, Science, Legal Studies or other appropriate discipline. Preference will be given to applicants who propose to study the law and legal system in a social context, science/law or international law. Information and application forms are available from the Lionel Murphy Foundation, GPO Box 4545, Sydney NSW 2001. Tel (02) 9223 5151, Fax (02) 9223 5267. Applications close mid-September.

The Meat Research Corporation (MRC) Studentships and Junior Research Fellowships (L,R,C)

- \$14,961 pa for study in a Masters or Diploma, \$20,000 for a PhD in Australia or US\$17,500 for study overseas, plus airfares, insurance and allowances
- 2 years for Studentships (Masters or Diploma), 3 years for Junior Research Fellowships (PhD)

Applicants should be proposing to undertake research and training in 'off-farm' disciplines of practical value to the Australian beef, sheep meat, goat meat and buffalo industries. Applications normally close mid-August.

The Menzies Research Scholarship in Allied Health Sciences (L,R)

- Up to \$24,000 pa
- 2 years

The scholarship is awarded to stimulate research in the non-medical allied health disciplines. Applicants should be full-time students, who have completed the first stage of a PhD program. Applications are available from The Menzies Foundation, 210 Clarendon St, East Melbourne VIC 3002, Fax (03) 9417 7049. Applications close late June.

The Minerals Council of Australia Student Research Award (I,L,R)

- \$500 plus travel and accommodation for the Environmental Workshop

The award is open to scholars who have completed or are undertaking postgraduate studies, and is aimed at encouraging excellence in student research and communication in the field of environmental management related to mining. The award will be judged on a paper written for and presented at the Minerals Council of Australia's Environmental Workshop. Nominations close early May.

The National Drug Strategy (NDS) Postgraduate Research Scholarship (I,L,R)

- \$23,204 pa
- 1 year, with a possible 2 year extension

Scholarships are available to students undertaking PhD studies and aim to develop expertise in researching and evaluating non-biomedical approaches to the prevention and treatment of drug misuse. Selection is based on academic merit, work experience and the potential of the project. Applications close mid-July.

The National Health and Medical Research Council (NHMRC) Training Scholarship for Aboriginal Health Research (L,R)

- \$15,637–\$23,257 pa (depending on qualifications)
- Up to 3 years

Applicants must be undertaking an undergraduate or postgraduate degree which includes, or leads to, research relevant to Aboriginal health. Applications will be assessed in terms of previous qualifications and experience with particular weight given to prior knowledge and experience of Aboriginal culture and health. Applications close late July.

The National Health and Medical Research Council (NHMRC) Dora Lush Biomedical Postgraduate Scholarships (L,R)

- \$15,637 pa, \$20,180 for HIV/AIDS research, \$17,637 for special initiative scholars, plus allowances
- Up to 3 years

Applicants must have completed a Science degree with Honours, or equivalent, at the time of submission of the application. Current APA holders or students enrolled in the final year of an Honours degree at the time of application are not eligible. Applications close late July.

The National Health and Medical Research Council (NHMRC) Medical and Dental Postgraduate Scholarships (L,R)

- \$23,257 pa plus allowances
- Up to 3 years

The scholarships are open to medical and dental graduates to undertake full-time research. Applications are particularly encouraged for research in the following special initiative areas: Aboriginal health and disease, prostate cancer, alcohol and substance abuse, nursing and allied health services, dementia, schizophrenia, injury and HIV/AIDS. Applications close late July.

The National Health and Medical Research Council (NHMRC) Public Health Postgraduate Scholarships (L,R)

- \$23,257 pa (medical/dental graduates), \$15,637 pa (other graduates), \$20,180 pa for HIV/AIDS research, plus allowances
- Up to 3 years

The scholarships are open to medical/dental or health related graduates to obtain training in public health research. Applications are particularly encouraged for research in the following special initiative areas: Aboriginal health and disease, prostate cancer, alcohol and substance abuse, nursing and allied health services, dementia, schizophrenia, injury and HIV/AIDS. Applications close late July.

The National Heart Foundation of Australia Postgraduate Medical and Science Research Scholarships (L,R)

- \$17,637 pa (science), \$23,257 pa (medical) plus \$1,200 departmental allowance
- Up to 3 years subject to satisfactory progress

Scholarships are available to science or medical graduates for research in cardiovascular function, disease or related problems. Applicants must usually reside in Australia. Further information and applications are available from the Medical Director, National Heart Foundation, PO Box 2, Woden ACT 2606. Medical Applications close May and Science applications close October.

The National Tertiary Education Union (NTEU) Scholarship for the Study of Industrial Relations and Unionism in Australian Tertiary Education (I,L,R)

- \$5,000 pa
- Up to 3 years

Applicants must have made or intend to make an application for candidacy for a Masters by Research or PhD in a topic which covers some aspect of industrial relations, policy issues and/or unionism related to Australian tertiary education. Further information is available from NTEU, PO Box 1323, South Melbourne VIC 3205. Tel (03) 9254 1910. Applications close early November.

The National Multiple Sclerosis Society of Australia Postgraduate Research Scholarships (L,R)

- Same as NHMRC scholarship stipends for medical and biomedical graduates
- Up to 2 years

Scholarships are available to medical graduates (or to appropriately qualified science graduates or health professionals) enrolled in a postgraduate research degree. Applications close mid-July.

The NSW Ministry for the Arts Scholarships (L)

- \$5,000–\$25,000 (depending on the award)

The NSW Government offers a number of scholarships and awards to writers, artists and scholars living in NSW. Further information is available from the New South Wales Ministry for the Arts, GPO Box 5341, Sydney NSW 2000. Tel (02) 9228 3533, Fax (02) 9228 4722.

The Pig Research and Development Corporation (PRDC) Postgraduate Top-Up Scholarships (L,R)

- Up to a maximum of \$21,000 as a supplement to other scholarships, plus allowances

Applicants must be eligible for another scholarship and be undertaking research relevant to increasing the competitiveness of the Australian pig industry. Applications close mid-December.

The Postgraduate Equity Scholarships (L,C)

- Substitution of HECS for tuition fees
- One session, renewable if eligibility criteria are satisfied

Postgraduate students enrolled in full-fee courses may be allowed to pay HECS rather than course fees. Students granted the concession are also required to pay Student Activity Fees. Students who have previously completed a postgraduate course at the same level are not eligible. Applications for Session One close 15 January and 15 July for Session Two.

Financial Need HECS Substitution Scholarships

Applicants must be in receipt of a full allowance from the Department of Social Security (DSS), Department of Veteran Affairs, or AUSTUDY. Students granted the assistance must re-apply each session.

HECS Substitution for Scholarships for Women

A limited number of scholarships will also be provided to women enrolling in a postgraduate course after a period of absence from study and/or employment who are seeking to extend their professional experience in order to re-enter the workforce. Preference will be given to women enrolling in courses which have a low female enrolment. Selection will take into account the applicant's academic merit, her personal statement, including details of a well-planned future career path, and referee's support. The scholarship is tenable for the duration of the course.

The Re-Entry Scholarship for Women (I,L,R,C)

- \$15,888 pa (equivalent to the Australian Postgraduate Award)
- 1 year

Applicants must be women who have been out of full-time paid professional employment for a period of time and who wish to take up or resume a full-time research or coursework program of postgraduate study. Priority will be given to applicants wishing to update their research skills or to those who wish to gain further experience in order to return to employment in industry, business or education. Applicants must be able to demonstrate a well-planned career path. A letter of application and curriculum vitae should be forwarded to the Scholarships and Student Loans Unit, UNSW. Applications close 31 October.

The River Basin Management Society Ernest Jackson Memorial Research Grants (I,L,R)

- Up to \$2,000

The scholarship assists PhD and Masters students undertaking research in the field of river basin management. Further information is available from RBMS, PO Box 113, Forest Hill Vic 3131. Tel (03) 9816 6896. Applications usually close May and November.

The Ronald Henderson Postgraduate Scholarships (L,R)

- \$5,000 pa as a supplement to an APA
- Up to 2 years for Masters by Research, 3 years for a PhD

The scholarships are open to graduates who intend to commence Masters or PhD studies in social economics, and who obtain an APA or equivalent university postgraduate award. Applicants may be enrolled in qualifications in economics, commerce or arts. Information and applications are available from the Ronald Henderson Research Foundation, 5th Floor, 165 Flinders Lane, Melbourne VIC 3000. Tel (03) 9654 8299, Fax (03) 9650 7501, Email: lance@creativeaccess.com.au. Applications close late October.

The RSPCA Alan White Scholarship (I,L,R)

- \$2,500

Applicants should be undertaking original research to improve the understanding and welfare of animals. Applicants must have a sound academic record and demonstrate a major commitment animal welfare issues. A letter of application including two referees and academic transcript, should be sent to the Executive Officer, RSPCA Australia, PO Box E369, Queen Victoria Terrace, Canberra ACT 2600. Tel (02) 62311437. Applications close mid-March.

The Rural Industries Research and Development Corporation (RIRDC) Postgraduate Scholarships (L,R)

- \$21,500 pa plus \$3,500 to the host institution
- Up to 3 years

The scholarships are available for postgraduate study in rural research and development in areas of interest to the Corporation. Applicants must hold an Honours 1 or 2/1 degree in an appropriate discipline. Applications from mature age students with rural industry experience are particularly encouraged. Applications close early November.

The Shell Postgraduate Scholarship (L,R)

- \$20,000 pa
- Up to 3 years

Applicants should be intending to undertake a PhD in science, engineering, economics/commerce, computer science, or a closely related discipline. Selection will be based on academic achievements, objectives of the proposed study and other personal qualities. Applications close late October.

The Social Policy Research Centre (SPRC) Postgraduate Research Scholarship (I,L,R)

- \$15,888 pa (equivalent to the APA), plus allowances
- 3 years for a PhD

Applicants should have a Bachelors Degree with at least Honours 2/1 in any of the fields of study relevant to social policy. The successful candidate will be enrolled in a relevant School of the University but will undertake research at the Centre. Prospective applicants must contact the School in which they wish to enrol. Application packages are available from the SPRC Publications and Information Officer, Social Policy and Research Centre, UNSW. Tel (02) 385 3833. Applications close late October.

The State Librarian's Metcalfe Scholarship at UNSW (L,R,C)

- At least \$2,000

The scholarship is open to suitably qualified librarian's to undertake a Masters degree in the areas of librarianship, marketing or technology. Selection will be based on academic merit, the outline for the proposed area of study and demonstrated interest in librarianship. Applications normally close 30 November.

The Sugar Research and Development Corporation (SRDC) Postgraduate Scholarships (L,R)

- \$22,000 pa plus \$3,000 to the host institution
- Up to 3 years

The scholarships are available to foster research in disciplines compatible with the SRDC's research priorities. Applicants should hold an Honours degree or equivalent and have a strong motivation to make a professional career in the sugar industry. Further information and applications are available from the Executive Director, Sugar Research and Development Corporation, PO Box 12050, Brisbane Elizabeth St Qld 4002. Tel (07) 3210 0495, Fax (07) 3210 0506. Applications close mid-September.

The Telstra Research Laboratories Postgraduate Research Fellowship (L,R)

University departments may apply for the Fellowships for one or more of their PhD students who are undertaking research relevant to the telecommunications industry in the fields of electrical engineering, computer science, science, psychology, social science or economics or other appropriate course. Further information is available from the Fellowship Applications Officer, Telstra Research Laboratories, Box 249, Rosebank MDC, Clayton Victoria 3169. Email: c.zaman@trl.telstra.com.au. Applications close late September.

VSDC Deafness Projects Fund (L)

Tertiary Education Scholarships may be awarded to deaf students undertaking tertiary courses related to deafness, deaf education, or a fields which will advance the interests of deaf people. Applicants must be permanent residents of Australia. Further information is available from the VSDC-Services for Deaf Children, PO Box 6466, St Kilda Rd Central, Melbourne Vic 3004. Applications close mid-May.

The Wenkart Foundation Grants (I,L,R)

- Up to \$22,000 pa
- 2 years with the possibility of renewal

Applicants must be undertaking full-time research in clinical, biomedical or health related clinical sciences. The grants will not be available again until the 1999 academic year. Applications close mid-May.

The Zonta International Amelia Earhart Awards (I,L,R)

- US\$6,000
- 1 year

Applicants must be women who have completed one year graduate study in an aero-space related science or engineering degree. Further information and applications are available from Zonta International, 557 West Randolph St, Chicago, Illinois 60661-2206, USA. Tel +1 312 930 5848, Fax +1 312 930 0951. Applications close early November.

Faculty

Faculty of Life Sciences

Biological Science

The Australian Biological Resources (ABRS) Postgraduate Research Scholarship (L,R)

- \$15,888 pa (subject to annual review to match the APA).
- Up to 3 years for a PhD

Applicants should be proposing to undertake full-time study in a PhD, in an area of relevance to ABRS taxonomic principles. Applicants should hold an Honours 1 or 2/1 degree in an appropriate discipline and be strongly motivated to make a professional career as a taxonomist. Permanent residents must have had 12 months continuous residence in Australia. Applications close early October.

Psychology

The John Clark Memorial Award in Psychology (I,L,R,C)

- \$1,000
- 1 year

Applicants must be enrolled in a postgraduate course in Psychology undertaking research in an area concerned with the ongoing problems of the community, particularly the behaviour of the 'whole person' in a social milieu. Applications close late June.

Faculty of Science and Technology

Materials Science and Engineering

The Sir Rupert Myers Postgraduate Scholarship in Materials Science and Engineering (I,L,R,C)

- \$5,000 pa
- 1 year, renewable up to 3 years

Applicants must hold an Honours degree in materials science and engineering, or a related field. The scholarships are available for study towards a postgraduate degree in the School of Materials Science and Engineering. Information is available from the School of Materials Science and Engineering, University of New South Wales, 2052. Tel (02) 9385 4436. Applications close December.

Optometry

The Brien A Holden Postgraduate Research Scholarship (I,R)

- Tuition fees, living allowance (approx \$15,000 pa), travel and other allowances
- Up to 3 years, annually renewable

Scholarships are available for full-time study leading to the degree of Master of Science or PhD at the Cooperative Research Centre for Eye Research and Technology (CRCERT) at UNSW. The scholarship is open to international students, with special consideration given to applicants from developing countries. Selection will be based on academic merit, the reasons for the proposed study and financial need. Applications close late October.

The Contact Lens Society of Australia Scholarship (I,L,R,C)

- \$3,500 pa

The scholarship is provided to enable a graduate in optometry, medicine, or other appropriate discipline to undertake the degree of Master of Science or PhD in the School of Optometry. Enquiries to The Secretary, Contact Lens Society. Tel (02) 9243 3997.

Physics

The Gordon Godfrey Scholarship in Theoretical Physics (I,L,R)

- \$1,500 pa
- 2 years

The scholarship is provided to enable a student to undertake a research degree in theoretical physics. The scholarship may be held concurrently with another award. Information is available from the School of Physics. Tel (02) 9385 4553/5649.

Travel Scholarships

Students in receipt of postgraduate scholarships not listed below may, if the scholarships conditions allow, spend a period of time overseas undertaking research relevant to their Australian qualification.

General Travel

AAUW Educational Foundation International Fellowships (I,L,R,C)

- US\$15,160
- 1 year

The American Association of University Women (AAUW) offers Fellowships for full-time postgraduate study or research in the United States for one academic year. Applicants must be females who have earned the equivalent of a United States Bachelor's degree and who are not US citizens or permanent residents. Preference will be given to women who show prior commitment to the advancement of women and girls through civic, community or professional work. Members of the Australian Federation of University Women (AFUW) may also be eligible for AAUW-IFUW awards for advanced training at any overseas institution. Application packs are available from the Scholarships and Student Loans Unit or the AAUW Educational Foundation, 2201 N. Dodge St, Dept 67, Iowa City, IA 52243 USA. Applications close late November.

The ACSANZ Postgraduate Awards for Canadian Studies (I,L,R)

- Up to \$3,000 towards a research trip to Canada

The Association for Canadian Studies in Australia and New Zealand will offer grants to postgraduate students wishing to undertake a short research trip to Canada. Applicants must be enrolled in Master's or Doctoral degrees at Australian or New Zealand universities, and grants will be for research into all areas of academic enquiry that have a distinctly Canadian orientation, for example in the humanities, social and political sciences and some branches of the health and environmental sciences. Information and applications are available from the Academic and Cultural Relations Officer, Canadian High Commission, Commonwealth Avenue, Canberra, ACT 2600. Tel (02) 6273 3844, Fax (02) 6270 4083, Email: co.cnbra@cnbra01.x400.gc.ca. Applications close late September.

The Asian Studies Library Awards (ASLA) (L,R)

- \$250 to \$800 in a lump sum

Applicants must be undertaking a Masters by Research or PhD. The award provides a contribution towards the travel costs to centres with Asian collections to undertake library research. Further information and application forms are available from the Project Coordinator, Asian Studies Library Awards, Collection Management Division, Library ANU, Canberra ACT 2600. Applications close mid-June.

The Association of International Education Japan (AIEJ) Short-Term Student Exchange Promotion Program (Inbound) Scholarships (I,L,R,C)

- 50,000 yen (settling-in allowance), 80,000 yen per month, plus airfare
- Six months to one year

Applicants must be accepted by a Japanese university under a student exchange program agreement with UNSW. Students must initially apply directly to a Japanese university through the International Student Centre at UNSW. The Japanese host university will recommend candidates to AIEJ and students must apply as directed by the host university. Applications close February, May and September each year.

The Association of International Education Japan (AIEJ) Short-Term Student Exchange Promotion Program (Inbound) Peace and Friendship Scholarships (I,L,R,C)

- 50,000 yen (settling-in allowance), 100,000 yen per month, plus airfare
- Ten months to one year

Applicants must be accepted by a Japanese university under a student exchange program agreement with UNSW. Students must initially apply directly to a Japanese university through the International Student Centre at UNSW. The Japanese host university will recommend candidates to AIEJ and students must apply as directed by the host university. Applications close February, May and September each year.

Association of University Women Educational Foundation – Charles & June Ross International Fellowship (L,R,C)

- US\$15,400
- 1 year

The fellowship is available to Australian women who have graduated from an Australian university, for full-time postgraduate study or research in the United States for one academic year. Applicants must be members of the Australian Federation of University Women or AAUW and intend to return to Australia to pursue their professional career. Information and applications are available only from AAUW Educational Foundation, PO Box 4030, Iowa City, Iowa 52243–4030, USA. Tel +1 319 337 1716, fax +1 319 337 1204. Applications close late November.

The AT&T Leadership Award (I,L,R,C)

- US\$5,000

The award is open to students who will be commencing full-time undergraduate or postgraduate study in the United States between January and September in the year of

application. The scholarship is open to students from the following Asia/Pacific countries: Australia, China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. Information and applications are available from the U.S. Consulate General, USIS, Level 59 MLC Centre, 19–20 Martin Place, Sydney NSW 2000. Tel (02) 9662 3016. Applications close 15 September.

The Australia–Korea Foundation Awards (L,R,C)

The AKF provides assistance to Korean language graduates who will be undertaking teacher training in the Korean language, and for work-experience programs. Information and applications are available from the Programs Coordinator, National Korean Studies Centre, PO Box 218, Hawthorn Vic 3122. Email: nksc@swin.edu.au.

The Australian Bicentennial Scholarships and Fellowships Scheme (L,R,C)

- 4,000 pounds sterling
- At least 3 months

Awards are available for study or research in the United Kingdom in any discipline, where it can be demonstrated that there is an advantage to be gained from a period of study in the U.K. Applicants must be enrolled as postgraduate students at Australian higher education institutions and usually resident in Australia. Applications are available from the Secretary, Sir Robert Menzies Centre for Australian Studies, University of London, 28 Russell Square, London, WC1B 5DS, UK. Tel +44 171 580 5876, Fax +44 171 580 9627, Email: mcintyre@sas.ac.uk. Applications close early November.

The Australian Federation of University Women (AFUW) (I,L,R,C)

Each year the Federation offers to its members a number of awards for study in Australia and overseas. Details of awards are included in a booklet available from the Australian Federation of University Women Inc, 8th Floor, Dymocks Building, 428 George Street, Sydney NSW 2000. Tel (02) 9232 5629.

The British Aerospace Australia Chevening Scholarship (L, R, C)

- Tuition fees, maintenance allowance, airfare
- 1 year

The scholarship is available to undertake an approved one-year MSc course in aerospace engineering at a British university. Applicants must hold, or expect to complete before October, an Honours 1 or 2/1 degree. Application forms are available from the British Council, PO Box 88, Edgecliff NSW 2027. Tel (02) 9326 2022, Fax (02) 9327 4868. Applications close late October.

The British Chevening Scholarships (L,R,C)

- Tuition fees, maintenance allowance and return airfare
- 3 months to 1 year

The awards are intended for outstanding graduates and young professionals with the potential to rise to senior positions in the private or public sectors and will contribute to Australian–British relations and understanding. The awards are tenable for postgraduate study at British universities. Application forms are available from the British Council, PO Box 88, Edgecliff NSW 2027. Tel (02) 9326 2022, Fax (02) 9327 4868. Applications close October.

The Cambridge Commonwealth Trust Scholarships (L,R,C)

The Cambridge Commonwealth Trust administers several scholarships for Australian Citizens to undertake postgraduate study at the University of Cambridge. Scholarship application forms should be requested from the University of Cambridge when applying for admission. Admission forms and copies of the Graduate Studies Prospectus are available from The Board of Graduate Studies, 4 Mill Lane, Cambridge CB2 1RZ, United Kingdom. By submitting one Scholarship Application Form, applicants will be considered for all the Trust's scholarships for which they are eligible. Information on how to apply is available from the Honorary Secretary, Australian Committee of the Cambridge Commonwealth Trust, c/o Dept of Classics, ANU, Canberra ACT 0200. Tel (02) 6249 2913/8830, Fax (02) 6249 5039. Applications for admission to Cambridge close 31 December and scholarship applications close 30 April in the following year.

The Cancer Research Fellowship Programme (I,L,R)

- Travel expenses and living allowances
- 1 year

Applicants should be engaged in research in medical or allied sciences and intending to pursue a career in cancer research. The awards are tenable at the International Agency for Research on Cancer in France, or any other suitable institution abroad. Areas of research include epidemiology, biostatistics, environmental and viral carcinogenesis and mechanisms of carcinogenesis. Applications are available from the International Agency for Research on Cancer, 150 cours Albert–Thomas, 69372 Lyon Cedex 08, France, Tel 72 73 84 85, Fax 72 73 85 75. Applications normally close in December.

Churchill Fellowships (L)

- Tuition, travel and living allowances

Churchill Fellowships provide financial support for Australian citizens to undertake study, training or projects overseas that offer special advantage over those in Australia. Fellowships will not normally be awarded for higher academic or formal qualifications however.

Applicants must be over 18 years of age. Further information and applications are available from the Chief Executive Officer, The Winston Churchill Memorial Trust, 218 Northbourne Ave, Braddon ACT 2612. Tel (02) 6247 8333. Applications close late February.

The Commonwealth Scholarship and Fellowship Plan (CSFP) (L,R,C)

- Varies for each country. Generally covers travel, living expenses, tuition fees, books and equipment, approved medical expenses
- Usually 2–3 years depending on the country

CSFP provides opportunities for Commonwealth students to undertake advanced academic study in other Commonwealth countries. Candidates should be Commonwealth citizens who are graduates. Applications close at different times depending on the country in which the study is proposed.

The Coral Sea Scholarship (L,R,C)

- \$3,000 per month, plus \$2,500 travel entitlement
- Up to 3 months

The award is for applicants holding a tertiary qualification who are proposing study in the United States, to investigate a problem or opportunity relevant to Australian business or industry. Applicants must be Australian citizens (Permanent Residents are ineligible). Applications are available from the Program and Development Officer, Australian–American Foundation, GPO Box 1559, Canberra City ACT 2601. Tel (02) 6247 9331, Email: lindy@aaef.anu.edu.au. Applications close 30 September.

DAAD – The German Academic Exchange Service Scholarships (I,L,R,C)

Application forms and information (including closing dates) for the following scholarships are available from the Consulate General of the Federal Republic of Germany, PO Box 204, Woollahra NSW 2025.

One-Year Scholarships

- Monthly allowance between DM1,000 and DM1,600, airfares, health and accident insurance, and tuition fees
- 1 year

Scholarships are available for graduate studies in Germany. Applicants must be aged 32 or under and hold a Bachelors degree (or equivalent). A working knowledge of German is required of those who study arts, others may receive additional language training prior to the commencement of the scholarship. Applications normally close in September.

Research Grants

- Monthly stipend of DM1,600, health insurance contribution and travel assistance of DM2,500
- 2 to 6 months

PhD students can apply for assistance to undertake a short period of research in Germany. Applicants must be aged 32 or under.

Information Visits by Groups of Professors and Students

Groups (minimum of 10 persons, maximum of 30 persons) of professors and students can apply for assistance to visit Germany with the intention of increasing the knowledge of specific German topics. The program offers support in making travel and study arrangements and may include some financial assistance (based on the length of the stay and the number of persons undertaking the study tour). The period of stay must be between 7 and 21 days. No tours will be organised for July or August.

Deutschlandkundlicher Winterkurs

- Course fees, DM3,500 to assist with travel and living expenses, health insurance
- 8 weeks (3 January–21 February)

Undergraduate and postgraduate students from all fields with at least two years university-level German may apply for this scholarship. Applicants must be Australian or New Zealand citizens, aged from 19 to 32 and proposing to undertake a German Studies course (in German) at the Albert-Ludwigs University of Freiburg. The course provides language instruction and concentrates on historical and cultural aspects of contemporary Germany for students with a background in German Studies. Applications usually close in early August.

East West Center Graduate Degree Fellowship (I,L,R,C)

- Accommodation, monthly stipend of US\$600, tuition fees, health insurance plus allowances
- 12 months with a possible 1 year extension

The Fellowships are available for postgraduate study at the University of Hawaii, preferably at Masters level. Citizens of countries in Asia, the Pacific and the United States are eligible to apply. Potential applicants must request an application package direct from the East West Centre, Awards Services Officer, Burns Hall 2066, 1601 East-West Road, Honolulu Hawaii 96848–1601, USA. Tel +1 808 944 7735, Fax +1 808 944 7730. Applications close early October.

Frank Knox Memorial Fellowships (L,R,C)

- US\$15,000 pa plus tuition fees and health insurance
- 1 year with the possibility of renewal for a further year

Applicants must be undertaking, or near completion, of a postgraduate qualification at an Australian university. The scholarships are tenable at one of the graduate schools of Harvard University. Applications close early October.

The Fulbright Postgraduate Student Awards (I,L,R)

- Up to \$28,050, depending on the type of award, with the possibility of other allowances (e.g. return airfares and tuition fees)
- 1 year

Students planning to undertake an American higher degree or engage in research towards an Australian higher degree in any field can apply for the Fulbright Student Awards. Four other privately sponsored awards include the Engineering Award, Aboriginal and Torres Strait Islander People Award, Visual and Performing Arts Award, and Tim Matthews Memorial Award in Statistics and Related Disciplines. Applicants must be Australian citizens who have completed an Honours degree or equivalent and who are eligible to undertake a higher degree at an American institution. Information and applications are available from the Honorary Secretary, Fulbright NSW State Selection Committee, Research and Scholarships office, University of Sydney NSW 2006. Tel (02) 9351 4464, Email: meredith@reschols.usyd.edu.au. Applications close late September.

The Golda Meir Scholarship (I,L,R,C)

- Tuition (some allowances may be paid)
- 1 year

The Golda Meir scholarships are available to graduates, with a major field of study in Jewish studies, religious studies, Israel studies or Middle East studies, who meet the relevant requirements for the Graduate Year Program at the Hebrew University's Rothberg School for Overseas Students. Application forms are available from the Australian Friends of the Hebrew University, 36 Hawthorn Road, South Caulfield VIC 3162. Tel (03) 9272 5511.

The Gowrie Scholarship Trust Fund (L,R,C)

- \$4000 pa
- 2 years

Applicants must be members of the Forces or children (or grandchildren or lineal descendants) of members of the Forces who were on active service during the 1939–45 War. Special consideration may be given to cases of financial hardship. Applications close October.

The Harkness Academic Fellowships (L,R,C)

- Some allowances and tuition fees for study in the USA
- 12–21 months

The Academic Fellowships cover academic study and research. Applicants should be active in the public, business or voluntary sectors with an outstanding record of achievement. Special consideration may be given to studies in health care and related community issues. Applications are available on written request from the Harkness Fellowship, PO Box 836, Belconnen ACT 2606. Applications close early September.

The Harkness Mid-Career Fellowships (L,R,C)

- Professional travel allowance
- 7–12 months

The Mid-career Fellowships are for study and practical experience. Applicants should be active in the public, business or voluntary sectors with an outstanding record of achievement. Special consideration may be given to studies in health care and related community issues. Applications are available on written request from the Harkness Fellowship, PO Box 836, Belconnen ACT 2606. Applications close early September.

Japanese Government (Monbusho) Scholarships (L)

Scholarships are available to Australian citizens for study in Japan in the following categories: Japanese Studies, In-Service Training for Teachers, Research, Undergraduates. Applicants must be willing to study the Japanese language and receive instruction in Japanese. Further information and applications are available from Monbusho Scholarships, Embassy of Japan, 112 Empire Circuit, Yarralumla ACT 2600. Tel (02) 6273 3244, Fax (02) 6273 1848. Applications close April (for Japanese Studies and Teacher Training) and July (for Research and Undergraduate scholarships).

The Kobe Steel Postgraduate Scholarship (L,R,C)

- Maintenance allowance of at least 7,000 pounds sterling plus tuition fees and travelling expenses
- Up to 2 years with the possibility of extension

The scholarship is tenable at St Catherine's College, Oxford University. The scholarship will be awarded to outstanding individuals who display qualities of leadership, excellence in sport as well as academic ability. Students should have a past or future interest in Japan. Applications close mid-October.

Korean Government Scholarships (L)

- Tuition fees, living allowance, travel and other allowances
- Duration of course

Scholarships are available to Australian citizens for postgraduate study in Korea for Master's, PhD or Research programs. Applicants with knowledge of the Korean language are preferred. Information and applications are available from the Embassy of the Republic of Korea, 113 Empire Circuit, Yarralumla ACT 2600. Tel (02) 6273 3044, Fax (02) 6283 4839. Applications close early May.

The Lady Davis Fellowship Trust (I,L,R,C)

The Lady Davis Trust provides awards for study, research, or teaching at graduate, post-doctoral or professorial levels

at the Hebrew University or the Technion (Israel Institute of Technology). Information is available from the Australian Friends of the Hebrew University, 36 Hawthorn Road, South Caulfield VIC 3162. Tel (03) 9272 5511. Applications normally close in November.

The Laporte Centenary Scholarship (L,R)

- Airfare, living allowance, tuition fees
- 3–6 months

The scholarship is tenable for postgraduate research in the United Kingdom. Candidates should be undertaking a postgraduate qualification in a science-based discipline, preferably in the practical application of special chemicals. Applications are available from the Secretary, Sir Robert Menzies Centre for Australian Studies, University of London, 28 Russell Square, London, WC1B 5DS, UK. Tel +44 171 580 5876, Fax +44 171 580 9627, Email: mcintyre@sas.ac.uk. Applications close early November.

The Lionel Murphy Postgraduate Scholarship (L,R,C)

- \$15,000 pa for study in Australia, up to \$30,000 for study overseas
- 1 year

Applicants must be intending to undertake a postgraduate degree in Law, Science, Legal Studies or other appropriate discipline. Preference will be given to applicants who propose to study the law and legal system in a social context, science/law or international law. Information and application forms are available from the Lionel Murphy Foundation, GPO Box 4545, Sydney NSW 2001. Tel (02) 9223 5151, Fax (02) 9223 5267. Applications close mid-September.

The Lloyd's Register of Shipping Chevening Scholarship (L,R,C)

- Tuition fees, maintenance allowance, airfare
- 1 year

Two scholarships are available to graduates of proven academic merit and leadership potential, to pursue a postgraduate course at a British university. One scholarship is for a one-year MSc course in Marine Engineering/Naval Architecture, and the other is for a one-year MSc course in Environmental Sciences. Applicants must hold, or expect to complete before October, an Honours 1 or 2/1 degree. Application forms are available from the British Council, PO Box 88, Edgecliff NSW 2027. Tel (02) 9326 2022, Fax (02) 9327 4868. Applications close late October.

The Meat Research Corporation (MRC) Studentships and Junior Research Fellowships (L,R,C)

- \$14,961 pa for study in a Masters or Diploma, \$20,000 for a PhD in Australia or US\$17,500 for study overseas, plus airfares, insurance and allowances

- 2 years for Studentships (Masters or Diploma), 3 years for Junior Research Fellowships (PhD)

Applicants should be proposing to undertake research and training in 'off-farm' disciplines of practical value to the Australian beef, sheep meat, goat meat and buffalo industries. Applications normally close in mid-August.

The Menzies Scholarships (L,R,C)

The Menzies Scholarships are intended to provide funds for Australian citizens (aged 21 to 45) who wish to travel to Britain to undertake a course of research and to write a paper on a subject of concern and importance to the relationship between the Australian and British communities. Tertiary qualifications are preferred but the awards are not restricted to graduates or students. Information and applications are available from the Australia-Britain Society, GPO Box 551, Sydney NSW 2000. Tel (02) 9223 5244. Applications normally close in October.

Nanyang Technological University Singapore Research Scholarships (I,L,R)

- Tuition fees plus S\$1,400–S\$1,500 per month allowance
- 2 years for a Master's, 3 years for a PhD degree

Research scholarships are available to graduates with good Honours degrees to undertake postgraduate study. Information and application forms are available from The Registrar, Nanyang Technological University. Email: Gleong@ntu.edu.sg, Fax: +65 791 1604.

The NSW Ministry for the Arts Scholarships (L)

- \$5,000–\$25,000 (depending on the award)

The NSW Government offers a number of scholarships and awards to writers, artists and scholars living in NSW. Further information is available from The New South Wales Ministry for the Arts, GPO Box 5341, Sydney NSW 2000. Tel (02) 9228 3533, Fax (02) 9228 4722.

The Oxford Nuffield Medical Fellowship (L,R)

- Between 27,525 and 31,945 pounds sterling pa (subject to tax), plus travel expenses
- 2 years with a possible 1 year extension

The awards are available for research in a clinical medicine or medical science department of the University of Oxford. The appointee is required to return to Australia for at least 3 years to perform work similar to that carried out in the United Kingdom during the tenure of the Nuffield fellowship. Further information is available from Australian Academy of Science, GPO Box 783, Canberra City ACT 2601. Tel (02) 6247 5777, Fax (02) 6257 4620. Applications close mid-March.

Overseas Research Students Awards Scheme (United Kingdom) (I,L,R)

- Difference in tuition fees for a 'home' and an 'overseas' student

The ORS Scheme provides partial remission of tuition fees to overseas students of outstanding merit and research potential. The awards are open to graduates who will be commencing full-time research studies at a participating institution in the United Kingdom, and who will be liable to pay tuition fees at the overseas student rate. Information and applications must be obtained directly from the Registrar or Secretary of the institution students are applying to in the United Kingdom. Applications normally close in April in the year of tenure.

Queen's Trust Grants (L)

- Up to \$15,000

The Queen's Trust provides grants to Australian citizens aged 18–28 years, for the pursuit of excellence in their chosen fields. Projects are supported for the advancement of Australian youth, development of community leadership and/or other skills which will be of benefit to Australia. Information and applications may be obtained from the Queen's Trust. Tel 1800 033 625. Applications close late April.

The Rhodes Scholarship (L,R,C)

- Tuition fees, assistance with travel expenses, up to \$17,500 allowance
- 2 years, with a possible 1 year extension

The scholarship is tenable for postgraduate study at Oxford University. Applicants must be aged between 19 and 25 and have an honours degree or equivalent. Selection for the scholarship will be based on academic and personal achievements, including community spirit. Applications close late August.

The Robert Gordon Menzies Scholarship to Harvard (L,R,C)

- Up to \$25,000 towards tuition fees, living expenses or travel costs (students who enrol in the Harvard Business School may be eligible for an additional \$12,000)
- 1 year

The scholarships are tenable at one of the graduate schools of Harvard University. Applicants must be postgraduates of an Australian tertiary institution who intend to return to Australia after studies at Harvard or to represent Australia overseas. The scholarships are awarded on the basis of academic excellence and personal qualities such as leadership and public duty. The successful applicant will be expected, when circumstances permit, to repay the scholarship in later years. Applications and additional information may be obtained from the Chair, Board of Faculties, ANU, Canberra ACT 0200. Fax (02) 6248 5561,

E-mail: lynne.colley@anu.edu.au. Applications close at the end of December.

Rotary Foundation Ambassadorial Scholarships (I,L)

The Rotary Foundation offers scholarships to study or train in another country where Rotary clubs are located. Applicants must have completed at least two years of a university or college course, or have completed high school and have been employed for at least two years. Applicants must also be citizens of a country in which there is a Rotary club. Information regarding scholarship availability, closing dates and applications should be obtained from the applicant's local Rotary club.

The Sir Charles Mackerras/Australia-Britain Society Music Scholarship (L)

- 8,000 pounds sterling

The scholarship is open to outstanding young conductors, composers and répétiteurs, aged between 21 and 30 who are likely to be influential leaders in the field of music, to undertake study in the United Kingdom or the Czech republic for at least six months. Application forms are available from the British Council, PO Box 88, Edgecliff NSW 2027. Tel (02) 9326 2022, Fax (02) 9327 4868, Email: bcsydney@sprint.com. Applications close early November.

The STA Travel Grant (I,L,R,C)

- Up to \$1,500 (in 1998) and up to \$3,000 from 1999

Applicants must be undertaking study leading to a degree or diploma of the University and a member of the University Union. The grant is awarded on the basis of significant contribution to the community life of the University involving a leadership role in student affairs and the University Union and the relevance and merit of the proposed travel to the student's academic program or University Union activities. Applications close mid-April.

The Swedish Institute Guest Scholarships (I,L)

- SEK 7,000 per month living allowance
- 9 months (1 academic year)

The scholarships are open to students/researchers who wish to travel to Sweden for studies/research which cannot equally well be pursued in countries other than Sweden. Applicants must establish contact with a Swedish University willing to accept the applicant for the proposed studies. Initial requests for application forms must be made in writing, including name and address, nationality, educational background and work experience, knowledge of any languages, statement of the purpose of study/research in Sweden, and a copy of a letter of invitation from a Swedish University Department. Requests for applications should be sent to the Swedish Institute, Department for Educational and Research Exchange, PO Box 7434, S-103 91, Stockholm, Sweden. Email:

grantinfo@si.se. Requests for application forms must reach the Swedish Institute before 1 December.

Swiss Government Scholarships (L,R,C)

- Tuition fees, living allowance, medical insurance and assistance with airfares
- 1 academic year

One scholarship is available for art/music and two for other disciplines, to undertake postgraduate study or attend an art school/conservatory in Switzerland. Applicants will be required to pass a language test in German or French. Applicants must be aged under 35. Applications close early October.

The Tokyo Metropolitan Government Foreign Student Scholarship Program (L,R,C)

- 200,000 yen per month, tuition and travel expenses, plus allowances
- Up to 2.5 years

Scholarships are available for a Master's degree or postgraduate research at Tokyo Metropolitan University, or Tokyo Metropolitan Institute of Technology. Applicants must be aged under 35 years, be Australian citizens from New South Wales, and be graduates of a university in NSW.

University College London Scholarships

The University College London offers various scholarships to students from overseas, who hold an offer of admission to a full-time programme of study at UCL. Applicants must be self-financing and liable to pay tuition fees at the rate for overseas students. Information and applications are available from the International Office, University College London, Gower St, London WC1E 6BT, UK. Tel +44 171 380 7708, Fax: +44 171 380 7380, Email: international@ucl.ac.uk.

Yokohama Scholarship Awards (L,R,C)

- JPY 120,000 per month undergraduate, JPY 150,000 per month for postgraduate students, tuition fees, airfare plus allowances
- Up to 4 years (undergraduate), 1 year for Japanese language study, 2 years for Masters, 3 years for PhD

Applicants must be Australian citizens who have submitted their application to, or been accepted by a Japanese university and be able to communicate in Japanese (or be willing to undertake intensive study of the Japanese language). All disciplines are eligible except Medicine, Veterinary Science and Dentistry. Scholarships will be granted subject to the applicant's final acceptance by the chosen Japanese University. Original application forms only will be accepted and are available from the Yokohama Scholarship Foundation. Tel (07) 5588 0880, Fax (07) 5588 0842. Applications close with the Foundation in early October.

The following information summarises prizes awarded by the University. Prizes are grouped by level as follows: Undergraduate, common Undergraduate/Postgraduate, Postgraduate. Within these groups prizes are listed under the faculty, school or department in which they are awarded. Prizes which are not specific to any school are listed under General. Law prizes are awarded only for students enrolled in the LLB or Jurisprudence courses.

Information regarding the establishment of new prizes may be obtained from the Student Information and Systems Office.

Prize information is normally provided in the following format:

- Prize value
- Conditions

Undergraduate Prizes

The University of New South Wales (General Category for Prizes)

The Heinz Harant Challenge Prize

- \$1,000 (bi-annual prize)

For an original piece of assessable work submitted in the course of completing a General Education subject

The Sydney Technical College Union Award

- \$400 and a bronze medal

Leadership in student affairs combined with marked academic proficiency by a graduand

The UNSW Human Rights Essay Prize

- \$400

For the best research essay on a Human Rights topic by a student enrolled at the University of New South Wales proceeding to a Bachelor degree

Department of Applied Geology

The CRAE Mapping Prize in Applied Geology

- \$250

For the best performance in GEOL3031 Stratigraphy and Basin Analysis – Geological Field Mapping Tutorial by a student in the Bachelor of Science degree course

The CRAE Ore Deposits Prize

- \$200

For the best overall performance in the 3rd year Economic Geology subject, or in any subject or subjects which may be substituted therefore, by a student proceeding to the degree of Bachelor of Science

The FC Loughnan Prize for First Year Geology

- \$100

For the best performance in Year 1 of the Geology component of the Bachelor of Science degree course

The FC Loughnan Prize in Applied Geology

- \$340

For the best performance in Year 3 of the Geology component of the Bachelor of Science degree course

The Laric V Hawkins Prize

- \$500

For the best field project report involving a substantial component of geophysics in a postgraduate program, Year 4 of the Applied Geology course, or an equivalent Honours program in the Science or Advanced Science course

The Lorant Eotvos Prize

- \$300 and a bronze medal

For the best performance in GEOL4111 Advanced Geological Techniques by a student in the final year of the Bachelor of Science in Applied Geology or the Bachelor of Science in Applied Geology at Honours level

The Prospectors Supplies Prize

- A Brunton compass

Meritorious performance in the field work associated with the Second Year of course 3000 Applied Geology or course 2500 Geology

The Structural Geology Field Prize

- \$100 and winner's name engraved on Perpetual Trophy

For the best performance in the Third Year Structural Geology Field Tutorial by a student proceeding to the degree of Bachelor of Science in either Applied Geology or the Board of Studies in Science and Mathematics (Geology Program)

School of Biochemistry and Molecular Genetics**The Australasian Association of Clinical Biochemists Prize**

- \$100, 1 year Associate Membership and a plaque

For the best performance in BIOC3261 Human Biochemistry in the Bachelor of Science

The Beckman Instruments Prize of the Biochemical Graduates Association

- \$200

For the best performance in the fourth year Biochemistry Honours program by a student proceeding to the degree of Bachelor of Science

The Fisher Biotec Prize

- \$200

For the best performance in the examinations in level 2 Biochemistry subjects by a student proceeding to the degree of Bachelor of Science

The Life Technologies Prize

- \$200

For the best performance in BIOC3281 Recombinant DNA Techniques and Molecular Biology

The Selby–Biolab Prize

- \$200

For the best performance in the examinations in level 3 Biochemistry subjects by a student proceeding to the degree of Bachelor of Science

The WJ O'Sullivan Prize

- \$200

For the best performance in BIOC2329 Medical Biochemistry and Genetics

Department of Biotechnology**The Amersham Modern Techniques in Biotechnology Prize**

- \$250

For the best performance in BIOT3061 Monoclonal Antibody and Genetic Techniques in Biotechnology

The Burns Philp Foods Prize

- \$300

For the best performance in BIOT3100 Fermentation Processes in the Bachelor of Science degree course

The Burns Philp Foods Prize

- \$300

For the best performance in one of the Level 3 Biotechnology subjects BIOT3011 Biotechnology A BIOT3021 Biotechnology B BIOT3031 Microbial Genetics BIOT3061 Monoclonal Antibody and Genetic Techniques in Biotechnology by a student in the Bachelor of Science degree course

The Burns Philp Foods Prize

- \$300

For the best overall performance by a student proceeding to the degree of Bachelor of Science in Biotechnology at Honours level

School of Chemistry

The Bosworth Prize in Physical Chemistry

- \$200 and a bronze medal

For the best performance in CHEM3011 Physical Chemistry in the Bachelor of Science degree course

The Inglis Hudson Bequest

- \$15

For the best performance in CHEM2021 Organic Chemistry

The Jeffery Bequest

- \$100

For the best performance in CHEM2021 Organic Chemistry

The June Griffith Memorial Prize

- \$60

For the best performance in Level 1 Chemistry subjects in the Bachelor of Science degree course

The Merck Sharp & Dohme (Australia) Pty Limited Prize

- \$150

For the best performance in Level 3 Chemistry subjects in the Board of Studies in Science and Mathematics

The Merck Sharp & Dohme (Australia) Pty Limited Prize

- \$150

For the best performance in Level 2 Chemistry subjects in the Board of Studies in Science and Mathematics

The RACI Analytical Chemistry Group Prize

- \$150

For the best performance in CHEM3041 Analytical Chemistry and CHEM3141 Advanced Analytical Chemistry

The University of New South Wales Chemical Society Parke–Pope Prize

- \$100

For meritorious performance in Level 3 Chemistry subjects

Department of Food Science and Technology

The Flavourfresh Food Prize

- \$400

For the best performance in FOOD1310 Food Preservation by a full-time student in the Bachelor of Science in Food Science and Technology degree course

The Nestlé Australia Limited Prize

- \$200

For the best performance in FOOD1400 Project in the Bachelor of Science degree course in Food Science and Technology

The Wilfred BS Bishop Prize

- \$75

For the best overall performance in the Bachelor of Science degree course in Food Science and Technology by a student who has made a significant contribution to staff and student activities

School of Geography

The Jack Mabbutt Medal

- A bronze medal

For the best performance in the Year 4 Project in Applied Geography by a student in the Bachelor of Science degree course

The Jack Mabbutt Prize

- \$150

For the best performance by a third year student proceeding to Geography at Honours level

School of Materials Science and Engineering

The ACI Glass Packaging Prize

- \$200

For outstanding quality in an honours thesis in one of the areas of glass or glass-ceramics in the Bachelor of Engineering in Ceramic Engineering degree course

The ANSTO Prize

- \$100

For the best performance in year four in the Bachelor of Engineering in Ceramic Engineering degree course

The Austral Bricks Prize

- \$100

For the best performance in year three in the Bachelor of Engineering in Ceramic Engineering degree course

The Australasian Ceramic Society Prize

- \$100

For the highest overall course aggregate by a student completing the final year of the Bachelor of Engineering in Ceramic Engineering degree course

The Australasian Corrosion Association (NSW) Prize

- \$150

For the best performance in MATS1203 Materials and Design 2 by a student in the Bachelor of Metallurgical Engineering degree course

The Boral Bricks Prize

- \$500

For the best performance in MATS2273 Chemistry of Ceramic Processing, Unit 2, Technical and Non-Technical Ceramics in the Bachelor of Engineering in Ceramic Engineering degree course

The Broken Hill Proprietary Company Prize

- \$1,000

For the best performance in the Metallurgical Engineering degree course by a graduating student

The Capral Aluminium Limited Prize

- \$200

For the best performance in MATS1280 Light Alloys

The Commercial Minerals Limited Prize

- \$200

For the best performance in MATS2133 Ceramic Raw Materials in the Bachelor of Engineering in Ceramic Engineering degree course

The Fernz Minerals Prize

- \$250

For the most aptitude and technique shown in the combined laboratory subjects MATS2153 Ceramic Processing Laboratory and MATS2203 Physico-Chemical Ceramics Laboratory (with each subject receiving one half of the weighting for the average) by a student in the Bachelor of Engineering in Ceramic Engineering degree course

The Ferro Corporation (Australia) Prize

- \$250

For the best performance in MATS2123 Ceramic Process Principles 2 in the Bachelor of Engineering in Ceramic Engineering degree course

The Hugh Muir Prize

- \$275

For the best performance by a student in the final year seminar class, or who in the opinion of the Head of School has contributed most to the corporate life of the School of Materials Science and Engineering

The ICI Advanced Ceramics Prize

- \$100

For the best overall academic performance by a student in the second year of the Bachelor of Engineering in Ceramic Engineering degree course

The Institute of Metals and Materials Australasia Prize

- \$200 and 1 year membership of the Institute

For the best performance in MATS1022 Materials Process Principles

The Max Hatherly Prize

- \$275

For the best performance in MATS1002 Microstructural Analysis

The Monier PGH Prize

- \$1,000

For the best performance by a graduating student in the Bachelor of Engineering in Ceramic Engineering degree course

The Morganite Insulating Products Pty Limited Prize

- \$200

For the best performance in MATS2254 Ceramic Engineering Design by a student in the Bachelor of Engineering in Ceramic Engineering degree course

The Sialon Ceramics Prize

- \$100

For the best performance in an honours thesis that reflects an advancement in the technology and development of advanced ceramics by a student proceeding to the degree of Bachelor of Engineering in Ceramic Engineering

The Taylor Ceramic Engineering Prize

- \$150 and a plaque

For the greatest overall amount of ingenuity shown in professional activities by a graduating student in the Bachelor of Engineering in Ceramic Engineering degree course

The Wallarah Minerals Prize

- \$100

For the best performance in an honours thesis by a student in the Bachelor of Engineering in Ceramic Engineering degree course

The Welding Technology Institute of Australia Prize

- Books valued at approximately \$200 and 1 year membership of the Institute

For the best performance in MATS1214 Welding and other Joining Processes

The Western Mining Corporation Limited Prize

- \$150

For the best overall performance in Year 3 full-time (or its part-time equivalent) by a student in the Engineering or Bachelor of Science (Technology) in Materials Science and Engineering degree course

The Western Mining Corporation Limited Prize

- \$150

For the best overall performance in Year 4 full-time (or its part-time equivalent) by a student in the Bachelor of Metallurgical Engineering in Process Metallurgy or the Bachelor of Science (Technology) in Metallurgy degree course

School of Mathematics

The Applied Mathematics Prize

- \$100

For excellence in level 3 Applied Mathematics subjects in a Bachelor degree or Diploma course

The CH Peck Prize

- \$200

For the best performance in Year 2 Mathematics by a student proceeding to Year 3 in the School of Mathematics

The Coca-Cola Amatil Prize

- \$200

For the best performance in Theory of Statistics or Higher Theory of Statistics 3 subjects in a Bachelor degree course

The Head of School's Prize

- \$100

For excellence in four or more Mathematics units in Year 2 in a Bachelor degree or Diploma course

The JR Holmes Prize

- \$100

For the best performance in Level 3 Pure Mathematics subjects by a student in a Bachelor degree or Diploma course

The Michael Mihailavitch Erihman Award

- \$1,000

For the best performance by a student enrolled in a Mathematics Program, in examinations conducted by the School of Mathematics in any one year

The Reuters Australia Pty Limited Prize

- \$100

For excellence in Higher Theory of Statistics 2 subjects in a Bachelor degree course

The School of Mathematics Prize

- \$100

For the best performance in MATH1131 Mathematics 1A or MATH1141 Higher Mathematics 1A, and MATH1231 Mathematics 1B or MATH1241 Higher Mathematics 1B by a student in a Bachelor degree or Diploma course

The School of Mathematics Prize

- \$100

For the best performance in basic Level 2 Higher Mathematics units by a student in a Bachelor degree or Diploma course

The Statistical Society of Australia (NSW Branch) Prize

- \$200

For the best performance in Theory of Statistics subjects

The Towers Perrin Fourth Year Prize

- \$200

For the best performance in the fourth year project by a student proceeding to the degree of Bachelor of Science at Honours level within the School of Mathematics

The Towers Perrin Third Year Prize

- \$200

For the best performance in both MATH3610 Higher Pure Mathematics 3 – Real Analysis and MATH3620 Higher Pure Mathematics 3 – Functional Analysis or in MATH3181 Applied Mathematics 3 – Optimal Control Theory

School of Microbiology and Immunology

The Bio–Rad Prize in Immunology

- \$250

For the best performance in MICR3051 Immunology 2

The Clinical Microbiology Update Programme Prize

- \$300

For the best performance in MICR3081 Medical Bacteriology by a student proceeding to the degree of Bachelor of Science at Pass or Honours level

The Jackson Prize

- \$500

For the best Honours student in MICR4013 Microbiology 4 (Honours)

School of Optometry

The ACBO Prize

- Textbooks or visual therapy equipment worth approximately \$150

For the best overall performance throughout the Bachelor of Optometry course in binocular and children's vision

The AOA Bookshop Prize

- A book voucher from AOA Bookshop worth \$150

For the best overall performance in Session 2, Year 1 of the Bachelor of Optometry degree course

The Australian Optometrical Association Prize

- \$500

For outstanding academic performance in the Bachelor of Optometry degree course

The Bausch & Lomb Prize

- \$200 or a pair of Ray-Ban sunglasses valued at approximately \$300 and a plaque

For the best performance in Year 3 of the Bachelor of Optometry course

The BOC Ophthalmic Instruments Prize

- Colour Vision Test

For the best overall performance throughout the course in Colour Vision

The Designs for Vision Prize

- \$250

For the best overall performance throughout the course in Primary Care Optometry

The ESSILOR Australia Pty Limited Prize

- \$200

For the best performance in OPTM3301 Visual Science III and OPTM3309 Ocular Science III

The Eycon Lens Laboratories Pty Limited Prize

- A trial fitting set of contact lenses

For the best overall performance throughout the Bachelor of Optometry course in contact lenses

The Head of School's Prize

- \$500

To be awarded at the discretion of the Head of School

The Hoya Lens Australia Pty Limited Prize

- \$250

For the best overall performance in Ocular and Visual Science throughout the Bachelor of Optometry degree course

The Hydron Pty Limited Prize

- \$250

For the best performance in OPTM4302 Clinical Optometry 4 (Year 4) in the Bachelor of Optometry degree course

The Hydron Pty Limited Prize

- \$250

For the best overall performance in Year 4 of the Bachelor of Optometry degree course

The Martin Wells Pty Limited Prize

- \$250

For the best final year essay in the Bachelor of Optometry degree course

The Optometric Vision Research Foundation Prize

- \$250

For the best research project in the final year of the Bachelor of Optometry degree course

The Optometrists Association of NSW Prize

- \$150

For the best overall performance in Year 2 of the Bachelor of Optometry course

The Perkins Optical Products Pty Ltd Prize

- \$200

For the best overall performance in OPTM2303 Spectacles, Lenses and Optical Systems

The Perkins Optical Products Pty Ltd Prize

- \$200

For the best overall performance throughout the course in Dispensing

The Protector Technologies Pty Ltd

- \$150

For the best overall performance throughout the course in Public Health and Occupational Optometry

The Safilo Australia Prize

- \$150

For the best performance in OPTM2302 Clinical Optometry 2

The SOLA Optical Australia Pty Ltd Prize

- \$200

For the best overall performance in OPTM4301 Visual Science 4

The Theo Kannis Prize for Clinical Optometry

- \$250

For the best overall performance in Clinical Optometry throughout the Bachelor of Optometry degree course

School of Physics

The Australian Institute of Physics Prize

- \$100 and 1 year membership of the Institute

For the highest aggregate in any 3 units from PHYS3010 Quantum Mechanics, PHYS3050 Nuclear Physics, PHYS3021 Statistical Mechanics and Solid State Physics, PHYS3030 Electromagnetism, PHYS3060 Advanced Optics, PHYS3041 Experimental Physics A by a student in the Bachelor of Science degree course

The B L Turtle Memorial Astrophysics Prize

- \$150

For the best performance in PHYS3160 Astrophysics by a student in the Bachelor of Science degree course

The Bob Dalglish Prize

- \$100

For the best performance in a competition based on the use of microcomputers in PHYS1601 Computer Applications

The Bob Dalglish Prize

- \$100

For the best performance in a project carried out within PHYS2601 Computer Applications

The Coherent Scientific Prize for Lasers, Optoelectronics & Applications

- \$250

For the best performance in PHYS3710 Lasers and Applications or PHYS3720 Optoelectronics

The Gordon and Mabel Godfrey Award In Theoretical Physics 4

- \$200

For excellence in PHYS4503 Theoretical Physics 4 (Honours) in the Bachelor of Science degree course at honours level

The Gordon and Mabel Godfrey Prize in Theoretical Physics 3

- \$200

For the best performance in a selection of Year 3 Theoretical Physics subjects chosen from: PHYS3510 Advanced Mechanics, Fields and Chaos PHYS3530 Advanced Quantum Physics PHYS3550 General Relativity PHYS3560 Relativistic Electrodynamics and Plasmas Physics

The Head of School's Prize in Physics

- \$50

For the best Year 4 Honours Thesis in Physics in the Bachelor of Science degree course

The Nilsen Prize in Electronics

- \$200

For excellence in PHYS3630 Electronics or PHYS3041 Experimental Physics A and PHYS3760 Laser and Optoelectronics Technology Laboratory 1

The Nucletron Prize in Experimental Physics

- \$200

For the best performance by a student in the third year physics subject PHYS3041 Experimental Physics A

The Physics Staff Prize for Physics 1

- \$100

For the best performance in PHYS1002 Physics 1

The Physics Staff Prize for Physics 2

- \$150

For the highest aggregate in PHYS2001 Mechanics and Computational Physics PHYS2011 Electromagnetism and Thermal Physics PHYS2021 Quantum Physics and

Relativity PHYS2031 Laboratory by a student in the Bachelor of Science degree course

The Physics Staff Prize for Physics Honours

- \$200

For the best performance in the Physics Honours Year by a student in the Bachelor of Science degree course

The Spex Prize for Advanced Optics

- \$250

For the best performance in PHYS3060 Advanced Optics by a student proceeding to the degree of Bachelor of Science

School of Physiology and Pharmacology

The DI McCloskey Prize for Physiology/ Pharmacology Honours

- \$100

For the best performance in PHPH4218 Physiology 4 Honours or PHPH4258 Pharmacology Honours in course 3801 Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery in the Faculty of Medicine or course 3970 Bachelor of Science) in the Board of Studies in Science and Mathematics

The DN Wade Prize For Medical Pharmacology

- \$100

For the best performance in PHPH3055 Medical Pharmacology by a student in course 3801 Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery, 3821 Bachelor of Science Bachelor of Medicine Bachelor of Surgery or 3840 Bachelor of Arts Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery

The Doerenkamp–Zbinden Prize in Pharmacology

- \$100

For the highest aggregate in PHPH3152 Pharmacology in the Bachelor of Science degree course

The FC Courtice Prize

- \$100

For the best performance in PHPH2018 Medical Physiology 1 in course 3801 Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery or 3840 Bachelor of Arts

Bachelor of Science (Medicine) Bachelor of Medicine
Bachelor of Surgery

The FC Courtice Prize

- \$100

For the best overall performance in Level III Physiology in a Bachelor degree course

The School of Physiology and Pharmacology Staff Prize for Medical Biology

- \$100

For the best performance in PHPH1004 Biology for Medical Students in year 1 of course 3801 Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery or 3840 Bachelor of Arts Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery

The School of Physiology and Pharmacology Staff Prize for Physiology 1 or Principles of Physiology

- \$100

For the best performance in PHPH2112 Physiology 1 or PHPH2122 Principles of Physiology in course 3821 Bachelor of Science Bachelor of Medicine Bachelor of Surgery

The WE Glover Prize for Physiology

- \$100

For the best performance in PHPH3014 Medical Physiology 2 in course 3801 Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery, 3821 Bachelor of Science Bachelor of Medicine Bachelor of Surgery or 3840 Bachelor of Arts Bachelor of Science (Medicine) Bachelor of Medicine Bachelor of Surgery

School of Psychology

The Australian Psychological Society Prize

- \$300

For the best performance in Psychology 4 Honours

The Istvan Tork Prize in Neuroscience

- \$100

For the best performance by a fourth year Honours student who completed a thesis in the field of Neuroscience in the Schools of Psychology or Anatomy or Physiology and Pharmacology

The Milon Buneta Prize

- \$80

For the best performance in Year 2 of the Bachelor of Science (Psychology) degree course

The Psychology Staff Prize

- \$80

For the best performance in Year 2 Psychology

Department of Textile Technology

The Charles Parsons Prize (Year 2 Textile Management)

- \$500

For the best performance in Year 2 Textile subjects by a student proceeding to the degree of Bachelor of Science in Textile Management

The Charles Parsons Prize (Year 2 Textile Technology)

- \$500

For the best performance in Year 2 Textile subjects by a student proceeding to the degree of Bachelor of Science in Textile Technology

The Charles Parsons Prize (Year 3 Textile Management)

- \$500

For the best performance in Year 3 Textile subjects by a student proceeding to the degree of Bachelor of Science in Textile Management

The Charles Parsons Prize (Year 3 Textile Technology)

- \$500

For the best performance in Year 3 Textile subjects by a student proceeding to the degree of Bachelor of Science in Textile Technology

The JB Speakman Prize

- \$50

For the best undergraduate thesis in the final year of the Bachelor of Science in Textile Technology or Textile Management degree course

The RJ Webster Prize

- \$250

For the best performance throughout the Bachelor of Science in Textile Technology or Textile Management degree course

The Textile Institute Prize

- 2 years free membership of the Textile Institute

For the best performance in Textile Technology by a student in the Bachelor of Science in Textile Technology or Textile Management degree course

Department of Wool and Animal Science

The CR Luckock Prize

- \$60

For the best performance in Meat Science in the Department of Wool and Animal Sciences

The PR McMahon Memorial Prize

- \$100

For excellence in Wool Science in the Bachelor of Science in Wool and Pastoral Science degree course

Postgraduate Prizes

Department of Food Science and Technology

The Spruson and Ferguson Patent and Trade Mark Prize

- \$250

For the best performance in the Seminar presentation by a student proceeding to the degree of Master of Science or Doctor of Philosophy in the Department of Food Science and Technology

School of Psychology

The Mitchell, Sutton & Gallagher Prize

- \$200

For the best performance by a student in PSYC7108 Research Thesis (Applied)

School of Mathematics

The JR Holmes Prize

- \$100

For excellence in at least 4 pass-level pure Mathematics level 3 units, taken over no more than two consecutive years by a student in the Science, Arts or Education degree courses

Department of Safety Science

The Blackmores Ltd Prize for In Vitro Toxicology Laboratory Science

- \$250

For the best performance in Chemical Safety and Applied Toxicology (CSAT) laboratory based subject or project report on in vitro toxicology, by a student enrolled in a Diploma or Coursework Master's Degree in the Department of Safety Science

The Ergonomics Society of Australia (NSW) Prize

- \$100 and membership of the Society

For the best overall performance in all prescribed Core subjects by all students who have completed the requirements to graduate with the award of either the Master of Applied Science (Ergonomics) or the Graduate Diploma in Ergonomics

School of Optometry

The Theo Kannis Prize for Advanced Clinical Optometry

- \$250

For the best performance in OPTM8001 Advanced Clinical Optometry by a student in the Master of Optometry degree course

The MMI Insurance Prize for Introduction to Occupational Health

- \$250

For the best performance in SESC9260 Introduction to Occupational Health by a student enrolled in a Diploma or Coursework Masters degree course in the Department of Safety Science

The MMI Insurance Prize for Occupational Medicine

- \$250

For the best performance in SESC9262 Occupational Medicine by a student enrolled in a Diploma or Coursework Masters degree course in the Department of Safety Science

The MMI Insurance Prize for Principles of Ergonomics

- \$250

For the best performance in SESC9224 Principles of Ergonomics by a student enrolled in a Diploma or Coursework Masters degree course in the Department of Safety Science

The National Safety Council of Australia Prize

- \$100

For the best performance in SESC9211 Introduction to Safety Engineering by a student enrolled in a Diploma or Coursework Masters in the Department of Safety Science

The National Safety Council of Australia Prize in Occupational Health and Safety

- \$250

For the best performance by a graduating student in the Master of Applied Science in Occupational Health and Safety degree course

The National Starch & Chemical Prize

- \$200

For the best performance in SESC9543 Management of Dangerous Materials by a student enrolled in a Diploma or Coursework Masters degree in the Department of Safety Science

The Neil Adams Ergonomics Prize

- \$250

For the best performance in three subjects, one of which is an ergonomics subject, by a student enrolled in the Graduate Diploma in Ergonomics

The Safety Institute of Australia (NSW Division) Bill Lessels' Memorial Prize for Master of Safety Science

- A book voucher worth \$200

For the best overall performance by a student in the Master of Safety Science degree course

The Safety Institute of Australia (NSW Division) Bill Lessels' Memorial Prize for Graduate Diploma in Safety Science

- A book voucher worth \$200

For the best overall performance by a student in the Graduate Diploma of Safety Science degree course

The Whiteley Industries Prize

- \$200

For the best performance in SESC9263 Chemical Safety and Toxicology by a student enrolled in a Diploma or Master's degree in the Department of Safety Science

Department of Textile Technology

The Malcolm Chaikin Prize

- \$200 and a bronze medal

For an outstanding PhD thesis in the Department of Textile Technology

The University of New South Wales • Kensington Campus

Theatres

Applied Science Theatre **F11**
 Athol Lykke Theatre **C27**
 Biomedical Theatres **E27**
 Central Lecture Block **E19**
 Chemistry Theatres
 (*Dwyer, Mellor, Murphy, Nyholm, Smith*) **E12**
 Clancy Auditorium **C24**
 Classroom Block (*Western Grounds*) **H3**
 Fig Tree Theatre **B14**
 Heffron Theatres **E13**
 Io Myers Studio **D9**
 Keith Burrows Theatre **J14**
 MacAuley Theatre **E15**
 Mathews Theatres **D23**
 Parade Theatre **E3**
 Physics Theatre **K14**
 Quadrangle Theatre **E15**
 Rex Vowels Theatre **F17**
 Science Theatre **F13**
 Webster Theatres **G15**

Buildings

AGSM **G27**
 Applied Science **F10**
 Arcade **D24**
 Architecture **H14**
 Barker Apartments **N13**
 Barker Street Gatehouse, Gate 14 **N14**
 Bassler College (*Kensington*) **C18**
 Baxter College **D14**
 Biosciences **D26**
 Central Store **B13**
 Chancellery **C22**
 Dalton (*Chemistry*) **F12**
 Goldstein College (*Kensington*) **D16**
 Golf House **A27**
 Gymnasium **B5**
 High Street Gatehouse, Gate 9 **B24**
 Heffron, Robert (*Chemistry*) **E12**
 International House **C6**
 John Goodsell (*Commerce and Economics*) **F20**
 Kensington Colleges (*Office*) **C17**
 Library (*University*) **E21**
 Link **B6**
 Main **K15**
 Maintenance Workshop and Central Store **B13**
 Mathews **F23**
 Menzies Library **E21**
 Morven Brown (*Arts*) **C20**
 New College **I6**

Newton **J12**
 NIDA **D2**
 Parking Station **H25**
 Parking Station **N18**
 Pavilions **E24**
 Philip Baxter College (*Kensington*) **D14**
 Quadrangle **E15**
 Sam Cracknell Pavilion **H8**
 Samuels Building **F25**
 Science Precinct Development **H13**
 Shalom College **N9**
 Webster, Sir Robert **G14**
 Unisearch House **L5**
 University Regiment **J2**
 University Union (*Roundhouse*) **E6**
 University Union (*Blockhouse*) **G6**
 University Union (*Squarehouse*) **E4**
 Wallace Wurth School of Medicine **C27**
 Warrane College **M7**

General

Aboriginal Resource and Research Centre **E20**
 Aboriginal Student Centre **A29**
 Accommodation (*Housing Office*) **E17**
 Accounting **E15**
 Admissions **C22**
 Alumni Relations **C22**
 Anatomy **C27**
 Applied Bioscience **D26**
 Applied Economic Research Centre **F20**
 Applied Geology **F10**
 Archives, University **E21**
 Architecture **H14**
 Arts and Social Sciences (*Faculty Office*) **C20**
 Asia-Australia Institute: 45 Beach Street, Coogee
 Asian Business and Language Studies **E15**
 Audio Visual Unit **F20**
 Australian Graduate School of Management **G27**
 Banking and Finance **E15**
 Biochemistry and Molecular Genetics **D26**
 Biological Science **D26**
 Biomedical Library **F23**
 Biotechnology **F25**
 Building **H14**
 Built Environment (*Faculty Office*) **H14**
 Business Law and Taxation **F20**
 Campus Services **C22**
 Cashier's Office **C22**
 Chaplains **E4**
 Chemical Engineering and Industrial Chemistry **F10**
 Chemistry **F12**

Civil and Environmental Engineering **H20**
 Commerce and Economics (*Faculty Office*) **F20**
 Communications Law Centre **C15**
 Community Medicine **D26**
 Computer Science and Engineering **G17**
 Cornea and Contact Lens Research Unit 22-32 King
 St, Randwick
 Economics **F20**
 Education Studies **G2**
 Educational Testing Centre **E4**
 Electrical Engineering **G17**
 Energy Research, Development & Information Centre
 F10
 Engineering (*Faculty Office*) **K17**
 English **C20**
 Equity and Diversity Unit **E15**
 Examinations **C22**
 Facilities Department **C22, B14A**
 Fees Office **C22**
 Fibre Science and Technology **G14**
 Food Science and Technology **B8**
 Geography **K17**
 Geomatic Engineering **K17**
 Graduate School of Biomedical Engineering **F25**
 Graduate School of the Built Environment **H14**
 Graduate School of Engineering (MBT Program) **K17**
 Groundwater Centre **F10**
 Health Service, University **E15**
 Health Services Management **F25**
 History **C20**
 Human Resources **C22**
 Industrial Design **G14**
 Industrial Relations and Organisational Behaviour
 F20
 Information, Library and Archives Studies **F23**
 Information Systems **E15**
 Information Technology Unit **F21**
 International Student Centre **F9**
 IPACE Institute **F23**
 Kanga's House **O14**
 Landscape Architecture **K15**
 Law (*Faculty Office*) **F21**
 Law Library **F21**
 Legal Studies and Taxation **F20**
 Library Lawn **D21**
 Life Sciences (*Faculty Office*) **D26**
 Loans **C22**
 Lost Property **H11**
 Marine Science **D26**
 Marketing **F20**
 Materials Science and Engineering **E8**

Mathematics **F23**
 Mechanical and Manufacturing Engineering **J17**
 Media Liaison **C22**
 Medical Education **C27**
 Medicine (*Faculty Office*) **B27**
 Microbiology and Immunology **D26**
 Michael Birt Gardens **C24**
 Mines **K15**
 Mining Engineering **K15**
 Modern Language Studies **C20**
 Music and Music Education **B11**
 News Service **C22**
 Optometry **J12**
 Pathology **C27**
 Performing Arts **B10**
 Petroleum Engineering **D12**
 Philosophy **C20**
 Physics **K15**
 Physiology and Pharmacology **C27**
 Planning and Urban Development **K15**
 Political Science **C20**
 Pooch Corner **N8**
 Printing Section **C22**
 Professional Development Centre **E17**
 Psychology **F23**
 Publications Section **C22**
 Remote Sensing and Geographic Information
 Systems **K17**
 Research Office: 34 Botany Street, Randwick
 Safety Science **B11a**
 Science and Technology (*Faculty Office*) **E12**
 Science and Technology Studies **C20**
 Security **H13**
 Social Science and Policy **C20**
 Social Policy Research Centre **F25**
 Social Work **G2**
 Sociology **C20**
 Sport and Recreation Centre **B6**
 Squash Courts **B7**
 Student Centre (*off Library Lawn*) **C22**
 Student Recruitment Office **C22**
 Student Services: Careers, Housing, Counselling **E15**
 Students' Guild **E15**
 Swimming Pool **B4**
 Tennis Pavilion **J6**
 Textile Technology **G14**
 Theatre and Film Studies **B10**
 UNSW Bookshop **E15**
 WHO Regional Training Centre **C27**
 Wool and Animal Sciences **G14**
 Works and Maintenance **B14A**