THE UNIVERSITY OF
NEW SOUTH WALES

Science

HANDBOOK

1996

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NEW SOUTH WALES

Faculty of
Science

HANDBOOK

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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 1995, but may be amended
without notice by the University Council.

CREDIT POINTS - IMPORTANT NOTE

From 1996, UNSW is introducing a university wide credit point system for all
subjects offered to both undergraduate and postgraduate students. The system
will mean that a subject will have the same credit point value irrespective of which
faculty's course it is counting towards. Students will be 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 or for the standard 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Old subject measures have been replaced by new university credit points.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 1996 subject selections based on the credit points
shown in this handbook.

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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 & 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.

WJ O'Sullivan
Dean
Board of Studies in Science and Mathematics

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

	1996	1997
Session 1 (14 weeks)	4 March to 4 April 15 April to 14 June	3 March to 27 March 7 April to 13 June
Mid-session recess	5 April to 14 April	28 March to 6 April
Study period	15 June to 20 June	14 June to 19 June
Examinations	21 June to 9 July	20 June to 8 July
Mid-year recess	10 July to 28 July	9 July to 27 July
Session 2 (14 weeks)	29 July to 27 September 8 October to 8 November	28 July to 26 September 7 October to 7 November
Mid-session recess	28 September to 7 October	27 September to 6 October
Study period	9 November to 14 November	8 November to 13 November
Examinations	15 November to 3 December	14 November to 2 December

Important dates for 1996

January
M   1   New Year's Day - Public Holiday
M   15   Medicine IV - Term 1 begins
Th 18   Medicine V - Term 1 begins
F   26   Australia Day - Public Holiday
T   30   Enrolment period begins for new undergraduate students and undergraduate students repeating first year

February
M   12   AGSM Open Learning GMQ and GDM programs - Semester 1 begins
M   26   Medicine VI - Term 2 begins
AGSM MBA program - Year 1 classes - Term 1 begins

March
F   1   Last day for acceptance of provisional enrolment by re-enroling students
M   4   Session 1 begins for faculties other than Medicine and AGSM
AGSM MBA program - Year 2 classes - Term 1 begins
University College, ADFA - Session 1 begins
F   15   Last day applications are accepted from students to enrol in Session 1 or whole year subjects
Su 17   Medicine IV - Term 1 ends
M   18   Medicine IV - Term 2 begins
Su 24   Medicine V - Term 1 ends
Su 31   Last day for students to discontinue without failure subjects which extend over Session 1 only
HECS Census Date for Session 1

April

M	1	Medicine V - Term 2 begins
F	5	Good Friday - Public Holiday
		Mid-session recess begins for faculties other than Medicine, AGSM and University College, ADFA
S	6	Easter Saturday - Public Holiday
M	8	Easter Monday - Public Holiday
Su	14	Mid-session recess ends for faculties other than Medicine, AGSM and University College, ADFA
		Medicine VI - Term 2 begins
M	15	Medicine VI - Recess begins
Su	21	Medicine VI - Recess ends
M	22	Medicine VI - Term 3 begins
Th	25	Anzac Day - Public Holiday
Su	28	Medicine IV - Term 2 ends
M	29	Medicine IV - Recess begins

May

S	4	University College, ADFA - May recess begins
Su	5	Medicine IV - Recess ends
M	6	Medicine IV - Term 3 begins
F	10	AGSM MBA program - all classes - Term 1 ends
M	13	AGSM MBA program - all classes - Examinations begin
	14	Publication of provisional timetable for June examinations
F	17	AGSM MBA program - all classes - Examinations end
Su	19	University College, ADFA - May recess ends
W	22	Last day for students to advise of examination clashes
S	25	AGSM Open Learning GDM program - Semester 1 ends
		AGSM Open Learning GDM program - Examination

June

S	1	AGSM Open Learning GMQ program - Semester 1 ends
		AGSM Open Learning GMQ program - Examination
Su	2	Medicine V - Term 2 ends
		Medicine VI - Term 3 ends
M	3	AGSM MBA program - all classes - Term 2 begins
		Medicine VI - Term 4 begins
T	4	Publication of timetable for June examinations
M	10	Queen's Birthday - Public Holiday
T	11	Medicine V - Term 3 begins
F	14	Session 1 ends for faculties other than Medicine, AGSM and University College, ADFA
S	15	Study recess begins for faculties other than Medicine, AGSM and University College, ADFA
Su	16	Medicine IV - Term 3 ends
M	17	Medicine IV - Term 4 begins
Th	20	Study recess ends for faculties other than Medicine, AGSM and University College, ADFA
F	21	Examinations begin for faculties other than Medicine, AGSM and University College, ADFA
		University College, ADFA - Session 1 ends
S	22	University College, ADFA - Mid-year recess begins
M	24	University College, ADFA - Examinations begin

July

F	5	University College, ADFA - Examinations end
T	9	Examinations end for faculties other than Medicine, AGSM and University College, ADFA
W	10	Mid-year recess begins for faculties other than Medicine, AGSM and University College, ADFA
M	15	AGSM Open Learning GMQ and GDM programs - Semester 2 begins
Su	21	University College, ADFA - Mid-year recess ends
M	22	University College, ADFA - Session 2 begins
F	26	Medicine VI - Term 4 ends
S	27	Medicine VI - Recess begins
Su	28	Mid-year recess ends for faculties other than Medicine, AGSM and University College, ADFA
M	29	Session 2 begins for faculties other than Medicine, AGSM and University College, ADFA

August

Su	4	Medicine VI - Recess ends
M	5	Medicine VI - Term 5 begins
F	9	Last day applications are accepted from students to enrol in Session 2 subjects
		Last day for students to discontinue without failure which extend over the whole academic year
		AGSM MBA program - all classes - Term 2 ends
Su	11	Medicine IV - Term 4 ends
		Medicine V - Term 3 ends
M	12	AGSM MBA program - all classes - Examinations begin
		Medicine IV - Recess begins
F	16	AGSM MBA program - all classes - Examinations end
Su	18	Medicine IV - Recess ends
M	19	Medicine IV - Term 5 begins
		Medicine V - Term 4 begins
S	31	Last day for students to discontinue without failure subjects which extend over Session 2 only
		HECS Census Date for Session 2

September

M	2	AGSM MBA program - all classes - Term 3 begins
S	7	Open Day
Su	15	Medicine VI - Term 5 ends
M	16	Medicine VI - Term 6 begins
F	27	Closing date for applications to the Universities Admission Centre
S	28	Mid-session recess begins for faculties other than Medicine and AGSM
		University College, ADFA - September recess begins
Su	29	Medicine IV - Term 5 ends
M	30	Medicine IV - Term 6 begins

October

M	7	Labour Day - Public Holiday
		Mid-session recess ends for faculties other than Medicine and AGSM
		University College, ADFA - September recess ends
T	8	Publication of provisional timetable for November examinations
W	16	Last day for students to advise of examination clashes
Su	20	Medicine V - Term 4 ends
F	25	University College, ADFA - Session 2 ends
S	26	AGSM Open Learning GDM program - Examination
Su	27	Medicine VI - Term 6 ends
M	28	University College, ADFA - Examinations begin
T	29	Publication of timetable for November examinations

November

S	2	AGSM Open Learning GDM program - Semester 2 ends
		AGSM Open Learning GDM program - Examination
F	8	Session 2 ends for faculties other than Medicine, AGSM and University College, ADFA
		AGSM MBA program - all classes - Term 3 ends
S	9	Study recess begins for faculties other than Medicine, AGSM and University College, ADFA
		AGSM Open Learning GMQ program - Semester 2 ends
		AGSM Open Learning GMQ program - Final Examination
Su	10	Medicine IV - Term 6 ends
M	11	AGSM MBA program - all classes - Examinations begin
Th	14	Study recess ends for faculties other than Medicine, AGSM and University College, ADFA
F	15	Examinations begin for faculties other than Medicine, AGSM and University College, ADFA
		University College, ADFA - Examinations end
		AGSM MBA program - all classes - Examinations end

December

T	3	Examinations end for faculties other than Medicine, AGSM and University College, ADFA
W	25	Christmas Day - Public Holiday
Th	26	Boxing Day - Public Holiday

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The Board of Studies in Science and Mathematics includes all members of the Faculty of Biological and Behavioural Sciences and the Faculty of Science, and some members of specific schools in other faculties contributing to the Science and Mathematics Courses: Applied Geology (Department), Biotechnology (Department), Chemical Engineering and Industrial Chemistry, Geography, Materials Science and Engineering; Philosophy, Science and Technology Studies (Arts and Social Sciences); Accounting, Economics, Information Systems (Commerce and Economics); Electrical Engineering, Computer Science and Engineering, Mechanical and Manufacturing Engineering, Surveying (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine); Education (Professional Studies); and the Centre for Liberal and General Studies.

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Centre for Membrane and Separation Technology

(in association with the Faculty of Applied Science)

Director, Biophysics
Professor HGL Coster

Director, Chemical Engineering
Professor AG Fane

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. Graduate 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 & Molecular Genetics	Biological and Behavioural Sciences
BIOS	School of Biological Science	Biological and Behavioural Sciences
BIOM	Centre for Biomedical Engineering	Engineering
BIOT	Department of Biotechnology	Applied Science
BSSM	Board of Studies in Science and Mathematics	
CHEM	School of Chemistry	Science
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	Biological and Behavioural Sciences
FINS	School of Banking and Finance	Commerce and Economics
GENS	Centre for Liberal and General Studies	
GEOG	School of Geography	Applied Science
GEOL	Department of Applied Geology	Applied Science
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
MDCN	School of Medicine	Medicine
MECH	School of Mechanical and Manufacturing Engineering	Engineering
MICR	School of Microbiology and Immunology	Biological and Behavioural Sciences
MINP	School of Chemical Engineering and Industrial Chemistry	Applied Science
MSCI	Centre for Marine Science	Science
OCEA	Oceanography (Mathematics)	Science
OPTM	School of Optometry	Science
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
POLY	Department of Polymer Science	Applied Science
PSCY	School of Psychiatry	Medicine
PSYC	School of Psychology	Biological and Behavioural Sciences
REMO	Centre for Remote Sensing	Engineering
SAFE	Department of Safety Science	Applied Science
SCTS\ HPST	School of Science and Technology Studies	Arts and Social Sciences
WOOL	Department of Wool and Animal Science	Applied Science

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 Biological and Behavioural 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 Biological and Behavioural Sciences and the Faculty of Science and some members of specific Schools in other faculties contributing to the Science and Mathematics Course: Biotechnology, Chemical Engineering and Industrial Chemistry, Geography, Mines (Applied Science); Science and Technology Studies, Philosophy (Arts); Accounting, Economics, Information Systems (Commerce); Electrical Engineering, Computer Science and Engineering, Mechanical and Manufacturing Engineering, Surveying (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine); Education (Professional Studies); and the Centre for Liberal and General Studies.

The Dean is Professor W O'Sullivan who is also the Dean of the Faculty of Biological and Behavioural Science.

The Presiding Member is Associate Professor G Russell.

The Coordinator of Studies in Science and Mathematics is Associate Professor HA Goodwin.

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 1996 should obtain a copy of the leaflet *Re-Enrolling 1996: 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 (SM96). 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 3are 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 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 Biological and Behavioural Sciences, and the Faculty of Science, 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 responsibilty and services provided.

The Faculty of Science 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 form 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 Biological and Behavioural Sciences Library Facilities

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

The Biomedical Library

The Biomedical Library provides library sevices for staff and students from the Faculties of Medicine and Biological and Behavioural Sciences, the Schools of Appied 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 Library Facilities

Although any of the university libraries may met specific needs, the satff and students of the Faculty of Science 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

Student Equity

The University of New South Wales is committed to providing an educational environment that is free from discrimination and harassment. Both commonwealth and state anti-discrimination law requires the University not to discriminate against students or prospective students on the following grounds: sex, race/ethnicity, age, disability, sexual harassment, racial harassment, disability harassment, marital status, pregnancy, sexual preference, HIV/AIDS. Also included are acts of vilification on the grounds of: race and HIV/AIDS.

Complaint/Disputes

The University has internal dispute handling procedures to deal with complaints against staff or other students. The Discrimination and Harassment Grievance Procedures are handled by the Student Equity Unit of the Equal Employment Opportunity Unit. Complaints that largely concern academic matters are usually handled through the Head of School.

Advocacy and Support

Students can seek assistance getting disputes resolved, either in relation to discrimination or academic matters. Assistance can be sought from various areas in the University including:

Student Equity Unit; Student Guild Advocacy Service; Student Counselling; Equal Employment Opportunity Unit; Course Co-ordinators; Senior Academic Staff; Heads of School.

Students may be confident that their interests will be protected by the University if a complaint is lodged. This means that students should not be disadvantaged or victimised because they have, in good faith, sought to assert their rights to equal opportunity in education.

Undergraduate Study
Science and Mathematics Courses
- course codes 3970; 3978; 3979
Advanced Science Courses
- course codes 3973; 3976; 3985; 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:

423970   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 49-52.

423978   Computer Science
This is applicable specifically to a major in Computer Science in course 3978 as outlined on pages 39-40.

423979   Information Systems

This is applicable specifically to a major in Information Systems in course 3979 as outlined on page 47.

423985 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 , and in course 3973 as outlined in the Medical Physics program on page 35.

423990 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 35.

423976 Advanced Science (Environmental Science)

This is applicable to study in environmental science in course 3976 as outlined in programs 6861 - 6869 commencing on page 41.

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. 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 and 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 Coordinator of Studies. 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 to 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 Credti 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 15 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; 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. 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.

Students in the Advanced Science course must complete General Education subjects totalling 112 hours Category C is designed to permit students to address questions concerning the design and responsible management of the human and planetary future. 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 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 Coordinator of Studies. 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 15 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 or 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	423970, 423990
BIOCHEMISTRY	4100	3970, 3990	423970, 423990
BIOLOGICAL SCIENCE	1700	3970, 3990	423970, 423990
BIOLOGICAL SCIENCES Holding Program	6817	3970, 3990	423970, 423990
BIOMEDICAL SCIENCE	7370	3990	423990
BIOTECHNOLOGY	4200	3970, 3990	423970, 423990
BOTANY	1743	3970, 3990	423970, 423990
CHEMISTRY	0200	3970, 3985	423970, 423985
COMPUTER SCIENCE	0600	3978	423978
EARTH AND ENVIRONMENTAL SCIENCE	2527	3970, 3985	423970, 423985
ECOLOGY			
Geographical Ecology	6851	3970, 3990	423970, 423990
Mathematical Ecology	6852	3970, 3990	423970, 423990
Biological Ecology	6853	3970, 3990	423970, 423990
ENVIRONMENTAL SCIENCES			
Biological Environments (Terrestrial)	6861	3976	423976
Biological Environments (Marine)	6862	3976	423976
Biological Environments (Microbial)	6863	3976	423976
Environmental Chemistry	6864	3976	423976
Earth Environments (Geography)	6865	3976	423976
Earth Environments (Geology)	6866	3976	423976
Engineering Physics	0176	3985	423985
Environmental Mathematics (Fluid Dynamics)	6867	3976	423976
Environmental Mathematics (Statistics)	6868	3976	423976
Environmental Mathematics (Population Dynamics)	6869	3976	423976
GENETICS	6840	3970, 3990	423970, 423990
GEOGRAPHY	2700	3970, 3985	423970, 423985
GEOLOGY	2500	3970, 3985	423970, 423985
GEOCHEMISTRY	0225	3985	423985
GEOPHYSICS	2503	3985	423985
INFORMATION SYSTEMS	1400	3979	423979
MARINE SCIENCE			
Physical Oceanography	6831	3970, 3990	423970, 423990
Biological Oceanography	6832	3970, 3990	423970, 423990

Subject Area	Program Number	Available in Course(s)	UAC Entry Code(s)
Earth Science Oceanography	6833	3970, 3990	423970, 423990
Environmental Chemistry	6834	3970, 3990	423970, 423990
MATHEMATICS	1000	3970, 3985	423970, 423985
MATHEMATICS WITH COMPUTING	1061	3970, 3985	423970, 423985
MATHEMATICS OF MANAGEMENT	6810	3985	423985
MATHEMATICS WITH COMPUTER SCIENCE	1060	3985	423985
MEDICAL CHEMISTRY	0210	3985	423985
MEDICAL PHYSICS	0141	3973	423985
MICROBIOLOGY AND IMMUNOLOGY	4400	3970, 3990	423970, 423990
MOLECULAR GENETICS	4110	3970, 3990	423970, 423990
NEUROSCIENCE A	7312	3990	423990
NEUROSCIENCE B	1273	3990	423990
PHARMACOLOGY	7301	3970, 3990	423970, 423990
PHILOSOPHY	5200	3970, 3985	423970, 423985
PHILOSOPHY OF SCIENCE	5262	3970, 3985	423970, 423985
PHILOSOPHY AND COMPUTER SCIENCE	5206	3985	423985
PHYSICS	0100	3970, 3985	423970, 423985
PHYSICS WITH COMPUTER SCIENCE	0161	3970, 3985	423970, 423985
PHYSICS AND ASTRONOMY	0121	3985	423985
PHYSIOLOGY	7300	3970, 3990	423970, 423990
PSYCHOLOGY	1200	3970, 3990	423970, 423990
PSYCHOLOGY AND COMPUTER SCIENCE	1206	3990	423978
PHILOSOPHY	5262	3970, 3985	423970, 423985
PHILOSOPHY AND COMPUTER SCIENCE	5206	3985	423978
PURE AND APPLIED CHEMISTRY	0205	3985	423985
SCIENCE AND TECHNOLOGY STUDIES	6200	3970, 3985	423970, 423985
STATISTICS	1006	3970, 3985	423970, 423985
STATISTICS WITH COMPUTER SCIENCE	1066	3985	423985
STATISTICS WITH COMPUTING	1067	3970, 3985	423970, 423985
ZOOLOGY	1745	3970, 3990	423970, 423990

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/Optometry), **3995** (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 PATH3201)
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 is concerned with understanding life processes, especially molecular aspects of living organisms. Historically, the diverse approaches of chemistry and physiology were applied to biologial systems but now Biochemistry has achieved its own techniques, approaches and body of knowledge, and its ideas pervade biology. It, however, retains a molecular basis and is an ideal study for those students who are interested in understanding and appreciating biological processes at the molecular rather than descriptive level. Integration of this molecular approach at the cellular, tissue, organ and whole organism level is an important part of Biochemistry. Biochemistry also represents a fundamental component of medical science and has an important role in many aspects of modern medicine.

4100
Biochemistry

The program allows students to combine Biochemistry with other disciplines, for example Microbiology, Chemistry, Physiology, Biotechnology, Biological Science, Genetics or Anatomy.

Stage 1
BIOS1101, BIOS1021
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 or BIOC2372*
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

Preference will be given to students enrolling in selected advanced science programs such as 7000 Anatomy, 7370 Biomedical Science, 0141 Medical Physics, 7312 Neuroscience A or 1273 Neuroscience B. Other students may be admitted with the permission of the Head of School.

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

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).

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, BIOC2201
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 COMP1811 and 1 subject totalling 15 Credit Points
or PSYC1002

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 105 or 120 Credit points, with at least 75 Credit Points from:
ANAT2111, ANAT2211, BIOC2101 and BIOC2201 or BIOC2372**, 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 105 or 120 Credit Points (to complete a total of 345 or 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 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.

From 1994 Student numbers in PHPH2112 and BIOC2372 will be limited. Entry to these subjects will be based on academic merit.

From 1995 Student numbers in Level III Physiology and Pharmacology subjects will be limited. Entry to these subjects will be based on academic merit.

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. Details of the BE Degree Course in Bioprocess Engineering and the BSc degree course in Biotechnology are given in the Faculty of Applied Science Handbook. 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
BIOS2011, BIOS2021, BIOS2041, BIOS2051
Elective subjects totalling 30 Credit Points to make a total of 8
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 (Chemistry) and 0205 (Pure and Applied Chemistry, for Advanced Science only). Both programs provide a basic scientific education and a professional training in the chemical sciences. Fundamental, applied, environmental and industrial aspects of chemistry are included.

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/Geology: programs 0200 and 2500 can be made compatible (initially consult the School of Chemistry);

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 7301 Pharmacology are mutually compatible;

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

0200
Chemistry

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
Elective subjects totalling 45 Credit points
All General Education subjects (112 hours)

Stage 3
Choose Level III Chemistry subjects totalling 60 Credit Points of which at least 45 Credit Points are from:
CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose Elective subjects totalling 60 Credit Points
Students proposing to proceed to Stage 4 (Honours) must complete Level III subjects totalling 120 Credit Points.

Stage 4 (Honours)
CHEM4003

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

0205
Pure and Applied Chemistry (Advanced Science 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 Level III entirely to chemistry.

Stage 1
CHEM1101, CHEM 1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PHYS1002
Elective subjects totalling 30 Credit Points

Stage 2
CHEM2011, CHEM2021, CHEM2031, CHEM2041
Elective subjects totalling 60 Credit Points (Recommended: Biochemistry,
Biotechnology, Computer Science, Geology, Mathematics, Physics, Physiology)
All General Education subjects (112 hours)

Stage 3
CHEM3011, CHEM3021, CHEM3031, CHEM3041
Level III Chemistry subjects totalling 60 Credit Points

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
PHPH2112*, BIOC2101 and BIOC2201 or BIOC2372*
One 56 hour or two 28 hour General Education Subjects

Stage 3
CHEM3021, CHEM3041
PHPH3152*
BIOC311 and BIOC3281
Choose two additional level 3 units (one from Chemistry and one from either Biochemistry or Physiology and Pharmacology)
One 56 hour or two hour General Education Subjects

Stage 4
CHEM4003 or PHPH4258/PHPH4264 or BIOC4318/4618
One Catagory C General Education Subjects

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

Student numbers in these subjects are limited. Entry to these subjects 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
GEOL1101, GEOL1201

Stage 2
CHEM2011, CHEM2021, CHEM2031, CHEM2041
GEOL2011, GEOL2041, GEOL2042, GEOL2072, GEOL2092, GEOL8202
One 56 or two 28 hour General Education Subjects

Stage 3
CHEM3021, CHEM3031, CHEM3041 and CHEM3141 or CHEM3311
GEOL3011, GEOL3021, GEOL3101, GEOL3092, GEOL8303
One 56 or two 28 hour General Education Subjects

Stage 4
CHEM4003 (Program 0225)
One General Education Subject

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

COMPUTER SCIENCE

Entry to this program is restricted to students who have been offered a place directly (UAC code 423978). 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 423978)); Philosophy (program 5206 (UAC entry code 423978))

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

Subjects up to 120 Credit Points may be counted from appropriate subjects not listed in this handbook. Enrolment in subjects available for study in the Faculty of Arts and Social Sciences is subject to approval by the relevant subject authority.

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*
GEOG1064, GEOG1073
GEOL1101, GEOL1201
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 or BIOS1301*
GEOG2021, GEOG3025, GEOG2051
GEOL6231, GEOL7223, GEOL7233
One 56 hour or two 28 hour General Education subjects

This subject is only available to students not wishing to take further Biology in Stage 3.

Stage 3
GEOL6321, GEOL7323, GEOL7333
Plus Level III subjects from Geology and/or Biology and/or Geography totalling 60 Credit points
One 56 hour or two 28 hour General Education subjects

Stage 4 (Honours)
GEOL4313 or GEOG4050/GEOG4100 or GEOL4333
(Only offered over two Stages)

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
GEOG1064, GEOG1073
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Choose 1 of the strands:
1. CHEM1101, CHEM1201
2. GEOL1101, GEOL1201
3. Elective subjects totalling 30 Credit Points

Stage 2
BIOS2011, BIOS2051 and BIOS2031 or BIOS2061
BIOS2041 or GEOG2013
GEOG2021, GEOG2025
Subjects totalling at least 15 Credit Points from:
BIOC2101, BIOS2021, BIOS2031, BIOS2061, GEOG2051, GEOG3025, GEOL7223, GEOL6231, MICR2201, MICR2011
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG3042, GEOG3062, GEOG3211
subjects totalling At least 15 Credit Points from:
BIOS3011, BIOS3031, BIOS3051, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3151, GEOG2032, GEOG2051, GEOG3011, GEOG3025, 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

Stage 1
BIOS1101, BIOS1201
COMP1811
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081

Choose 1 of the strands:
1. CHEM1101, CHEM1201
2. GEOG1064, GEOG1073
3. PHYS1002 or PHYS1022

Stage 2
BIOS2011, BIOS2051,
MATH2501, MATH2510
BIOS2031 or BIOS2061
Choose 1 of the strands:
1. MATH2120, MATH2200, MATH2841
2. MATH2801, MATH2831
Subjects totalling At least 15 Credit Points from: BIOS2021, BIOS2031, BIOS2061, GEOG2021, GEOG2051, GEOG3025, GEOG3032, GEOG3042, GEOG3062, MATH2160, MATH2180, MATH2220, MATH2301, MATH2520, MATH2810, MATH2840, MICR2201 or MICR2011
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3061, BIOS3111 and GEOG2025 or GEOG3211
Subjects totalling At least 45 Credit Points from subjects related to the strand chosen in Stage 2:
1. MATH3161, MATH3181, MATH3201, MATH3540, MATH3550, MATH3870, MATH3880
2. MATH2810, MATH2840, MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3861
Subjects totalling at least 15 Credit Points from: BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3151, GEOG2013, GEOG2025, GEOG2051, GEOG3011, GEOG3025, GEOG3051, GEOG3062, 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)

6853
Biological Ecology

Stage 1
BIOS1101, BIOS1201
CHEM1101, CHEM1201
GEOG1064, GEOG1073
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and BIOS2031 or BIOS2061
Subjects totalling 15 Credit Points from: BIOS2031, BIOS2061, GEOG2021, GEOG2025, GEOG2051, GEOG3042, MICR2011, MICR2201
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG3211
further Level III subjects totalling 30 Credit Points from: BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3151, GEOG2025, GEOG2051, GEOG3025, GEOG3042, 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 or BIOS1301, BIOS3071
CHEM1101, CHEM1201, CHEM3901
ECON1107
ENVS1011, ENVS2010, ENVS2020, ENVS2801
GEOG1073, GEOG3042
GEOL1101 or GEOL1201 or GEOL6231 or GEOL6321
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241
BIOS2041 or GEOG2013 or MATH2841 or MATH2301

6861
Biological Environments (Terrestrial)
(Advanced Science only)

Stage 1
BIOS1101, BIOS1201
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020, ENVS2801
GEOG2025
GEOL1201 or GEOL6231
subjects totalling 15 Credit Points from:
BIOS2031, BIOS2051
BIOS2061,GEOG2021, MSCI2001, MICR2201
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3071, BIOS3111
CHEM3901
GEOG3042, GEOG3211
BIOS3061 or GEOG3062
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
BIOS4068/BIOS4069 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
BIOS4168 (Combination of an honours thesis project and course work in Biological Science approved by Program Adviser) or
BIOS4064 (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
GEOG1073
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020, ENVS2801
GEOL1101
MSCI2001
subjects totalling 15 Credit Points from BIOS2031,

BIOS2051, BIOS2061, GEOG2021, MICR2011, MICR2201
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3071, BIOS3081, BIOS3091, BIOS3111
CHEM3901
GEOG3042
subjects totalling at least 15 Credit Points from:
GEOG3062, GEOG3211,
GEOL6231, GEOL6321, MSCI3001
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
MSCI4063/MSCI4069 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
MSCI4065 (Combination of an honours thesis project and course work approved by Program Adviser) or
MSCI4066 (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
GEOG1073
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2
BIOS2011
ECON1107
ENVS2010, ENVS2020, ENVS2801
MICR2011, MICR2201
subjects totalling 30 Credit Points from: BIOS2031, BIOS2041, BIOS2051, BIOS2061, GEOG2021, GEOL1101, GEOL1201, MSCI2001
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3071
CHEM3901
GEOG3042
MICR3021, MICR3071
subjects totalling 15 Credit Points from: BIOS2041, GEOG2025, GEOG3062
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
MICR4063/MICR4069 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
MICR4065 (Combination of an honours thesis project and course work approved by Program Adviser) or
MICR4066 (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 or BIOS1301
CHEM1101, CHEM1201
ENVS1011
GEOG1073
GEOL1101
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
GEOG3042
statistics subjects totalling 15 Credit Points from BIOS2041, GEOG2013, or MATH2841
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

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

Stage 4
CHEM4065 (Combination of an honours thesis project and course work approved by Program Adviser) or further subjects for major sequence approved by Program Adviser and CHEM4005 (Environmental Chemistry/ Science project with the appropriate Credit Point value to complete a full Stage load) and General Education requirement

6865
Earth Environments (Geography) (Advanced Science only)

Stage 1
CHEM1101, CHEM1201
ENVS1011
GEOG1064, GEOG1073
GEOL1101 or GEOL1201

MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2
BIOS1101 or BIOS1301
ECON1107
ENVS2010, ENVS2020, ENVS2801
GEOG2013, GEOG2021, GEOG2051, GEOG3025
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3071
CHEM3901
GEOG3042, GEOG3062 or GEOG3211
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
GEOG4063/GEOG4069 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
GEOG4065 (Combination of an honours thesis project and course work approved by Program Adviser) or
GEOG4066 (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
GEOG1073
GEOL1101, GEOL1201
MATH1011 or MATH1131 or MATH1141
MATH1021 or MATH1231 or MATH1241

Stage 2
BIOS1101 or BIOS1301
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
GEOG3042
GEOL6231, GEOL6321, GEOL7323, GEOL7333
subjects totalling 15 Credit Points from: GEOG2021, GEOG3032, GEOG3062, GEOL6221
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
GEOL7401/GEOL7402 (Full Stage honours thesis project)
with permission of Program Adviser and Head of School or
GEOL7403 (Combination of an honours thesis project and
course work approved by Program Adviser) or
GEOL7404 (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)

Stage 1
ENVS1011
GEOG1073
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002

Stage 2
BIOS1101 or BIOS1301
ECON1107
ENVS2010, ENVS2020, ENVS2801
MATH2100, MATH2120, MATH2240, MATH2220
MATH2301, MATH2520, MATH2510
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3071
GEOL1101
GEOG2021, GEOL1101
MATH3121, MATH3301, MATH3241, MATH3261
One 56 hour or two 28 hour General Education subjects

Stage 4
CHEM3901
GEOG3042, GEOG3062
MATH5265 or MATH5285 or MATH5295
MATH4002
An additional subject will be taken in a topic associated with
environmental fluid dynamics, numerical modelling or data
analysis, chosen after consultation.
General Education requirement

6868
Environmental mathematics (statistics) (Advanced Science only)

Stage 1
BIOS1101, BIOS1201
ENVS1011
GEOG1073
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241

Stage 2
BIOS2011
ENVS2010, ENVS2020, ENVS2801
ECON1107
MATH2501, MATH2510, MATH2520, MATH2801, MATH2831
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOL1101
GEOG2021
MATH2810, MATH2840, MATH3811, MATH3820, MATH3830
One 56 hour or two 28 hour General Education subjects

Stage 4
CHEM3901
GEOG3042, GEOG3062
MATH4002
Additional subjects to make a final total of 480 Credit Points.
General Education requirement

6869
Environmental Mathematics (population dynamics) (Advanced Science only)

Stage 1
BIOS1101, BIOS1201
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1131 or MATH1141
MATH1231 or MATH1241

Stage 2
BIOS2011
ECON1107
ENVS2010, ENVS2020, ENVS2801
MATH2200, MATH2220, MATH2501, MATH2510, MATH2520, MATH2841
One 56 hour or two 28 hour General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG2021, GEOG3062
GEOL1101
MATH3201, MATH3540, MATH3550
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
CHEM3901
GEOG3042
MATH3161, MATH3181
MATH4002
Additional subjects to make a final total of 480 Credit Points.
General Education requirement

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 and also in the School of Community Medicine.

6840
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 or BIOC2372*
BIOS2011 or MICR2201
BIOS2021
MATH2841 or BIOS2041
2 or Elective subjects totalling 45 Credit points,
Recommended: BIOS2031, BIOS2051, BIOS2061,
CHEM2021, COMP1811,
MICR2011, WOOL3803 or CMED3111
One 56 hour or two 28 hour General Education subjects

Preference will be given to students enrolling in selective advanced science programs, such as 7000 Anatomy, 7300 Biomedical Science, 0141 Medical Physics, 7312 Neuroscience A or 1273 Neuroscience B. Other students may be admitted with the permission of the Head of School.

Stage 3
Subjects totalling at least 60 Credit Points from: BIOC3121, BIOC3131, BIOC3281, BIOC3291, BIOT3031 or MICR3021, CMED8201, CMED8202 or CMED8302, CMED8303, WOOL4813 and further elective subjects to give a total of 345 Credit Points
Recommended: BIOC3111, BIOS3071, BIOS3121, BIOS3141, BIOT3011, COMP1821, MICR3041, WOOL3901
One 56 hour or two 28 hour General Education subjects

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

Stage 4 (Honours)
BSSM4103 (F/T), BSSM4109 (P/T)

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 human affairs.

The program 2700 includes physical and human Geography, with particular emphasis on studies of the natural 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, studied with Geology in the Earth and Environmental Science (2527), with Biological Science in Ecology (6851) and with Environmental Science programs (especially 6865).

2700
Geography

Stage 1
GEOG1064, GEOG1073
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
Geography subjects totalling 45 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 45 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 GEOG2013

Stage 4 (Honours)
GEOG4100/GEOG4050

GEOLOGY AND GEOPHYSICS

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. Resource geology is concerned with the application of all

geological knowledge to the location and extraction of mineral and energy deposits, and to engineering and environmental tasks, activities fundamental to society. Thus geology has an applied, professional function as well as being a scientific discipline.

Geophysics employs sophisticated instrumentation in order to construct physical earth models and is a companion discipline to Geology.

Program for Professional Geology
Since June 1986, the Australasian Institute of Mining and Metallurgy has required that its corporate members, including professional geologists, shall have completed a four Stage course. Students wishing to enter the geology profession through Science should take program 2500 with a double specialisation in Applied Geology and then take a Stage 4 honours program. Stage 4 is divided between a core of advanced geological topics, and one strand chosen from mineral resources, sedimentary basin resources, engineering and environmental geology, or geophysics. Session 2 of Stage 4 is devoted to a specialised research project.

Single Specialisation in Geology
Geology is a natural companion to other sciences, such as Chemistry (in Geochemistry), Botany and Zoology (in Palaeontology) and Geography. Program 2500 also allows a single specialisation in Geology. Students who wish to undertake an honours degree program that includes geology with another science should consult the Department of Applied Geology. Those interested in combining Geology with Biology should read the following section.

Geology with Biological Science
Geology and the Biological Sciences meet in palaeontology, the evolution and environmental controls on the growth of ancient life forms. Palaeontology provides geologists with essential information about the relative ages and depositional environments of sedimentary rocks, particularly the strata with potential to yield fossil fuels.

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

2500
Geology

Stage 1
CHEM1101, CHEM1201
GEOL1101, GEOL1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
and either
BIOS1101 and BIOS1201* or BIOS1301 or
GEOG1064, GEOG1073 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 and subjects totalling 45 Credit Points of Geology which must include GEOL2031 and GEOL2062. At Level III subjects totalling at least 60 Credit Points of Geology which must

include GEOL3031 plus BIOS3131 and subjects totalling 45 Credit Points chosen from BIOS3101, BIOS3051, BIOS3071, BIOS3081, BIOS3091, BIOS3121

Stage 2
GEOL2011, GEOL2022, GEOL2031
GEOL2041, GEOL2042, GEOL2051, GEOL2062, GEOL2072, GEOL2092
One 56 hour or two 28 hour General Education subjects

Stage 3
GEOL3011, GEOL3021, GEOL3031, GEOL3052, GEOL3072, GEOL3082, GEOL3092, GEOL3101, GEOL3102
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 or GEOL4343 (Only offered over two Stages)

2503
Geophysics (Advanced Science only)

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

Stage 1
COMP1811
GEOL1101, GEOL1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002 and PHYS1601

Stage 2
COMP1821, COMP2011
GEOL2051, GEOL2062, GEOL8220, GEOL8221
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
GEOL2072, GEOL3052, GEOL3072, GEOL3082, GEOL8350, MATH3150
GEOL8360, MATH3101, PHYS2011, PHYS3620
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

2504
Geochemistry (Advanced Science 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
GEOL1101, GEOL1201

Stage 2
CHEM2011, CHEM2021, CHEM2031, CHEM2041
GEOL2011, GEOL2041, GEOL2042, GEOL2072, GEOL2092, GEOL8201
One 56 hour or two 28 hour General Education Subjects

Stage 3
CHEM3021, CHEM3031, CHEM3041 and CHEM3141 or CHEM3311
GEOL3011, GEOL3021, GEOL3101, GEOL3092, GEOL8370, GEOL8380
One 56 hour or two 28 hour General Education Subjects

Stage 4
GEOL4303 or GEOL4343
Honours research projects co-supervised by members of the School of Chemistry and the Department of Applied Geology are strongly advised.

INFORMATION SYSTEMS

Entry to this program is restricted to students who have been offered a place directly (UAC code 423979). 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
COMP1811
ECON1101
INFS1602, INFS1603
MATH1131 or MATH1141
MATH1231 or MATH1241

Stage 2
COMP1821
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
COMP1821
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 and ECON1102.

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. BIOS1011, BIOS1021
2. CHEM1101, CHEM1201
3. GEOL1101, GEOL1201
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. GEOL1101, GEOL1201
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 8 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
GEOL1101, GEOL1201
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. GEOL1101, GEOL1201
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)

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 is a specified interdisciplinary program, Mathematics of Management (6810), and 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.

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 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. MATH1081 in Stage 1 is highly recommended.

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 and fluid mechanics: either PHYS1002 or appropriate Level I Engineering subjects.

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; PSYC1002; PHYS1002; CHEM1101 and CHEM1201.

4. Applied mathematics for computational methods or computer science: COMP1811, MATH1081.

Statistics majors
See programs 1006,1066 or 1067.

A major revision of the Statistics programs involving many new and altered subjects is in progress. Stage 2 has altered from 1996 and Stage 3 will alter from 1997.

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.

1000
Mathematics

Stage 1
MATH1131 or MATH1141
MATH1231 or MATH1241
Elective subjects totalling 90 Credit Points*
(MATH1081 is recommended)

Stage 2
MATH2011, MATH2120, MATH2501, MATH2520
A further 15 Credit Points of Level II or Level III Mathematics
Elective subjects totalling 60 Credit Points*
One 56 hour or two 28 hour General Education subjects

Stage 3
Level III Mathematics subjects totalling 60 Credit Points
Elective subjects totalling 45 Credit Points*
One 56 hour or two 28 hour General Education subjects

Advanced Science students must complete 90 Credit Points of Level III Mathematics subjects and elective subjects totalling 30 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
COMP1811, COMP1821
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Elective subjects totalling 45 Credit Points*

Stage 2
COMP2011, COMP2031
MATH2011, MATH2501
MATH2301, MATH2400
MATH2801 or MATH2841
Level II or Level III elective subjects totalling 22.5 Credit Points*
(*Recommended alternative strands:* Applied Mathematics: MATH2120. Pure Mathematics: MATH2410.)
One 56 hour or two 28 hour General Education subjects

Stage 3
30 Credit Points of Level III Computer Science subjects chosen from: COMP3111, COMP3121, COMP3311, COMP3411
15 Credit Points chosen from MATH3301, MATH3400, MATH3430
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.)
One 56 hour or two 28 hour General Education subjects

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 90 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
COMP1811
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Elective subjects totalling 60 Credit Points*

Stage 2
COMP1821
MATH2011, MATH2120, MATH2501, MATH2520
MATH2301, MATH2841
15 Credit Points chosen from: MATH2160, MATH2200,
MATH2400, MATH2410

Elective subjects chosen from Mathematics and/or
Computer Science totalling 15 Credit Points
One 56 hour or two 28 hour General Education subjects

Stage 3
COMP2011
MATH3301
A further 45 Credit Points of Level III Mathematics
(MATH3400, MATH3411, MATH3430 are recommended)
Elective subjects chosen from Mathematics and/or
Computer Science totalling 30 Credit Points
One 56 hour or two 28 hour General Education subjects

Advanced Science students must complete elective
subjects totalling 45 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*

Stage 2 (from 1996)
MATH2120, MATH2501, MATH2510 or MATH2011,
MATH2520, MATH2801, MATH2810, MATH2831.
Elective subjects totalling 45 Credit Points* (or 37.5 if
MATH2011 taken)
One 56 hour or two 28 hour General Education subjects

Stage 3 (1996 only)
(From 1997 there will be a new Stage 3)
60 Credit Points chosen from MATH3801, MATH3811,
MATH3820, MATH3830, MATH3840, MATH3850,
MATH3861, MATH3971
Elective subjects totalling 45 Credit Points*
One 56 hour or two 28 hour General Education subjects

Advanced Science students must complete 90 Credit
Points of Level III Mathematics subjects including 60 Credit
Points of Level III Statistics subjects including MATH3980
and, in addition, 30 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
COMP1811, COMP1821
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Elective subjects totalling 45 Credit Points*

Stage 2 (from 1996)
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)
One 56 hour or two 28 hour General Education subjects

Stage 3 (1996 only)
(From 1997 there will be a new Stage 3)
30 Credit Points of Level III Computer Science subjects
chosen from: COMP3111, COMP3121, COMP3311,
COMP3411
MATH3861, MATH3980
37.5 Credit Points of Level III Statistics subjects chosen
from: MATH3801, MATH3811, MATH3820, MATH3830,
MATH3840, MATH3850, MATH3971
Level III Mathematics subjects totalling 15 Credit Points
Elective subjects totalling 15 Credit Points*
One 56 hour or two 28 hour General Education subjects

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
COMP1811
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Elective subjects totalling 60 Credit Points*

Stage 2 (from 1996)
COMP1821
MATH2120, MATH2501, MATH2510 or MATH2011,
MATH2520, MATH2801, MATH2810, MATH2831,
MATH2840
A further 22.5 Credit Points (or 15 if MATH2011 taken) of
Mathematics and/or Computer science subjects
One 56 hour or two 28 hour General Education subjects

Stage 3 (1996 only)
(From 1997 there will be a new Stage 3)
MATH3861
A further 60 Credit Points of Level III Statistics subjects
A further 30 Credit Points of Mathematics and/or Computer
Science subjects
One 56 hour or two 28 hour General Education subjects

Advanced Science students must complete 90 Credit
Points of Level III Mathematics subjects including 60 Credit
Points of Level III Statistics subjects including MATH3980
and, in addition, 30 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*

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, MATH2501, MATH2520
MATH2160, MATH2180
MATH2801 or MATH2841
ACCT2522, INFS1602
15 Credit Points chosen from: ACCT2542, INFS2603,
FINS2613
One 56 hour or two 28 hour General Education subjects

Stage 3
30 Credit Points chosen from: MATH3101, MATH3121,
MATH3161, MATH3181, MATH3801, MATH3870,
MATH3880.
A further 45 Credit Points of Level III Mathematics
30 Credit Points chosen from one of the strands:
1. ACCT3563, ACCT3583
2. INFS3605, INFS3607, INFS3608
3. FINS2624, FINS3625
Elective subjects totalling 15 Credit Points*
One 56 hour or two 28 General Education subjects

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

Stage 4 (Honours)
MATH4103 or MATH4603

*Up to 45 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.*

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

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
BIOC2372
MATH2011
PHYS2410, PHYS2001, PHYS2021, PHYS2011,
PHYS2031
MATH2120
One 56 hour or two 28 hour General Education subjects

Stage 3
ANAT2111 or ANAT2120
PHPH2112
PHYS3410,PHYS3041,PHYS3060,PHYS1601
Plus elective subjects to make a total of 120 Credit points
chosen from:
MATH2520, MATH2160, MATH2841, MATH3121
PATH3201
PHYS3630, PHYS3620, PHYS3710, PHYS3720,
PHYS2601, PHYS3010*, PHYS3050*, PHYS3760,
PHYS3110, PHYS3120, PHYS3310, PHYS3610
One 56 hour or two 28 hour General Education subjects

Stage 4
PHYS3021, PHYS3030, PHYS4411, PHYS4413,
SAFE4410
1 General Education subject
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, 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 45 Credit Points*
One 56 hour or two 28 hour General Education subjects

Stage 3
MICR3021
Subjects totalling at least 45 Credit Points from MICR3041,
MICR3051, MICR3061, MICR3071, MICR3081
Additional elective subjects to give a total of 345 Credit
Points
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

Stage 4 (Honours)
MICR4013, MICR4023

BIOS2041 Biometry is recommended.
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 or BIOC2372*
BIOS2011 or MICR2201
BIOS2021
CHEM2021 or CHEM2041
MICR2011
1 or Elective subjects totalling 30 Credit Points
One 56 hour or two 28 hour General Education subjects

Preference will be given to students enrolling in selected advanced science programs such as: 7000 Anatomy, 7370 Biomedical Science, 0141 Medical Physics, 7312 Neuroscience A, 1273 Neuroscience B. Other students may be admitted with the permission of the Head of School.

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, BIOC3291, BIOT3011, CMED8303, 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: BIOC3271, BIOT3061, CMED8302, 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)
BIOC4318 or BIOS4013 or BIOT4073 or CMED8001 or MICR4013

NEUROSCIENCE

This program seeks to introduce 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 BIOC2372*
PHPH2112*
PSYC2001, PSYC2021
One 56 hour or two 28 hour General Education subjects

Stage 3
ANAT3411, ANAT3421
PHPH3121**, PHPH3131**
PSYC3021, PSYC3031
additional subjects totalling 30 Credit Points at Level II or Level III to complete 345 credit Points***
One 56 hour or two 28 hour General Education subjects

Stage 4
Subject to satisfactory progress throughout the course, 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.

From 1994 student numbers in PHPH2112 and BIOC2372 will be limited. Entry to these subjects will be based on academic merit.

**From 1995, student numbers in Level III Physiology and Pharmacology subjects will be limited. Entry to these subjects will be on academic merit.*

***Entrance to PSYC4023 requires students to have completed Psychology subjects with an average of at least 70% (PSYC1002 is not included in the average) students in course 3972 whose average falls below 70% enrol in PSYC4033.*

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
COMP1811 and 1 elective subject totalling 15 Credit Points

Stage 2
ANAT2111
BIOC2101 and BIOC2201 or BIOC2372*
PHPH2112*
and subjects totalling 30 Credit Points from the following:
ANAT2211, BIOS2041, BIOS2021

CHEM2011, CHEM2021, PSYC1002
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. Students who choose PSYC3031 as one of their Level III subjects must have completed PSYC1002 or may, in some circumstances, be admitted by the Head of School if they have completed a General Education elective in Human and Animal Behaviour
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.

From 1994, student numbers in PHPH2112 and BIOC2372 will be limited. Entry to these subjects will be based on academic merit.

**From 1995, student numbers in Level III Physiology and Pharmacology subjects will be limited. Entry to these subjects will be based on academic merit.*

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	Philosphy 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

Stage 1
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
subjects totalling 15 Credit Points from: HPST1106, HPST1107, HPST1108
PHIL1006, PHIL1007, PHIL1008, PHIL1009
Elective subjects totalling 75 Credit Points

Stage 2
PHIL2106
PHIL2116 or HPST2106
HPST2116
Further elective subjects to make a total of 120 Credit Points
one 56 hour or two 28 hour General Education subjects

Stage 3
*PHIL2107 or *PHIL2117, and subjects totalling 45 Credit Points from: PHIL2107, PHIL2109, PHIL2116, *PHIL2117, PHIL2118, PHIL2207, PHIL2208, PHIL2209, PHIL2218, HPST2014, HPST2109, HPST3106, HPST3117
Elective subjects totalling 45 Credit points
One 56 hour or two 28 hour General Education subjects

*students may not count the same subject toward satisfaction of both requirements

Stage 4 (Honours)
PHIL4000 or SCTS4106

PHYSICS

The programs offered by the School (0100, 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

Program 0100 Physics offers great flexibility in the choice of subjects for students enrolled in the BSc degree at pass level. Students who proceed further, 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*
PHYS2001, PHYS2011, PHYS2021, PHYS2031
Elective subjects totalling 30 Credit Points****
One 56 hour or two 28 hour General Education subjects

Stage 3
PHYS3010, PHYS3021, PHYS3030, PHYS3041,
PHYS3050***, PHYS3060***
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 III subjects totalling 120 Credit Points.

Stage 4 (Honours)(Advanced Science Only)
Choose one of PHYS4103, BSSM4013 (A General Education subject is incorporated)

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

**Appropriate Level I electives include: COMP1811, 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.*

*****In Advanced Science Level III Elective subjects totalling 60 Credit Points are required*

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*
PHYS2001, PHYS2011, PHYS2021, PHYS2031,
PHYS2160

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, PHYS3160
elective Level III subjects totalling 52.5 CreditPoints
One 56 hour or two 28 hour General Education subject.

Stage 4 (Honours)
PHYS4103 (A General Education subject is incorporated)

Students are encouraged to select Higher Level Mathematics subjects where available

**Appropriate Level I electives include: CHEM1101, CHEM1201, PHYS1601, COMP1811*

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
COMP1811
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002, PHYS1601
Elective subjects totalling 30 Credit Points

Stage 2
COMP1821
MATH2011, MATH2120, MATH2520
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
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 (A General Education subject is incorporated)

In Advanced Science an additional 15 Credit Points from level III Physics or Mathematics is required

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
COMP1811
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
PHYS2001, PHYS3021, PHYS3030, PHYS3060, PHYS3310, PHYS3610, PHYS3630, PHYS3710/3720, PHYS3760
One 56 hour or two 28 hour General Education subject

Stage 4
ELEC4010
PHYS3010, PHYS3041, PHYS3710/3720, PHYS4764
elective subjects totalling 15 Credit Points chosen in consultation with the School (e.g. Accounting, Economics, Engineering)
One General Education subject

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 Stage 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 BIOC2372 or BIOC2101 and BIOC2201. Physiology 2 provides the 60 Credit Points level III 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 BIOC2372. 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, or Chemistry. 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.

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 BIOC2372*
Elective subjects totalling 60 Credit Points (*Recommended electives:* Anatomy, Biological Science, Biochemistry, Chemistry, Psychology)
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
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 PHPH2112 and BIOC2372 are limited and entry is based on academic merit.

** Student numbers in level III Physiology and Pharmacology subjects are limited and entry is based on academic merit.

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 BIOC2371*
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 and BIOC2372 are limited and entry is based on academic merit.

Stage 3
PHPH3152* and either:
subjects totalling at least 30 Credit Points selected from level III Physiology subjects: PHPH3121, PHPH3131, PHPH3211 and PHP3221
or subjects totalling at least 30 Credit Points selected from BIOC3111, BIOC3121, BIOC3261, BIOC3271 and BIOC3281
or MICR3011 and subjects totalling at least 30 Credit Points selected from MICR3041, MICR3051 and MICR3061
or subjects totalling at least 30 Credit Points selected from CHEM3021, CHEM3041, CHEM3141, CHEM3221, CHEM3630 and CHEM3640
Further subjects to give a total of 345 Credit Points
One 56 hour or two 28 hour General Education subjects.

Note: Students wishing to study Pharmacology with Microbiology and Immunology or Chemistry subjects should contact the School of Physiology and Pharmacology before enrolment.

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 and entry is 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.

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. In the Board of Studies in Science and Mathematics a BSc(honours) program in psychology, or the BSc(Psychol) degree course (3431) described later in this handbook provides four years of approved training in Psychology. Currently students must also follow this by completing either 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 (entry being restricted to a minimum Class 2 Division 1 Honours degree in Psychology), or by two years of supervised experience in professional practice. The alternative of supervised experience for APS membership will no longer be available. Thus new undergraduate students will be required to complete six years of accredited academic training.

A full statement on the effect of changes to registration requirements for current and new undergraduate students is available from the School of Psychology.

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
PSYC1002
Elective subjects totalling 60 Credit Points*

Stage 2**
PSYC2001
subjects totalling 30 Credit Points from:
PSYC2011, PSYC2021, PSYC2031, PSYC2051
Elective subjects totalling 75 Credit Points* (no more than 15 additional Credit Points from Level II Psychology)
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

Stage 4 (Honours)**
PSYC4023 or PSYC4033

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

** Students intending to proceed to honours must include PSYC2001, PSYC2011, PSYC2021 and PSYC2031 at Level II together with elective subjects totalling 45 Credit Points (a total of 105 Credit points in Stage 2), Level III Psychology subjects totalling

120 Credit Points including PSYC3001, PSYC3011, PSYC3021 and PSYC3031. Entrance to PSYC4023 requires students to have completed Psychology subjects with an average of at least 70% (PSYC1002 is not included in the average). Students in Advanced Science whose average falls below 70% enrol in PSYC4033.

1206
Psychology with Computer Science
(Advanced Science 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
PSYC1002
Elective subjects totalling 15 Credit points

Stage 2
COMP2011 and COMP2031
PSYC2001, PSYC2011 and PSYC2021
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 PSYC3191
subjects totalling 45 Credit Points from the list below, 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 60 Credit Points at both Level II and Level III, including PSYC2031, PSYC3021 and PSYC3031, in Stages 2 and 3. Entrance to PSYC4023 requires students to have completed Psychology subjects with an average of at least 70% (PSYC1002 is not included in the average). Students in Advanced Science 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
PSYC2031, PSYC3011, PSYC3021, PSYC3031, PSYC3041, PSYC3061, PSYC3141, PSYC3151, PSYC3161

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 totlling 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
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)

Specific Science degree courses

Besides the undergraduate studies in Science and Advanced Science there are other specific courses offered in the Faculty of Biological and Behavioural Sciences and in the Faculty of Science. These are the Aviation Course (UAC3980), Psychology Full-time Degree Course 3431 (UAC423431), Business Information Technology Course 3971 (UAC423979), Optometry Course 3950 (UAC423950), and Combined Science/Optometry Course 3951.

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

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, Engineering and Professional Studies. 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 three Faculties offering the program. The Flying 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.

2001
Flying Stream

Stage 1
AVEN1300, AVEN 1500, AVEN1900
MATH1079
PHYS1889
PROF0101, PROF0102, PROF0103
AVIA1000,
Industrial Experience
One 28 hour General Education Subject

Stage 2
AVEN2200, AVEN2210, AVEN2400, AVEN2600,
AVEN2700, AVEN2900
MATH2079
PROF0202, PROF0203, PROF0204
AVIA2000

Stage 3
AVEN3200, AVEN3210, AVEN3400, AVEN3600,
AVEN3700, AVEN3900
PHYS2819, PHYS 3789, PHYS3829
PROF0301, PROF0302, PROF0303, PROF0304
AVIA3000

2002
Operations Management Stream

Stage 1
AVEN1300, AVEN1500, AVEN1900
AVIA1203, AVIA1103

MATH1079
PHYS1889, PHYS1159
PROF0101, PROF0102
PROF0103, PROF1002
IROB2727
Industrial Experience

Stage 2
AVEN2200, AVEN2210, AVEN2400, AVEN2600,
AVEN2700, AVEN2900
AVIA2403
MATH2869
PHYS2869
PROF0202, PROF0203, PROF0204, PROF2001,
PROF2002
Choose subjects totalling 15 Credit Points from:
ECON1103, IROB2721, MATH2079
Choose any 3 subjects from:
AVIA2203, AVIA2413, AVIA2503, AVIA2603, PHYS1159,
AVIA1103, IROB2727
One 28 hour General Education subject

Stage 3
AVEN3200, AVEN3210, AVEN3400, AVEN3600,
AVEN3700, AVEN3900
AVIA3002
PHYS2819, PHYS3789
PROF0301, PROF0303
Choose subjects totalling 30 Credit Points from:
AVEN3920, AVIA3703, MATH2160, PROF3001,
PROF0302, PROF0304, MATH2180, PHYS3829
One 28 hour General Education Subject

2003
Operations Management Stream

Stage 1
AVEN1300, AVEN1500, AVEN1900
AVIA1203
MATH1011, MATH1021
PROF0101, PROF0102, PROF0103, PROF1002
PHYS1022
Industrial Experience

Stage 2
AVEN2200, AVEN2210, AVEN2400, AVEN2600,
AVEN2700, AVEN2900
AVIA2403
MATH2869
PHYS2869
PROF0202, PROF0203, PROF0204, PROF2001,
PROF2002
Choose subjects totalling 15 Credit Points from:
ECON1103, IROB2721, MATH2079
Choose any 3 subjects from:
AVIA2203, AVIA2413, AVIA2503, AVIA2603, PHYS1159,
AVIA1103, IROB2727
One 28 hour General Education subject

Stage 3
AVEN3200, AVEN3210, AVEN3400, AVEN3600,
AVEN3700, AVEN3900
AVIA3002
PHYS2819, PHYS3789

PROF0301, PROF0303
Choose subjects totalling 30 Credit Points from:
AVEN3920, AVIA3703, MATH2160, PROF3001,
PROF0302, PROF0304, MATH2180, PHYS3829
One 28 hour General Education Subject

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), anf 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.** Currently students must also follow this by completing either 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 (entry being restricted to a minimum Class 2 Division 1 Honours degree in Psychology), or by two years of supervised experience in professional practice. The alternative of supervised experience for APS Membership will no longer be available thus new undergraduate students will be required to complete six years of accredited academic training.

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
PSYC1002
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 Science
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, PSYC2021, PSYC2031,
PSYC2042
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
Choose 8 Level III Psychology subjects to the value of 120
Credit Points including PSYC3001, PSYC3011,
PSYC3021 and PSYC3031.

Stage 4
PSYC4003

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
pscyhology subjects undertaken in that year 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 PSYC1002 taken over
the four Stages. The degree may be awarded at either Pass
level or with Honours.

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
COMP1811,
ECON1101

INFS1602, INFS1603
MATH1131 or MATH1141
MATH1231 or MATH1241

Stage 2
COMP1821
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).

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
BIOS1101	Biology A
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
MATH2819	Statistics SA
OPTM2106	Pathology for Optometry Students
OPTM2107	Microbiology for Optometry Students
OPTM2208	Diagnosis of Ocular Disease
OPTM2301	Ocular and Visual Science II
OPTM2205	Measurement of Light and Colour
OPTM2302	Clinical Optometry II
OPTM2303	Spectacle Lens and Optical Systems
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 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.

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.

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 while proceeding with their studies in Science. In each Stage of the combined degree course, students normally take subjects totalling 82.5 or 90 Credit Points from science and 30 Credit Points from Arts.

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 48 Credit Points in subjects offered by Schools, Departments or Programs within the Faculty of Arts and Social Sciences, including an approved major sequence. This degree is administered by the Board of Studies in Science and Mathematics.

3935
Combined Science / Social Science Course

BSc/BSocSc

The double degree of BSc/BSocSc normally requires an additional Stage of study, and enables students to complete the core program of the Bachelor of Social Science degree in the Faculty of Arts while proceeding with their studies in Science. In each Stage of the combined degree course, students normally take subjects totalling 82.5 or 90 Credit Points from Science and 30 Credit Points from Arts.

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 48 Credit Points in the core program from the Bachelor of Social Science degree. This degree is administered by the Board of Studies in Science and Mathematics and the Faculty of Arts and Social Sciences.

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 Professional Studies

**4075
Combined Science / Education Course**

Bachelor of Science / Bachelor of Education
BSc BEd

For details of the Combined Science / Education Course refer to the Faculty of Professional Studies 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.

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 os 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, 1400, 6810, Courses 3681, 3971, 3978 and 3979. Not available in Year 1 of programs 0600, 1000, 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, 1400, 6810 and Courses 3971, 3978 and 3979.

The second subject in a sequence of financial accounting subjects including an examination of the regulatory environment of financial reporting: the definition and recognition of assets, liabilities, revenues and expenses; accounting for partnerships and corporations. Financing decisions and financial management including financial statement and cash flow analysis, an examination of cost/volume/profit relationships in a single product firm, and short term budgeting. Lotus 123 spreadsheet applications have been integrated with these topics.

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, 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, 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 company 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 or capital instruments. Profit reporting More advanced aspects of the definition, recognition and measurement of assets and liabilities. Lease accounting. Issues in accounting for company income tax including the effects of timing differences, divided imputation, and revaluations. Published financial reports including more advanced cash flow statement preparation and analysis. Accounting for the extractive industries and for superannuation plans.

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.

The final financial reporting subject following ACCT1501, ACCT1511 and ACCT2542.

The examination of the accounting, reporting and legal problems associated with the preparation of consolidated accounts for complex mercantile structures, significant investments in joint arrangements and other inter-corporate holdings, generic trust designs, securitisation structures, cross-border forex dealings and translations, creative accounting, off-balance sheet mechanisms and structures, corporate regulation, the 'true and fair view' doctrine, business ethics, 'green' accounting and new generation (derivatives) financial instruments.

ACCT3583
Accounting and Financial Management 3B
Staff Contact: School Office
CP15 S1 or S2 L2 T2
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 P Pandey
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: Dr A Ansselin
CP15 F HPW3
Prerequisites: BIOS1101, BIOS1201
Corequisite: ANAT2111
Note/s: Restricted to program 7000 or in the Anatomy Quota.

Elementary theory of light and electron microscopy. General cell morphology and ultrastructure. Introduction to simple histological techniques and artefacts. 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 D Fernando
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.

ANAT3311
Mammalian Embryology
Staff Contact: Dr M Smith
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. Comparative 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
Neuroanatomy 2
Staff Contact: A/Prof P Waite
CP15 S2 HPW3
Prerequisite: ANAT3411
Note/s: Restricted to program 7000 or in the Anatomy Quota.

Topics of contemporary neuroanatomy and neuroscience. Includes: sensory, motor, and associational areas of the cerebral cortex, cerebral asymmetry, hippocampus, regulatory centres of the brainstem, organisation of cerebellum, sensory organs. Recent advances in chemical neuroanatomy and neuroendocrinology. Neuroanatomy of major neurological diseases, scientific basis of novel approaches to treatment. Recent work on the development of the brain. The course is organised in seminar format, and is based primarily on original publications. Students are required to undertake a substantial amount of private study.

Anatomy Level IV

ANAT4000
Anatomy 4
Staff Contact: Dr K Ashwell
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 K Ashwell
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

AVIA1000
Flying Training 1
Staff Contact: Flight Standards Officer
F
Note/s: Restricted to Course 3980 Program 2001

Practical flying training and associated ground training by contracted flying school.

AVIA1103
Air Traffic Control
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject is concerned with the procedures and structure of the Air Traffic system at both operational and administrative levels.

Emphasis is placed on the role of ATS (Air Traffic Services) from the perspective of the air traffic authority.

Topics will include; history, structure, legal aspects, communication, safety, future development.

AVIA1203
Risk Management 1
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject gives an overview of risk and the risk management process. The subject briefly considers what is risk, why people take risks and the cost of risk. It then considers the steps of the risk management process as defined by Australian standards on risk management.

The steps are defining the system, risk identification, risk analysis and assessment risk control implementation and auditing. The class will apply each step of the process to case studies of aviation issues.

AVIA2000
Flying Training 2
Staff Contact: Flight Standards Officer
F
Prerequisite : AVIA1000
Note/s: Restricted to Course 3980 program 2001

Practical flying training and associated ground training by contracted flying school.

AVIA2203
Risk Management 2
Prerequisite: AVIA1203
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject looks at 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, dangerous goods aviation medicine.

AVIA2403
Regulations 1
Note/s: restricted to students in course 3980 programs 2002 and 2003.

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 of Aviation Regulation 12 is that of routine implication of the Civil Aviation Act, civil aviation regulations and orders.

AVIA2413
Regulations 2
Prerequisite: AVIA2403

Aviation Regulations 2 builds on the fundamental concepts introduced in Aviation Regulations 1.

The emphasis of this subject is the legal ramifications 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.

AVIA2503
Airline Marketing
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject focuses the general issues of marketing within the airline environment. An industry specific subject it deals with the market specific nature of airlines and includes topics on, international marketing, community based attitude modification, the service of airlines to clients, airline product definition, impact of safety on marketing.

AVIA2603
Simulation Applications
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject addresses the broad application of simulation to the aviation industry. While the emphasis will be on aircraft simulations, aspect of operations and systems simulations will also be covered. The perspective of this subject will be that of end user application, particularly from management and training of human resource basis.

AVIA3000
Flying Training 3
Staff Contact: Flight Standards Officer
F
Prerequisite : AVIA2000
Note/s: Restricted to Course 3980 program 2001

Practical flying training and associated ground training by contracted flying school.

Note: Flying Training Syllabus. A detailed description of the Flying Training Syllabus is available from the Flight Standards Officer.

AVIA3002
Aviation Operations Management
Prerequisites: AVIA1203, PROF2001, AVIA2403, PROF0203
Corequisites: AVEN3920, AVIA3703
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject will provide an overview of the Operations Management Stream of the Bachelor of Aviation and will allow students to put into practice the theory which they have studied. The areas specifically covered in the course will include a synthesis of Environmental Issues, Industrial Relations, Risk Management, Organisational Structures and Practices, and Regulatory Background and Responsibilities. The course is designed to demonstrate to students how these issues are inter-related and how the

consequences of their decisions in any of these areas can affect an airline at the operational level.

The first session of the course (14 weeks) will consist of lectures describing how each of the areas identified above influence decision making with regard to operational strategies. During second session (14 weeks), in addition to continuing lectures, students will complete a practical project/projects which will be designed to assess students overall comprehension of course material and its application to operational procedures. Projects will be formulated under the direction of the appropriate academic member of the Aviation Degree program and will involve liaison with industry.

AVIA3703
Airport Management and Security
This is an industry based issue which brings the generalities of large areas management into the specific context of Airports and Aviation.

Topics will include legislation, international movements, customs, health and freight. Engineering awareness and operational awareness are addressed in the context of senior airport authorities.

Aviation regulation and local government issues that pertain will also be covered.

Industrial Experience
Staff Contact: Flight Standards Officer
Note/s: Restricted to course 3980.

This will involve visiting Aerospace manufacturing facilities, airlines operation and maintenance bases, airport facilities, (including ATC) migration and custom activities and general tourist organisations to provide the student with a broad context for their specific studies.

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
Australian Capital Markets
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 S2 L2 T1
Prerequisite: FINS2613
Note/s: Excluded FINS3715 and FINS2614. 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

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 K Moon, Dr G King
CP15 S1 HPW6
Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002
Note/s: Excluded 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.

An introduction to modern biochemistry covering fundamental aspects of the structure-function relationships of proteins and an overall coverage of intermediary metabolism. Major topics to be covered will 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.

BIOC2201
Principles of Molecular Biology
Staff contact: Dr T Stewart, Mr H Shoory
CP15 S2 HPW6
Prerequisite: BIOC2101
Note/s: Excluded 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.

This subject 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 to be 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.

BIOC2372
Biomedical Biochemistry
Staff Contact: Dr G Zalitis
CP30 F HPW6
Prerequisites: BIOS1101 and BIOS1201, CHEM1101 and CHEM1201 or CHEM1002
Note/s: Excluded BIOC2101, BIOC2201, BIOC2312, CHEM2929

Introduction to modern biochemistry and molecular biology with emphasis on the human. The properties and roles of the biologically important molecules including amino acids, peptides and proteins, carbohydrates, lipids and nucleic acids. The nature and function of enzymes as catalysts. The intermediary metabolism of carbohydrates, lipids and nitrogenous compounds in the various tissues and organs and the interrelationships between these pathways. The role of hormones in metabolic regulation. The respiratory chain, oxidative phosphorylation and energy-trapping systems. The molecular mechanism of gene expression including DNA, RNA and protein synthesis. Recombinant DNA technology and protein engineering. The impact of modern molecular biology in forensic science and in the study of inherited diseases. Practical work to complement the lectures.

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
Note/s: Excluded 41.102, 41.102A.

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 V Murray
CP15 S1 HPW6
Prerequisites: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201, CHEM2021 or CHEM2041
Note/s: Excluded 41.102, 41.102A.

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
Prerequisite: 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, embryogenesis 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.

BIOC3261
Human Biochemistry
Staff Contact: Dr A Bagnara
CP15 S2 HPW6
Prerequisite: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

This subject covers the aspects of metabolism that are of particular relevance to the human. The major topics to be 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
Cellular Biochemistry and Control
Staff Contact: A/Prof M Edwards
CP15 S2 HPW6
Prerequisite: 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. Complementary to BIOS3141 Ultrastructure and Function of Cells and students with a special interest in cell biology are encouraged to take both subjects. Practical work amplifies the lectures.

BIOC3281
Recombinant DNA Techniques and Eukaryotic Molecular Biology
Staff Contact: A/Prof A Mackinlay
CP15 S2 HPW6
Prerequisite: BIOC3121
Note/s: Excluded 41.132, 41.102E.

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 Eucaryotes 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 B Millborrow
CP120 F
Prerequisite: Completion of program 4100 including Level III subjects totalling 120 Credit Points 4 of which must be 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.

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 A (room G20, Biological Science building) as follows:

6-10 Feb	10.00-17.00
13-17 Feb	10.00-17.00
20-24 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

Pre-enrolment in another faculty does NOT automatically entitle you to a place in your chosen practical time. You must obtain a seat from the Biological Science Registration Centre.

Students enrolling in other subjects do not need to sign on at the Biological Science Registration Centre but only 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 G27 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 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: BIOS1021.
Note/s: Prerequisites for BIOS1101 are minimal (and may be waived on application to the Director) 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 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.

BIOS1201
Molecules, Cells and Genes
Staff Contact; Dr ML Augee
CP15 S2 HPW6
Prerequisite: BIOS1101 or BIOS1021 (Students without this prerequisite may seek the permission of the Director to enrol.)
Note/s: Excluded: BIOS1301 and BIOS1011.

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.

BIOS1301
Biology of Australian Flora and Fauna
Staff Contact: Dr ML Augee
CP15 S2 HPW6
Prerequisite: None.
Note/s: Excluded: BIOS1021 and BIOS1201

Surveys the plants and animals of Australia and examines their relationship to those of the rest of the world, particularly Gondwana. Emphasis will be on vertebrate animals and flowering plants and the unique ways in which they have adapted to the Australian environment. This subject is not acceptable as a prerequisite for upper level Biology subjects.

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 G20, Biological Sciences Building. For further details, see Faculty timetable.

Introduction to functional relationships between living organisms and environments in which they live. Emphasis on interactions within and between populations, ecological energies, ecophysiology, and the theory of evolution by natural selection. Plants, animals and microbes are covered. Also serves content 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 G27, Biological Sciences Building. For further details, see Faculty timetable.

Genome structure and life cycles in prokaryotes and Eukaryotes: DNA, gene mapping, cytogenics. 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: Mr A Woods
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 S1 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 G27, 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 S2 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 G27, 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 will incur expense.

BIOS3051
Insect Diversity and Management
Staff Contact: Dr C Orton
CP15 S1 HPW6
Prerequisite: BIOS2031

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: Dr 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 G27, 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 compulsory.

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: Students intending to enrol in this subject should register with the School of Biological Science for the February field trip by 9 December.

The ocean environment and its effect on the life of marine organisms. Emphasis on the biology of zooplankton and fish, together with the study of fisheries. Field studies are an integral component. Personal expenses will be incurred.

Complements BIOS3091 Marine Botany and Ecology.

BIOS3091
Marine Botany and Ecology
Staff Contact: A/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: A/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 S2 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 structure and development, includes 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.

BIOS3151
Lower Plants and Fungi
Staff Contact: Prof A Ashford
CP15 S2 HPW6, 2 hrs lectures, 4 hrs lab per week
Prerequisite: BIOS2051
Notes: Not offered in 1996, offered in 1997

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 explores.

Biological Science Level IV

BIOS4018
Biological Science 4 (Honours) Part-time
Staff Contact: A/Prof C Quinn
CP60
Prerequisite: Completion of program 1700 including Level III subjects totalling 105 Credit Points

BIOS4014
Biological Science 4 (Honours) Full-time
Staff Contact: A/Prof C Quinn
CP120 F
Prerequisite: Completion of program 1700 including Level III subjects totalling 105 Credit Points

BIOS4028
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

BIOS4024
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

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

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: Prof D Glenn
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, visits to industrial fermentation plants and industrial seminars.

BIOT3021
Biotechnology B
Staff Contact: Prof P Rogers
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 antobiotics, 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 F Foong
CP15 S1 L2 T4
Prerequisites: BIOS2011, BIOS2021, BIOC2101, BIOC2201 and MICR2201
Note/s: Excluded MICR3021.

This subject is suitable for students majoring in Microbiology, Biochemistry, Biotechnology or Genetics. It deals with major aspects of the genetics of bacteriophage, bacteria and yeast. Topics include plasmids and transposable genetic elements, gene transfer, mutagenesis and DNA repair, mutants, bacteriophage genetics, gene cloning (vectors, recombinant DNA techniques) and genetics of nitrogen fixation.

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.

Biotechnology Level IV

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.

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 I

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 53-100, or 3 unit Science 90-150, or 4 unit Science 1-200, or 2 unit Physics 53-100

Stoichiometry and solution stoichiometry. Atomic and molecular structure. Changes of state, phase diagrams, gases, liquids, solids, solutions. Thermodynamics. Equilibrium constants, acid-base and solubility. Oxidation and reduction. Kinetics.

CHEM1201
Chemistry 1B
Staff Contact: Dr P Chia
CP15 S2 or Summer Session HPW6
Prerequisite: CHEM1101
Note/s: Students who require CHEM1101 and CHEM1201 but have not undertaken chemistry at HSC Level should take CHEM1401 before proceeding to CHEM1101. However, no more than 30 Credit Points of Chemistry at Level I may be counted towards a Science degree.

Molecular Geometry, hybridization of Orbitals. Periodicity of Physical and Chemical Properties of Chemical compounds.

Organic Chemistry including Stereoisomerism.

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 prerequisite 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.

CHEM1800
Chemistry 1EP
Staff Contact: Dr P Chia
CP7.5 S1 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 1-200
Note/s: Restricted to program 0176 of Course 3985

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equlibria. Metals, electrochemistry and corrosion. Colloids and clays. Colligative properties of solutions. Organic chemistry, polymers. Applications of chemical principles to engineering.

Chemistry Level II

CHEM2011
Physical Chemistry
Staff Contact: Prof RF Howe
CP15 S1 or S2 HPW6
Prerequisites: CHEM1101, CHEM1201, MATH1032 or MATH1231 or MATH1042 or MATH1241 or MATH1021

First, second and third laws of thermodynamics. Applications of thermodynamics. Chemical and phase equilibria. Solutions of electrolytes and nonelectrolytes. Principles and applications of electrochemistry. Reaction kinetics, order and molecularity; effect of temperature on reaction rate. Molecular energy levels. Structure of solids and solid surfaces.

CHEM2021
Organic Chemistry
Staff Contact: Dr R Read
CP15 F or S2 HPW6
Prerequisites: CHEM1101, CHEM1201

Discussion of the major types of organic reaction mechanisms, eg addition, substitution, elimination, free radical, molecular rearrangement within context of important functional groups. Introduction to the application of spectroscopic methods to structure determination.

CHEM2031
Inorganic Chemistry and Structure
Staff Contact: Dr N Duffy
CP15 S1 or S2 HPW6
Prerequisites: CHEM1101, CHEM1201

Experimental basis for theories of electronic structure of atoms and molecules. Concepts and consequences of quantum theory. Structure, energetics and bonding in the solid state. Principles of co-ordination chemistry. Occurrence, preparation, properties and reactions of selected compounds of transition and main group elements.

CHEM2041
Chemical and Spectroscopic Analysis
Staff Contact: Dr G Moran
CP15 S1 or S2 HPW6
Prerequisites: CHEM1101, CHEM1201, MATH1032 or MATH1231 or MATH1042 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.

Chemistry Level III

CHEM3011
Physical Chemistry
Staff Contact: Dr D Alderdice
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: A/Prof M Gallagher
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: A/Prof H Goodwin
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: A/Prof J Matousek
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 R Lamb
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: Prof M Paddon-Row
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 D Phillips
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: A/Prof J Matousek
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 work stations for laboratory automation and management.

CHEM3211
Physical Chemistry of Large Molecules
Staff Contact: Dr D Smith
CP15 S2 HPW6
Prerequisite: CHEM2011
Note/s: Not available in 1996

Classification of macromolecules; naturally occurring and synthetic polymers. Techniques for the characterisation of macromolecules. Intermolecular forces and structural modelling. Thermodynamics and kinetics of macromolecular solutions. Colloid chemistry; colloidal dispersions, electrical and transport properties of dispersions. Micelles.

CHEM3221
Biological Organic Chemistry
Staff Contact: A/Prof N Cheetham
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: A/Prof M Long
CP15 S1* or S2* HPW6
Prerequisite: CHEM2011 or CHEM2021 or CHEM2031 or CHEM2041

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: Prof R Howe
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: A/Prof N Cheetham
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: Prof R Howe
CP7.5 S2 HPW3
Prerequisite: CHEM2031

Principles of quantum mechanics. Approximate methods for quantum mechanical problems. Molecular orbital theories for molecules (eg Hückel, 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 N Duffy
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 N Duffy
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 R Haines
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: A/Prof G Crank
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)
CP120 F
Prerequisites: Completion of Program 0200 or 0205 Including Level III subjects totalling 120 Credit Points 4 of which must be Chemistry subjects.

Consists of selected series of lectures on advanced topics in Chemistry and a research project.

The General Education requirements are met within the Honours Program by seminars, discussion and the 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 Year 3 (or completion of requirements for the award of the pass degree).

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Applied Science Handbook and Faculty of Engineering Handbook.

CHEM1806
Chemistry 1EE
Staff Contact: Dr P Chia
CP7.5 S1 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 1-200
Note/s: Restricted to Courses 3640 and 3725

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electrochemistry and corrosion. Colloids and clays. Colligative properties of solutions. Organic chemistry, polymers. Applications of chemical principles to engineering.

CHEM1807
Chemistry 1ME
Staff Contact: Dr P Chia
CP15 S1 HPW6
Note/s: excluded CHEM1101, CHEM1201, CHEM1002 Restricted to Course 3681

Stoichiometry. Atomic and molecular structure. Chemistry of materials. Thermochemistry. Kinetics. Equilibrium. Oxidation and reduction, electro-chemistry and corrosion of metals. Introduction to organic chemistry, structure and properties of polymers, fuels and lubricants. Surface chemistry.

CHEM1808
Chemistry 1CE
Staff Contact: Dr P Chia
CP15 S2 HPW6
Note/s: Excluded CHEM1101, CHEM1201, CHEM1002 Restricted to course 3730

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic

equilibria. Metals, electrochemistry and corrosion. Colloids and clays. Colligative properties of solutions. Organic chemistry, polymers. 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 53-100, 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, acidbase 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.

CHEM2818
Physical Chemistry for Materials Science and Engineering
Staff Contact: Prof RF Howe
S1 or S2 HPW5
Prerequisites: CHEM1002 or CHEM1101 and CHEM1201 and MATH1042 or MATH1241 or MATH1032 or MATH1231 or MATH1021
Note/s: Excluded 02.022A

First, second and third laws of thermodynamics. Applications of thermodynamics. Chemical and phase equilibria. Solutions of electrolytes and non-electrolytes. Principles and applications of electrochemistry. Reaction kinetics order and molecularity; effect of temperature on reaction rate.

CHEM2819
Physical Chemistry for Food and Fibre Science and Technology
Staff Contact: Prof RF Rowe
S1 or S2 HPW6
Prerequisites: CHEM1002 or CHEM1101 and CHEM1201 and MATH1042 or MATH1241 or MATH1032 or MATH1231 or MATH1021
Note/s: Excluded 02.002A

First, second and third laws of thermodynamics. Applications of thermodynamics. Chemical and phase equilibria. Solutions of electrolytes and non-electrolytes. Principles and applications of electrochemistry. Reaction kinetics order and molecularity; effect of temperature on reaction rate. Colloid and surface chemistry; liquid surfaces, surface tension, adsorption, surfactants and detergency, colloidal dispersions and micelles, solid surfaces and adsorption on solids.

CHEM2828
Organic and Inorganic Chemistry for Chemical Engineers
Staff Contact: Dr D Phillips

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 dblock transition elements.

CHEM2929
Fundamentals of Biological and Agricultural Chemistry
Staff Contact: Dr P Southwell-Keely

Aspects of the chemical and physical properties of materials important in biological systems. Amino acids, peptides and introduction to protein structure. Chemistry of monosaccharides, disaccharides and polysaccharides. Fats. Trace elements. Common heterocyclic systems of biological importance. Insecticides. Colour. Chromatography.

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 G Crank

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 G Crank

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.

Community Medicine

Community Medicine Level II/III

CMED3111
Genetics of Behaviour
Staff Contact: Dr L Lai
CP15 S1 HPW6
Prerequisite: BIOS1101

Principles of Mendelian, polygene and chromosomal genetics with examples from behavioural genetics. Emphasis on human behaviour in particular the genetics of mental retardation and psychiatric disorders. DNA technology in behavioural genetics. Practical classes aim at pedigree studies and the mathematical treatment of data.

Community Medicine Level III

CMED8201
Population Genetics
Staff Contact: Dr A Stark
CP15 S1 HPW5
Prerequisite: One statistical methods or theory subject, as approved by the Head of School

The genetic structure of populations: genetic relationships, mating systems, random and assortative mating, inbreeding, sexual selection, finite populations, systematic forces, selection, mutation, migration, genetic distance between populations, genetic load, stable populations, molecular population genetics, evolutionary trees; computer methods.

CMED8202
Human Genetic Analysis
Staff Contact: Dr A Stark
CP15 S2 HPW5
Prerequisites: A genetics subject and a statistical methods or theory subject, as approved by the Head of School.

Principles and methods of human genetics: design of surveys, estimation and applications of genic and genotypic frequencies, selective values, mutation and migration rates, coefficients of kinship, inbreeding and assortative mating, recombination fractions and heritabilities; segregation analysis; risks of recurrence of disease; consequences of human intervention; computer methods.

CMED8302
Human Biochemical Genetics
Staff Contact: Dr L Lai
CP15 S2 HPW6
Prerequisites: BIOC2312, BIOS2021 or CMED8303

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.

CMED8303
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.

Community Medicine Level IV

CMED8001
Human Genetics
Staff Contact: Dr L Lai, Dr AE Stark
CP120 F
Prerequisites: Completion of *at least* 3 of the following: BIOC3111 and BIOC3121, BIOT3031, MICR3041, BIOS3071, CMED3111, CMED8201, CMED8202, CMED8302, CMED8303 as well as Level III subjects totalling 90 Credit Points

Computer Science and Engineering

Computer Science and Engineering Level I

COMP1011
Computing 1A
Staff Contact: Dr A Taylor
CP15 S1 or S2 L3 T3
Prerequisites: as for MATH1131
Corequisite: MATH1031 or MATH1141
Note/s: Excluded COMP1811, 6.611, 6.600

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. *Computing systems:* Hardware (CPU, Memory, Peripherals), Software (Operating Systems, Networks, Languages) and Users. *Computing Applications:* Document Processing, Spreadsheets, Data Bases, Graphics and Communications. *Lab:* programming assignments.

COMP1021
Computing 1B
Staff Contact: Dr J Shepherd
CP15 S1 or S2 L3 T3
Prerequisite: COMP1011
Note/s: Excluded COMP1821, 6.621, 6,021D.

Introduction to the 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.

COMP1811
Computing 1 (Procedural)
Staff Contact: Dr A Sharma
CP15 S1 or S2 L3 T3
Prerequisites: As for MATH1131
Note/s: Excluded COMP1011, 6.611, 6.600

Defining problems. Reasoning about and solving problems using Logic, Abstraction, Specification, Algorithms and Data Structures. Exposure to a procedural programming language (currently C) for practical experience with these concepts. *Computing systems:* Hardware (CPU, Memory, Peripherals), Software (Operating Systems, Networks, Languages) and Users. *Computing applications:* Document Processing, Spreadsheets, Data Bases,

Graphics and Communications. *Lab:* programming assignments.

Computer Science and Engineering Level II

COMP1821
Computing 2
Staff Contact: Dr T Gedeon
CP15 S1 or S2 L3 T3
Prerequisite: COMP1811
Note/s: Excluded COMP1021, 6.621, 6.021D.

Abstract data types. Lists, stacks, queues, trees. Implementation in a procedural language (Modula-2 or C) using linked structures. Searching and sorting. Introduction to functional programming. The layered model of a computer, instruction set, execution cycle, data storage, assembly language programming. *Lab:* programming assignments.

COMP2011
Data Organisation
Staff Contact: Dr G Whale
CP15 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821
Note/s: Excluded 6.641.

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 G Heiser
CP15 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821
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 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821

The process model: sequential versus parallel computation. *Interprocess 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.

Computer Science and Engineering Level III

COMP3111
Software Engineering
Staff Contact: Mr K Robinson
CP15 S1 L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.642, 6.660G.

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: Dr A Goswami
CP15 S1 L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.642, 6.660G, 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 6.643, 6.664G, 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: Prof G Hellestrand
CP15 S1 L3 T2
Prerequisite: COMP2021 or ELEC2021
Note/s: Excluded 6.654, 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 6.0318, 6.060G, 6.613, 6.732E, 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 Jayasooriah
CP15 S1 or S2 L3 T2
Prerequisite: COMP2011 or COMP2031 or ELEC3020
Note/s: Excluded 6.632, 6.672, COMP9201.

Operating system organisation and services. *Process management:* scheduling, synchronisation and communication. *Memory management:* segmentation, paging and virtual memory. Storage management. File systems. Protection and security. Distributed operating systems and file systems. Case studies: UNIX and Mach. *Lab:* programming assignments.

COMP3311
Database Systems
Staff Contact: Dr A Ngu
CP15 S2 L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.005G, 6.663, 6.659G, 19.608, 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.

COMP3321
Business Systems Organisation
Staff Contact: School Office
CP15 SS L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.647, 6.661G. Not offered in 1996.

Review of the organisation of accounting systems: in journals, accruals, merchandising. The structure, design, development, and integration of various business systems selected from the following: general ledger; financial reporting; debtors; creditors; stock control; invoicing; purchasing and receiving; fixed assets; payroll. Systems for generating application systems and packages. User interfaces. File specifications and B-tree index files. Distributed commercial systems. The partial implementation of a business system is undertaken as a group project.

COMP3331
Computer Networks and Applications
Staff Contact: Dr J Zic
CP15 S2 L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.633, 6.659G, COMP9331.

History of digital communication and early computer networks. Circuit and packet switching. *Digital data transmission.* Protocols. Error detection and recovery. *The seven layer OSI model;* local area networks. *Internetworking:* repeaters, bridges, gateways; TCP/ICP. Data encoding, compression, encryption. *Applications:* file transfer, electronic mail, remote procedure calls, distributed file systems, distributed graphics, multimedia communications.

COMP3411
Artificial Intelligence
Staff Contact: Dr C Sammut
CP15 S2 L2 T3
Prerequisite: COMP2011
Note/s: Excluded 6.666G, 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, computeraided 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 6.668G, 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 6.006G, 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
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 N Warren
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, 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 T Stegman
CP15 S1 or S2 HPW3
Prerequisite: ECON1101
Note/s: Restricted to programs 0600, 1000, 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.

ECOH1301
Australia in the International Economy in the 20th Century
Staff Contact: Dr B Dyster
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, 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: ECON1102 or ECON1103
Note/s: Restricted 0600, 1000, 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 instrumentalities such as the Industries Commission, Prices Surveillance Authority, Trade Practices Commission and Foreign Investment Review Board are examined. Issues relating to microeconomic reform, economic rationalism, market failure and government business enterprises are explored.

ECON2104
Australian Macroeconomic Policy
Staff Contact: A/Prof G Kingston
CP15 S1 HPW3
Prerequisite: ECON1102 or ECON1104
Note/s: Restricted 0600, 1000, 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 Reserve 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
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: Prof IF Morrison
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.

ELEC2033
Electronics 1
Staff Contact: Dr SR Wenham
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, impedence 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: A/Prof B Fox
CP15 S1 HPW6
Note/s: Restricted to the Environmental Science Programs.

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: A/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: A/Prof B Fox or Dr B Parolin
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: A/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.

Geography

Geography Level I

GEOG1064
Global Development, Economy and Environment in Australia
Staff contact: A/Prof I Burnley, Dr M Sant, Mr K Dunn
CP15 S1 L4 T2
Note/s: Students will incur personal costs

Progressive integration of Australia into global capitalism, and developmental and environmental consequences of this process in Australia and adjacent territories. Colonial and dependent development in Australia, and resource use; applications of recent development theory as applied to core-periphery relationships between world financial centres and Australia, and between Australia and adjacent

territories; transnational organisations and technology transfer and investment in Australia, and relationships amongst changing trade patterns, production and development in Australia. Impacts of specific economic imperatives population growth and patterns of production and consumption on resources, land degradation and flora and fauna in Australia. Role of political factors and management quality in sustainable development and environmental protection.

GEOG1073
Environmental Processes and Analysis
Staff Contact: Mr D Edwards
CP15 S2 L3 T3
Note/s: Excluded: GEOG1031 Environmental Processes

The subject has the same content as GEOG1031 Environmental Processes but with an additional 2 hour laboratory introducing methods of analysis of climates, soils, hydrology, landforms and vegetation.

Geography Level II

GEOG2013
Geographical Data Analysis
Staff Contact: To be advised
CP15 S1 L1 T3
Prerequisite: GEOG1073

Inferential statistics and hypothesis testing in the analysis of spatial data. Methods of sampling, comparing populations and of identifying relationships through correlation, association, regression, time series and classification. Topics covered are applicable to physical and economic geography.

GEOG2021
Introduction to Remote Sensing
Staff Contact: Mr A Evans
CP15 S2 L2 T2
Prerequisite: Successful completion of a Year 1 program in Applied Science, Science or Arts or equivalent as approved by the Head of School

Principles and technical aspects of remote sensing. Forms of available imagery, their utility and facilities for interpretation. Basic airphoto interpretation techniques relevant to environmental assessment. Introduction to principles of the electromagnetic spectrum, photometry and radiometry. Sensor types, image formation and end products associated with selected satellite programs, including Landsat. Land-cover and land-use interpretation procedures in visual image analysis. Basic procedures in machine-assisted image enhancement.

GEOG2025
Biogeography
Staff Contact: A/Prof M. Fox
CP15 S2 L2 T2
Prerequisite: GEOG1073 and both BIOS1101 and BIOS1201

Distribution of taxa. Floras of the Southern Hemisphere with particular reference to Australia. Endemic, discontinuous and relict taxa. Dispersal and migration of species. Origin, evolution and geological history of Angiosperms. The development of the Australian biogeographic element. Study of the recent past to understand present distributions of taxa. The role of humans and climatic change on Australian vegetation. Detection of pattern and association

and their causes. Classification, ordination and mapping of vegetation. Ecology of selected Australian vegetation types. Management of vegetation in different climate regimes.

GEOG2051
Soils and Landforms
Staff Contact: Dr W Erskine
CP15 S1 L2 T2
Prerequisite: GEOG1073

An introduction to soil classification schemes with particular emphasis on the soils and landforms of floodplains and the Riverine Plain, NSW. Long term development of landscapes with emphasis on the evolution of mountain ranges. Arid zone and coastal landforms emphasising current processes and Quaternary history.

GEOG2092
Australian Social and Economic Landscapes
Staff Contact: A/Prof I Burnley
CP15 S1 L2 T2
Prerequisite: GEOG1064

Analysis of the principal factors and forces shaping the contemporary social and economic landscapes of Australia and the problems arising. Themes include Australia's changing population profile and distribution, the changing face of Australian cities, regional disparities in social and economic well-being, changing patterns of employment and industrial location, and the declining fortunes of rural Australia. Planning and policy responses to the problems of spatial change and reorganisation are emphasised and future scenarios addressed.

Geography Level III

GEOG3011
Pedology
Staff Contact: A/Prof M Melville
CP15 S1 L2 T2
Prerequisites: GEOG1073 and one of CHEM1101 or CHEM1401 or both GEOL1101 and GEOL1201 or both BIOS1101 and BIOS1201

Methodology of pedogenic studies and the application of these studies to the understanding of soil and form relationships. Soil physical and chemical properties and their interrelationships, emphasising clay mineral structure and behaviour, soil solution chemistry, soil water movement and the application of these properties to elements of soil mechanics. Soil properties in natural, rural and urban landscapes, including assessment of soil fertility, swelling characteristics, dispersibility, erodibility and aggregate stability. Laboratory analysis of soil physical and chemical characteristics with emphasis on properties associated with land capability assessment. Statistical analysis of soil data and its application to mapping. The use of soil micromorphological and mineralogical studies in pedology.

GEOG3025
Geomorphology
Staff Contact: Dr W Erskine
CP15 S2 L2 T2
Prerequisite: GEOG2051

Drainage basin processes including: weathering, the production of runoff 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
Prerequisite: GEOG2021 or GMAT8711

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 non-renewable resources to include: soils, geology, hydrology, vegetation, agriculture, rangelands, urban analysis, regional planning, transportation and route location and hazard monitoring.

GEOG3042
Environmental Impact Assessment
Staff Contact: Dr W Erskine, Prof B Garner, A/Prof M Fox
CP15 S1 L2 T2
Prerequisite: GEOG1073

Rationale and basic objectives; history and legislative framework: standardised types of environmental impact assessment EIA, including matrix approach, adopted methods of EIA in Australia. Techniques of impact evaluation in terms of socio-economic criteria. Environmental decision making and planning under conditions of uncertainty. Case studies exemplifying procedures, techniques and issues. Trends, changes and possible future developments in EIA. Practical exercises representing components of typical EIAs.

GEOG3062
Environmental Change
Staff Contact: To be advised
CP15 S1 L2 T2
Prerequisite: Successful completion of a Year 2 Program in Applied Science, Science, or Arts or equivalent as approved by the Head of School

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.

GEOG 3122
Geographic Information Systems
Staff Contact: Prof BJ Garner, Mr S Filan
CP15 S2 L2 T2
Prerequisite: Successful completion of at least one year of course 2700.0600 Computer Science or course 2700.1400 Information systems, or by permission from the Head of School.

Enrolments in this subject are constrained by availability of laboratory facilities. All enrolments must be approved by the Head, School of Geography, or her 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.

GEOG3123
Applied Geographic Information Systems
Staff Contact: Prof BJ Garner, Mr S Filan
CP15 S2 L2 T2
Prerequisite: successful completion of at least three subjects offered by the School of Geography; or special permission from the Head of the School of Geography or her representative.

An introduction to information systems of particular relevance for geographers with special reference to computer-based systems for resource evaluation. Case study evaluation, application of the MAP and other GIS software.

GEOG3142
Geographic Information Systems Applications
Staff Contact: Dr Q Zhou
CP15 S2 L2 T2
Prerequisite: GEOG3122

Examples of applications of geographical information systems in resources and environmental management and urban and regional analysis. Case studies include the monitoring of land degradation, management of biological and physical resources, environmental conflict resolution, administration of land records, provision of health services, transport and land use planning, marketing and territory assignment. Visits to inspect facilities and activities of key government agencies are included.

GEOG3161
Computer Mapping and Data Display
Staff Contact: Prof BJ Garner
CP15 S1 L1 T3
Prerequisite: Successful completion of a Year 1 program in Science or Arts or equivalent as approved by Head of School

Introduction to theoretical and practical problems in displaying data graphically and constructing thematic maps by computer using the Map info 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.

GEOG3172
Spatial Population Analysis
Staff Contact: A/Prof I Burnley
CP15 S2 L2 T2
Prerequisite: GEOG2092

Population growth and structure in an international urban and regional context. The components and processes of population change; fertility, mortality and migration set within the framework of demographic transition and development theory. Theories of migration and mobility and of optimal populations. Demographic and social indicators for urban and regional analysis and their implications for inequalities in living conditions, at local, regional, and international scales. The adjustment of immigrant and migrant populations to the urban environment.

GEOG3181
Urban Activity Systems
Staff Contact: Dr B Parolin
CP15 S1 L2 T2
Prerequisite: GEOG2092

Focus is on trip making, movement, and activity patterns in urban areas. Topics include: the activity concept, travel behaviour and urban spatial structure; constraints to individual travel behaviour and activity pattern linkages; the urban transport disadvantaged; public transport problems and issues in Australian capital cities; travel and activity consequences of transport infrastructure developments.

GEOG3192
Urban and Regional Development
Staff Contact: Dr M Sant
CP15 S2 L2 T2

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.

GEOG3211
Australian Environment and Natural Resources
Staff Contact: A/Prof M Fox
CP15 S1 L2 T2
Prerequisite: GEOG1073

The characteristics of Australia's physical and biotic environment: geology, climate, geomorphology, soils, vegetation and fauna. The problems of exploiting Australia's water and land resources including the degradation of land by erosion, salinisation and soil fertility decline; and habitat loss and fragmentation.

GEOG3333
Special Topic
Staff Contact: To be advised
CP15 F T4

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.

Geography Level IV

GEOG4100/GEOG4050
Honours Geography
Staff Contact: Dr A Skidmore
CP120/60 F
Prerequisites: Completion of program 2700, 2527 or 6851 including GEOG2013 and Level III subjects totalling 120 Credit Points.

Details of Honours Geography for Science students are available from the School of Geography office. Students are required to undertake an original piece of work extending throughout the year and to submit a thesis based upon it; and to participate in seminars and fieldwork as notified by the School.

The General Education requirements are met through compulsory coursework during the Honours program.

Applied Geology

Field tutorials are an essential part 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

GEOL1101
Geological Processes
Staff Contact: Dr MD Buck
CP15 S1 L3 T2
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) 53-100, or 2 unit Science (Chemistry) 53-100, or 2 unit Science (Geology) 53-100, or 2 unit Science (Biology) 53-100, or 4 unit Science 1-50, or 3 unit Science 90-150
Note/s: Up to 2 days of fieldwork is a compulsory part of this subject. Students will incur personal costs. Details will be provided during the first week of the subject.

Stream 1
The solar system. Origin of the earth. The earth's internal structure. Continental drift and plate tectonics. The origin of igneous, metamorphic and sedimentary rocks. Geological hazards. Geological time and dating. Structural geology, origin of faults and folds. Origins and circulations of oceans and atmosphere.

or
Stream 2
Available only with permission of the Head of School.

A program of projects and independent study of selected aspects of geology. Assessment includes practical and theory examinations.

GEOL1201
Geological Environments
Staff Contact: Dr MD Buck
CP15 S2 L3 T2
Prerequisite: GEOL1101 (except for program 6866)
Note/s: Up to 4 days of fieldwork is a compulsory part of this subject. Students will incur personal costs. Details will be provided during the first week of the subject.

Fossils, dinosaurs, mammals and man. Evolution of life. Principles of stratigraphy. Air photo interpretation and geological mapping. Economic and energy resources. Environmental geology. Climates and processes of the recent past. Global geophysics. Coastal Geology

Applied Geology Level II

GEOL2011
Mineralogy & Igneous Petrology
Staff Contact: Dr PC Rickwood, A/Prof BJ Hensen
CP15 S1 L2 T3
Prerequisite: GEOL1201
Note/s: Fieldwork of up to 4 days is a compulsory part of this subject and may be held in the last week of the Mid year Recess. Students will incur personal costs. Details will be provided in the first week of the subject.

Mineralogy. Principles of optical crystallography and the use of the transmitted light polarising microscope.

Chemical and physical properties of rock forming minerals. Mineral identification. Igneous Petrology. Occurrence, classification and origin of igneous rocks. Fractional crystallisation and differentiation. Partial melting. Simple binary melting diagrams. Igneous petrology relating to plate tectonics. Practical. Macroscopic and microscopic examination of rock forming minerals and igneous rocks in the field and the laboratory.

GEOL2022
Petrology & Structural Geology
Staff Contact: Dr MD Buck, A/Prof BJ Hensen, Dr PG Lennox
CP15 S2 L3 T2
Prerequisite: GEOL2011
Excluded: GEOL7223, GEOL8201
Note/s: Fieldwork of up to 4 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Sedimentary Petrology. The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The nonclastic sedimentary rocks including phosphates, evaporites; ferruginous and silceous deposits. Metamorphic Petrology. Origin and classification of metamorphic rocks as an aid in understanding common mineral assemblages. Petrographic studies of common metamorphic rocks. Field studies. Structural Geology. Origin, classification and description of structural elements and analysis of simple fracture systems. Tectonics and tectonic analysis.

GEOL2031
Sedimentology and Palaeontology
Staff Contact: A/Prof CR Ward, A/Prof AD Albani
CP15 S1 L3 T2 Field 1
Prerequisite: GEOL1201
Excluded: GEOL6201, GEOL7233, GEOL7321, GEOL8220
Note/s: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Sedimentology. Flow regimes and bedding forms, sedimentary structures. Modern and ancient sedimentary environments of deposition: alluvial, nearshore, shelf and deep sea, in both terrigenous clastic and carbonate domains. The facies concept: lateral and vertical relationships between depositional environments and associated lithofacies. Palaeontology. Morphology and geological significance of invertebrates including Foraminifera, Coelenterata, Brachiopoda, Mollusca, Arthropoda, Echinodermata and Protochordata. Introductory paleobotany, ichnology (trace fossils) and biostratigraphy.

GEOL2041
Geological Computing
Staff Contact: Dr DR Cohen
CP7.5 S1 L2 T1
Prerequisite: GEOL1101

Introduction to the use of PC's and networking, with emphasis on geological software. Introduction to programming with statistical applications pertinent to geoscience. Introduction to statistical theory.

GEOL2042
Geological Statistics
Staff Contact: Dr D Cohen
CP7.5 S1 L2 T1
Prerequisite: GEOL2041

Introduction to geostatistics, population characterisation and splitting. ANOVA methods, regression analysis, EDA, Markov chains, analysis of oriented data and processing of spatial geological data.

GEOL2051
Introductory Geophysics
Staff Contact: Mr D Palmer
CP15 S2 L2 T1
Prerequisite: GEOL1101
Note/s: Field work of up to 5 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Principles of gravity, geomagnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution and dynamic processes of the earth. Introduction to radiometric, gravity and magnetic exploration methods.

GEOL2062
Geological Mapping
Staff Contact: A/Prof AD Albani, Mr G McNally
CP15 S2 L2 T1
Prerequisite: GEOL1101 or GEOL1201
Excluded: GEOL8380
Note/s: Field work of up to 5 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 geological use of levels, tachometers and theodolites; instrumental errors and their correction. Precision of angular and distance measurements. Stadia surveying and its application to detailed geological mapping involving both closed and open traverses. Field computations. Map projections, coordinate systems and the Australian Mapping Grid. System transformations. The use of air photos for geological mapping and geomorphologic evaluation of land. Techniques and principles of aerial photography. Photo-interpretation of geological features. Relationships between geology, drainage, soil and vegetation. An introduction to remote sensing.

GEOL2072
Environmental Geology
Staff Contact: Dr J Jankowski, Mr G McNally, A/Prof A Albani
CP7.5 S2 L2 T1

Land degradation, problem soils, engineering geomorphology, geological hazards. Water resources and pollution. Land use conflicts. Hydrogeology. The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater development and monitoring groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area. Coastal Geology. Properties of sedimentary populations. Sampling practice and analysis of measured data. Geological implications of sediment parameters. Coastal environmental assessment. Shoreline processes. Geological evolution of the inner continental shelf.

GEOL2092
Geochemistry
Staff Contact: Dr PC Rickwood
CP7.5 S2 L2 T1
Prerequisite: GEOL1201
Exclusion: GEOL6331, GEOL7323

Basic principals of modern methods of analysis of silicates. Accuracy, precision and quality of geochemical data. Norms. Graphical display of analyses. Geochemical maps and elementary GIS systems. Geochemical classification of elements; basic crystal chemistry. The natural distribution of elements in terrestrial rocks. Heavy metals in unconsolidated sediments. Radiogenic nuclides and their use in dating rocks and minerals. The nature and origin of meteorites and tektites.

GEOL6201
Marine Geology 1
Staff Contact: A/Prof AD Albani, Dr PC Rickwood, Dr MD Buck
CP15 F L1 T2
Prerequisites: GEOL1101, GEOL1201
Excluded: GEOL2031, GEOL7233, GEOL7321, GEOL8220
Note/s: Field work of five days in a compulsory part of the subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Sedimentology. Flow regimes and bedding forms, sedimentary structures. Modern and ancient sedimentary environments of deposition, alluvial, nearshore, shelf and deep sea, in both terrigenous clastic and carbonate/ evaporite domains. The facies concept: lateral and vertical relationships between depositional environments and associated lithofacies within developing sediment wedges. Use of the polarising microscope. Mineralogy and Petrology of igneous and sedimentary rock types of the ocean floor and their significance.

Sedimentary Petrology. The influence of transportation deposition and diagenesis on the composition texture and structure of detrital sedimentary rocks. The non clastic sedimentary rocks including phosphates, evaporites, ferruginous and siliceous deposits.

GEOL6221
Introductory Geophysics
Staff Contact: Mr D Palmer
CP15 S1 HPW3
Note/s: Excluded GEOL2051. Fieldwork of up to 5 days is a compulsory part of the subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Principles of gravity, geomagnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution and dynamic processes of the earth. Introduction to radiometric, gravity and magnetic exploration methods.

GEOL7223
Surficial Constituents
Staff Contact: Dr P Rickwood, Dr MD Buck, A/Prof CR Ward
CP15 F L2 T1
Prerequisite: GEOL1101 or GEOL1201
Excluded: GEOL2011, GEOL2022, GEOL3102, GEOL8201

Mineralogy. Principles of optical crystallography and the use of transmitted light polarising microscope. Chemical and physical properties of rock forming minerals. Mineral identification. Sedimentary Petrology. The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary evaporites; ferruginous and silceous deposits. Clay mineralogy. The structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for the identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. Industrial uses of clays and bauxite.

GEOL7233
Processes in Environmental Geology
Staff Contact: A/Prof AD Albani
CP15 F L2 T1
Prerequisite: GEOL1101 or GEOL1201
Excluded: GEOL2031, GEOL2072, GEOL6201, GEOL7321, GEOL8220
Note/s: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Sedimentology. Flow regimes and bedding forms, sedimentary structures. Modern and ancient sedimentary environments of deposition, alluvial, nearshore, shelf and deep sea, in both terrigenous clastic and carbonate/ evaporite domains. The facies concept: lateral and vertical relationships between depositional environments and associated lithofacies within developing sediment wedges.

Environmental Geology: Hydrodynamics of pollutants and water quality principles. Domestic, industrial and radioactive waste disposal, deep well injections. Geological hazards and urban planning. Environmental impacts of dams, mineral exploration, mining and impact statement techniques. Water resources and pollution. Land use conflicts. Hydrogeology. The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater development and monitoring groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area.

GEOL8201
Sedimentary and Metamorphic Petrology
Staff Contact : A/Prof CR Ward, A/Prof BJ Hensen
CP15 S2 L4T2
Prerequisite: GEOL2011
Excluded: GEOL2022, GEOL7223, GEOL3102, GEOL6311

The influence of transportation, desposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The nonclastic sedimentary rocks including phosphates, evaporites: ferruginous and siliceous deposits.

The structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Clay-water systems and ion exchange. Chemical weathering and origin of the clay minerals. Industrial uses of clays and bauxite.

Origin and classification of metamorphic rocks as an aid in understanding common mineral assemblages. Petrographic studies of common metamorphic rocks.

GEOL8220
Sedimentology
Staff Contact: A/Prof CR Ward
CP7.5 S1 L1 T1
Prerequisite: GEOL1201
Note/s: Excluded GEOL2031,GEOL6201, GEOL7233, GEOL7321 . Field work of up to 5 days in a compulsory part of the subject. Students will incur, personal costs. Details will be provided in the first week of the subject.

As for Sedimentology in GEOL2031 Sedimentology and Palaeontology.

Applied Geology Level II/III

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 and determination of tidal planes. Soundings and bathometric surveys. Shallow water investigations for seabed and bedrock morphologies. Through its intensive practical approach, the course is designed to give each student an understanding of coastal surveying applicable to a large variety of small scale investigations, from beach to estuarine monitoring.

Applied Geology Level III

GEOL3011
Mineralogical Techniques
Staff Contact: Dr PC Rickwood
CP7.5 S1 L2 T1
Prerequisite: GEOL1201
Excluded: GEOL7323

Principles of X-ray powder diffractometry and the use of X-ray powder cameras and diffractometers. Elementary stereology. Laboratory methods of mineral separation. Mineral characterisation.

GEOL3021
Igneous and Metamorphic Processes
Staff Contact: A/Prof BJ Hensen
CP15 S1 L2 T1.5
Prerequisite: GEOL2011 and GEOL2022
Note/s: Fieldwork 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.

Igneous Petrology. Origin of silicate liquids. High pressure and low pressure fractionation. Liquids and fluids. Nature of the upper mantle. The use of trace elements and isotopes as petrogenetic indicators. Practical petrography and literature studies of igneous suites. Field study. Metamorphic Processes. Metamorphic reactions. Isograds. Mineral assemblages as geobarometers and geothermometers. Fluids in metamorphism. Pressure, temperature, timepaths and tectonic setting of metamorphism in the earth's crust. Metamorphic petrology

of Australia. Practical macroscopic and microscopic study of metamorphic suites from different tectonic regimes.

GEOL3031
Stratigraphy & Basin Analysis
Staff Contact: Prof J Roberts
CP22.5 S1 L2 T2
Prerequisite: GEOL1201
Note/s: Field work of up to 8 days is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Stratigraphy. Geological evolution of the Australian continent. Depositional regions within and adjacent to continents, island arcs and ocean basins. Development of the Precambrian craton. Palaeozoic-Mesozoic evolution of the eastern Australian mobile belt. Intracratonic basins of western and southern Australia and development of divergent margins. The northern collision zone. Palaeontology. Processes and theories of evolution. Theories of biological classification. Basin Analysis. Basin classification. Data gathering from outcrop and the subsurface. Drilling methods, description of cores and cuttings, petrophysical well logging. Lithofacies analysis, lithofacies maps, palaeocurrents, palaeogeographic maps. Provenance studies in sedimentary basins. Controls on basin stratigraphy, sea level change, sequence stratigraphy, depositional systems, systems tracts; application of depositional systems to the interpretation of sedimentary basins.

GEOL3052
Exploration Geophysics
Staff Contact: Mr D Palmer
CP15 S2 L2 T1
Prerequisite: GEOL1201
Note/s: Field work of up to 3 days is a compulsory part of this subject. Students will incur personal costs.

An introduction to the theory and application of geophysical methods to mineral, petroleum, coal, groundwater, and geotechnical studies. The methods covered include gravity, magnetic, seismic refraction, shallow seismic reflection, DC electrical resistivity, induced polarization, 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.

GEOL3072
Engineering Geology
Staff Contact: Mr GH McNally
CP7.5 S2 L2 T1
Note/s: Fieldwork of up to 2 days is a compulsory part of this subject. Students will incur personal costs.

Intact rock, discontinuities and rock masses; weathering engineering properties and testing of soils; soil and rock mechanics fundamentals; soil and rock construction materials applicatoins of geology in the investigation and design of roads, dams, tunnels and mines.

GEOL3082
Structural Geology
Staff Contact: Dr PG Lennox
CP15 S2 L2 T2 Field 1
Prerequisite: GEOL2022
Note/s: Field work of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

Structural Geology. Structural analysis at the microscopic, mesoscopic and macroscopic scales. Structural analysis using Bermagui, Cooma and Broken Hill Terrains. Folds, faults and foliation development. Strain analysis, deformation mechanisms and the relationship between deformation and metamorphism.

GEOL3092
Exploration Geochemistry
Staff Contact: Dr AC Dunlop, Prof GJS Govett
CP7.5 S2 L2
Prerequisites: GEOL2092, GEOL3101

Principles and techniques of soil drainage and rock geochemistry as applied to mineral exploration.

GEOL3101
Ore Deposits
Staff Contact: Dr AC Dunlop
CP15 S1 L3 T2 Field 1
Prerequisite: GEOL2022 or GEOL2092
Note/s: Field work of up to 4 days is a compulsory part of this subject and will be held in the last week of the Mid year Recess. Students will incur personal costs.

Geological setting, characteristics and genesis of the major categories of ore deposits. Laboratory study of specimens, thin sections and polished sections from these ore deposit categories.

GEOL3102
Fossil Fuels & Nonmetallic Resources
Staff Contact: A/Prof CR Ward
CP15 S2 L3T2 Field 1
Prerequisite: GEOL1201
Excluded: GEOL6311, GEOL7221, GEOL8201
Note/s: Fieldwork of up to 3 days is a compulsory part of this subject. Students will incur personal costs.

Coal Geology. Nature and properties of coal. Methods of testing and analysis. Introduction to coal petrology. Origin of coal seams and coal-bearing sequences. Coalfield exploration and coal mining geology. Geological factors in coal preparation and use. Petroleum Geology: Petroleum generation, including kerogen types and maturation, migration, entrapment and degradation; sedimentary features of reservoir sequences; structural traps, diapirs and fractured rock reservoirs, including coal-bed methane; primary and secondary porosity development; exploration techniques and resource evaluation; case studies of selected petroleum fields. Non-metallic Minerals. Occurrences and economic use of non-metallic and industrial minerals including limestone, silica, diatomite and asbestos. Clay Mineralogy. The structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for the identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. Industrial uses of clays and bauxite.

GEOL6311
Marine Geology 2
Staff Contact: A/Prof AD Albani
CP15 S2 L1 T2
Prerequisite: GEOL6201
Excluded: GEOL2072, GEOL3102, GEOL7221, GEOL8201

Structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for identification of the clay minerals.

Hydrogeology. The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater development and monitoring groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area.

Basin analysis. Basin classification. Data gathering from outcrop and the subsurface. Drilling methods, description of cores and cuttings, petrophysical well logging. Lithofacies analysis, lithofacies maps, palaeocurrents, palaeographic maps. Provenance studies in sedimentary basins. Controls on basin stratigraphy, sea level change, sequence stratigraphy, depositional systems, systems tracts; application of depositional systems to the interpretation of sedimentary basins.

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 the 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.

GEOL6330
Exploration Geophysics
Staff Contact: Mr D Palmer
CP15 S2 L2 T1
Excluded: GEOL3052
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.

An introduction to the theory and application of geophysical methods to mineral, petroleum, coal, groundwater, and geotechnical studies. The methods covered include gravity, magnetic, seismic refraction, shallow seismic reflection, DC electrical resistivity, induced polarization, 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.

GEOL6331
Geochemistry
Staff Contact: Dr PC Rickwood
Prerequisite: GEOL1201
CP7.5 S2 L2
Note/s: Excluded programs 2500, 2503, GEOL2092, GEOL7323.

As for GEOL2092

GEOL7323
Environmental Techniques
Staff Contact: Dr PC Rickwood
CP15 F L2 T1
Prerequisite: GEOL7223
Note/s: Excluded GEOL2092, GEOL3011, GEOL6331

Principles of x-ray powder diffractometry and the use of x-ray powder cameras and diffractometers. Elementary stereology. Laboratory methods of mineral separation. Basic principles of modern methods of analysis of silicates. Accuracy, precision and quality of geochemical data. Norms. Graphical display of analysis. Geochemical maps and elementary GIS systems Geochemical classification of elements, basic crystal chemistry. The natural distribution of elements in terrestial rocks. Heavy metals in unconsolidated sediments. Radiogenic dating.

GEOL7333
Environmental Statistical Methods
Staff Contact: Dr DR Cohen
CP15 F L2 T1
Prerequisite: GEOL1101 or GEOL1201
Note/s: Excluded GEOL2041, GEOL2042

Introduction to the use of PC's, networking with emphasis on geological software. Introduction to programming with statistical applications pertinent to geoscience. Sampling of geological materials; stochastic geological processes. Introduction to geostatistics, population characterisation and splitting, ANOVA methods, regression analysis, EDA, Markov chains. Analysis of oriented data and processing of spatial geological data.

GEOL8320
Gravity and Magnetic Methods
Staff Contact: Mr D Palmer
CP7.5 S1 L2 T1
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Note/s: Excluded program 2500. Restricted to program 2503. It is desirable that students taking this subject have a background to geology. Field work of one day is a compulsory part of this subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Fundamental principles. Field procedures and instruments. Reduction of field data. Regional and residual effects of sources of simple geometrical shapes and generalised two and three dimensional distributions.

GEOL8330
Seismic Methods
Staff Contact: Mr D Palmer
CP7.5 S1 L2 T1
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Note/s: Excluded program 2500. Restricted to program 2503. It is desirable that students taking this subject have a background in geology. Field work of one day is a compulsory part of this subject. Students will incur personal

costs. Details will be provided in the first week of the subject.

Seismic waves. Physical/engineering properties of geological materials. Ray theory is seismic refraction and reflection methods. Instrumentation. Data acquisition and processing. Depth and velocity analysis. Geophysical and geological interpretation. Case history studies.

GEOL8340
Electrical Methods
Staff Contact: Mr D Palmer
CP7.5 S1 L2 T1
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Note/s: Excluded program 2500. Restricted to program 2503. It is desirable that students taking this subject have a background in geology. Field work of one day is a compulsory part of the subject. Students will incur personal costs. Details will be provided in the first week of the subject.

Introductory theory and field practice of resistivity, self-potential, induced polarisation and airborne and ground electromagnetic methods. Geological interpretation of field data. Geophysical logging.

GEOL8350
Geological Applications
Staff Contact: Dr MB Katz
CP7.5 S1 L1 T1
Prerequisite: GEOL1201
Note/s: Excluded program 2500. Restricted to program 2503. Field work of one day is a compulsory part of the subject. Students will incur personal costs. Details will be provided in the first week of the subject. A subject of ten weeks duration.

Structural Geology: Elements of structural geology, stereographic projection and fracture analysis. Geology of Fuels: Origin of coal, oil and natural gas; stratigraphic and structural consideration of oil and coalfields. Hydrogeology: principles of hydrogeology; transmission of groundwater in rocks and soils.

GEOL8360
Geophysical and Geological Applications
Staff Contact: Mr D Palmer, Dr MB Katz
CP7.5 S2 L1 T2
Prerequisite: GEOL1201
Note/s: Excluded program 2500, GEOL6330. Restricted to program 2503.

Geological interpretation of Geophysical data. Seismic stratigraphy. Coal-seam geometry from high resolution seismic and in-seam data. Geology of Ore Deposits. Mineralogy of industrially important metallic and non-metallic minerals. Theories of ore formation including secondary enrichment processes.

GEOL8270
Water Geochemistry
Staff Contact: Dr J Jankowski
CP7.5 S1 L2T1
Prerequisites: GEOL2072
Excluded: GEOL9110, GEOL9120
Note/s: Fieldwork of up to 2 days is a compulsory part of this subject. Students will incur personal costs.

Chemical composition of natural and contaminated groundwaters. Hydrogeochemical parameter measurement. Chemical processes in groundwater; the carbonate system

and pH control. Weathering and water chemistry; groundwater in crytalline rocks; the mass balance approach. Oxidation and reduction. Groundwater microbiology. Geochemical modelling. Practical field and laboratory measurements. Application of environmental isotopes in groundwater studies.

GEOL8380
Practical Mapping
Staff Contact: A/Prof AD Albani
CP7.5 S1 L2
Excluded: GEOL2062
Note/s: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

Principles of surveying. Use of surveying instruments for geological mapping both on land and on water. Position fixing by GPS. Accuracy and precision of the locations of sample sites. The production of a geological map is a major part of this subject.

Applied Geology Level IV

GEOL4303
Geology Honours
Staff Contact: Dr PG Lennox
CP120 F
Prerequisite: Completion of program 2500 or 2503, 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 the Faculty of Applied Science 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 School.

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 School.

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 the Faculty of Applied Science 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 School.

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 writing of a thesis.

Industrial Relations and Organisational Behaviour

IROB2721
Managing People
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.

IROB2727
Industrial Relations for the Airline Industry
Note/s: restricted to students in course 3980 programs 2002 and 2003.

The subject is concerned with major features of Australia's unique system of industrial relations to provide a basis for understanding developments within the Aviation Industry.

The subject will examine different approaches to the study of industrial relations, industrial conflict and strikes, unions, the constitutional basis of Australian industrial relations, the role of the state, industrial tribunal, wage determination the accord and enterprise bargaining.

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, 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

Providing the required knowledge and practical skills to be able to design database systems in an organisational environment, an understanding of the role of data in business, an understanding of 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, INFS1603
Note/s: Restricted to programs 0600, 1000, 1400, 6810 and Course 3971.

System analysis and design: requirements analysis and specification, logical and physical design of business systems, specification and updating of files, man-machine dialogue procedures. Comparison of design methodologies: Set within the framework of an actual case study.

INFS2607
Business Data Networks
Staff Contact: School Office
CP15 S2 L2 T1
Prerequisite: INFS1602
Note/s: Excluded INFS3607.

Advanced data communication concepts, computer networks, reference to international standards and common industry communications software packages; local/metropolitan/wide area networks; net work management; telecom services and other options; data security; a case involving the design of a telecommunications- based commercial system.

INFS2609
Commercial Programming
Staff Contact: School Office
CP15 S1 L2 T1
Prerequisites: INFS1602, INFS1603
Note/s: Restricted to programs 1400, 6810, 1000, 0600 and Course 3971.

This subject examines programming in the commercial environment; a commercial programming language; hardware and operating systems concepts and their impact on the commercial computing environment. This subject also introduces the terms and concepts underlying current developments in programming and user interface implementation.

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: School Office
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: INFS1602, INFS2607

Introducing the management issues surrounding information systems and to provide an understanding of senior management use of technology: considering the use of information systems for strategic advantage; practical applications of tools and concepts of project management.

INFS3605
Software Engineering
Staff Contact: School Office
CP15 S1 L1 T2
Prerequisite: INFS2609
Note/s: Restricted to programs 0600, 1400, 6810 and Course 3971.

Supervised implementation of an information systems project in a commercial programming language. Advanced program design and structured techniques, computer aided software engineering techniques, interface with systems software at application implementation level, 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: Not offered in 1996.

Contents to be advised.

INFS3607
Distributed Computer Systems
Staff Contact: School Office
CP15 S2 L2 Lab1
Prerequisite: INFS2603
Note/s: Excluded INFS2607. Restricted to programs 0600, 1400, 6810 and Course 3971.

Advanced 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; a case involving the design of a telecommunications based commercial system.

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 and relational approaches; database reliability, security and integrity issues; data description and manipulation languages.

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.

A systems analysis design case study where students are required to produce: statement of requirements, feasibility/ evaluation study, logical design, physical design and presentation of proposals to users. User requirements elicitation techniques and approaches, project management, alternative design methodologies, information systems life cycle and practical use of CASE tools.

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, humanmachine 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
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.

A review of concepts, theory, methodologies and techniques discussed in IS security literature and current practice. Information systems security management, risk analysis and management, physical and logical security, database and telecommunications security, continuity planning, computer abuse, as well as legal and social issues are examined. Students will undertake case studies using the University's computing facilities and laboratories to provide them with a better understanding of computerised security techniques used 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.

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
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
S2 L3
Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

Knowledge acquisition and representation methods, including knowledge engineering as applied to knowledge based systems. Inferential mechanisms, artificial intelligence hardware (KBS) and software applicable to knowledge based information systems. Evaluation, with project work, of (KBS) tools and techniques in specified problem domains.

INFS4812
Software Engineering Management
Staff Contact: School Office
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
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
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
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
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.

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

A detailed study of current information systems research in the fields of decision support systems, information systems administration and distributed systems.

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 with no previous knowledge of the languages should enrol in JAPN1000 Japanese Communication 1A and JAPN1001 Japanese Communication 1B or KORE1000 Korean 1A and KORE1001 Korean 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 Program 1000.

JAPN1000
Japanese Communication 1A
Staff Contact: Dr Y Sasaki
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: Dr Y Sasaki
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: Mr W Armour
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: Mr W Armour
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.

JAPN2400
Japanese Business and Management
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.

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
Exclusions: 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: Ms Y Hashimoto
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: Ms Y Hashimoto
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 Program 1000.

KORE1000
Korean 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 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 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 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.

KORE2500
Korean Economy and Business
Staff Contact: Mr S-C Shin
C15 S2 HPW5
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 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 intermfediate 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 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 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 Australian legal system and areas of substantive law relevant to commerce including contract, business organisation, employment, commercial arbitration, advertising, trade regulation, civil compensation, discrimination.

Business Law and Taxation Level II

LEGT7721
Legal Transactions in Commerce
Staff Contact: School Office
CP15 S1 or S2 L2 T1
Prerequisite: LEGT7711
Note/s: Restricted to program 1400 and Courses 3971 and 3979.

General principles of law of contract and specialised commercial transactions including banking and negotiable instruments, insurance, agency, sale of goods, bailment, suretyship.

LEGT7731
Marketing and Distribution Law
Staff Contact: School Office
CP15 S1 or S2 L2 T1
Note/s: Restricted to program 1400 and Courses 3971 and 3979.

The regulation of restrictive trade practices and sales promotion. The legal framework of marketing strategy with special reference to anticompetitive practices (including collusive activity, exclusive dealing, price discrimination, resale price maintenance, mergers and monopolisation) and consumer protection law (including misleading and deceptive advertising and other unfair practices). Consumer credit; product liability; protection of intellectual property.

LEGT7761
Law of Finance and Securities
Staff Contact: School Office
S1 L2 T1
Prerequisite: Nil

This subject examines the legal environment of banking with particular reference to laws regulating business transactions and structures; 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.

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.

This subject examines the law governing information technology; intellectual property considerations; patents, copyrights, trade secrets and confidential information; computer contracts; computer crime; tortious and other civil liability; data protection and privacy; and current issues.

Business Law and Taxation Level III

LEGT7741
Business Entities
Staff Contact: School Office
CP15 S2 L2 T1
Prerequisite: LEGT7711
Note/s: Restricted to programs 1400 and Courses 3971 and 3979.

The law relating to corporations including company takeovers and the securities industry, partnerships, joint ventures and trusts, with special reference to their comparative utility.

LEGT7751
Taxation Law
Staff Contact: School Office
CP15 S1 L3 T1
Prerequisite: LEGT7711
Note/s: Restricted to program 1400 and Courses 3971 and 3979.

The law and practice of the taxation of income under the Income Tax Assessment Act 1936 (Commonwealth) including the concepts of income and allowable deductions; alienation of income; taxation of partnership, trusts and corporation; tax avoidance and evasion. Capital taxes. Introduction to stamp duties, payroll tax, land tax and sales tax. Tax policy.

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.

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.

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 same applies to 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 require 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 no further Mathematics subjects are normally available. (See also the note above on grades awarded.) A student with meritorious performance in MATH1021 may be permitted to proceed to a certain limited number of Year 2 subjects intended for biologists and chemical engineers. 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 I subject designed for students in Computer Science or Mathematics programs.

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 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 70.
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 offered in 1996.

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
CP25 S1 HPW6 S2(7 WEEKS) 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 subject MATH2009 Engineering Mathematics 2 is a servicing subject for some Engineering and Applied Science courses and is 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.

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 courses 3681, 3730.

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.

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.

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 (6 weeks) HPW8
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 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
Atmosphere-Ocean Dynamics A
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 scientific and mathematical computing in Fortran, including structured progamming, errors in floating

point numbers and their effect on calculations, and visual representation of results. Applications are taken from differential equations, nonlinear equations and numerical integration. Examples for weekly computer laboratory classes are drawn from topics such as chaos, fluid dynamics and finance, and help to illustrate the strengths and limitations of computational techniques.

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 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, MATH2859 and MATH2869 are not available to Science students unless specified as part of a program. The subject MATH2841 Statistics SS is available for Science students who wish to take only one Level II Statistics subject. From 1997, it cannot be followed by any Level III Statistics subjects.

Note/s: There has been a major revision of Level II Statistics subjects for 1996 which will be 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 Statistics subjects from 1996 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, 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, Excel. Visualisation of data. Dynamic graphics. Elements of FORTRAN programming. Macro programming in statistical packages. Use of subroutine libraries in statistical computing with applications.

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
Note/s: Excluded MATH2931, MATH3811, MATH3911, BIOS2041, MATH3870 (before 1997).

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
CP10 F HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2841, MATH2801, MATH2821, MATH2901, MATH2921. Restricted in Science course to combined degree course 3681.

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 regression and the bivariate normal distribution.

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(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2801, MATH2821, 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, 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.

MATH2859
Statistics SE2
Staff Contact: School Office
CP5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Not available to Science students. Offered in 1996 for the last time.

Estimation by moments and maximum likelihood; confidence interval estimation. The standard tests of significance with a discussion of power where appropriate. An introduction to linear regression, autoregression. Probability limit, law of large numbers and central limit theorem. Multivariate normal distribution. Stochastic processes in discrete and continuous time; Poisson and Gaussian processes.

MATH2869
Statistics SC
Staff Contact: School Office
CP5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Restricted in Science course to combined degree course 3730.

Introduction to probability. Random variables. Elementary distribution. Statistical inference. Point estimation. Confidence intervals.

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, 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
Note/s: Excluded MATH2831, MATH3811, MATH3911, BIOS2041, MATH3870 (before 1997).

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 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.

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
Note/s: Excluded MATH3141.

Analysis of some common numerical methods. Interpolation using polynomials and splines; least-squares approximation and orthogonal polynomials; numerical integration; iterative solution of nonlinear equations; solution of linear systems via LU-factorization; solution of initial value problems for ordinary differential equations via finite difference methods; extrapolation. This subject includes a substantial computing component.

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 1996.

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 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 1996.

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, orthgonal 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 S1 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 r 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 1996.

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 B
Staff Contact: School Office
CP15 S2 HPW4
Prerequisites: MATH2011 or MATH2100, MATH2120

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 variablity is examined using models for buoyant forcing, quasi-geostrophy and baroclinic instability.

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. Matrix computations and use of existing mathematical software packages, plus case studies from applications involving numerical integration, differential equations, symbolic algebra, and vector and parallel computers.

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/s: 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, compresssion 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 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, 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

Note: The following subjects are available only until 1996. From 1997 there will be a major revision of all Level III Statistics subjects. 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.

The two subjects MATH3870 Regression Analysis and Experimental Design and MATH3880 Applied Stochastic Processes are available to Science students who have previously taken MATH2821 or MATH2841 and who wish to take at most 15 Credit Points of Statistics at Level III. MATH3870 and MATH3880 will not be available from 1997.

MATH3801
Stochastic Processes
Staff Contact: School Office
CP15 S1 HPW4
Prerequisites: MATH2501, MATH2510, MATH2801
Note/s: Excluded MATH3880, 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.

MATH3811
Linear Models
Staff Contact: School Office
CP15 S1 HPW4
Prerequisites: MATH2501, MATH2510, MATH2821
Note/s: Excluded MATH3870, MATH3911.

Matrix theory. Multi-variate normal distribution. Quadratic forms (distributions and independence). The general linear hypothesis, Gauss-Markov theorem. Hypothesis testing. Selection of variables. Analysis of residuals. Analysis of variance.

MATH3820
Sample Survey Theory
Staff Contact: School Office
CP7.5 S1 HPW2
Prerequisite: MATH2821
Note/s: Excluded MATH3920.

Finite population sampling theory illustrated by mean estimation; simple random, stratified, cluster, systematic, multi-stage and ratio sampling, sampling proportional to size.

MATH3830
Design and Analysis of Experiments
Staff Contact: School Office
CP7.5 S2 HPW2
Prerequisites: MATH2821, MATH3811
Note/s: Excluded MATH3870, MATH3930.

Principles of good experimental design. Completely randomised experiments, randomised 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 S2 HPW2
Prerequisite: 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. Generalised 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 S2 HPW2
Prerequisites: MATH2821, MATH2830
Note/s: Excluded MATH3950.

One sample and two sample problems. Tests for association. Contingency tables. Nonparametric analysis of variance and regression.

MATH3861
Statistical Computation
Staff Contact: School Office
CP15 S2 HPW4
Prerequisites: MATH2821 or MATH2921, MATH2810 or MATH2910

Array and sequential processing in APL. Standard statistical operations and their efficient coding. Simulation of random variables and stochastic processes. Efficient coding of survey data. Modular package construction, and the use of packages eg STATAPL, IDAP, INSTAPAK, SPSS, GLIM, GENSTAT, MINITAB, SAS, BMD. A project to construct a small package consistent with general specifications and with safeguards against common errors.

MATH3870
Regression Analysis and Experimental Design
Staff Contact: School Office
CP7.5 S1 HPW2
Prerequisite: MATH2821 or MATH2841 or approved equivalent
Note/s: Excluded MATH3811, MATH3830, MATH3911, MATH3930.

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.

MATH3880
Applied Stochastic Processes
Staff Contact: School Office
CP7.5 S2 HPW2
Prerequisite: MATH2841 or MATH2801 or MATH2901 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.

MATH3901
Higher Stochastic Processes
Staff Contact: School Office
CP15 S1 HPW4.5
Prerequisites: MATH2501, MATH2510, MATH2901
Note/s: Excluded MATH3801, MATH3880.

As for MATH3801 but in greater depth.

MATH3911
Higher Linear Models
Staff Contact: School Office
CP15 S1 HPW4.5
Prerequisites: MATH2501, MATH2510, MATH2921
Note/s: Excluded MATH3811, MATH3870.

As for MATH3811 but in greater depth.

MATH3920
Higher Sample Survey Theory
Staff Contact: School Office
CP7.5 S1 HPW2
Prerequisite: MATH2921
Note/s: Excluded MATH3820.

As for MATH3820 but in greater depth.

MATH3930
Higher Design and Analysis of Experiments
Staff Contact: School Office
CP7.5 S2 HPW2
Prerequisites: MATH2921, MATH3911
Note/s: Excluded MATH3830, MATH3870.

As for MATH3830 but in greater depth.

MATH3940
Higher Statistical Inference
Staff Contact: School Office
CP7.5 S2 HPW2
Prerequisite: MATH2921
Note/s: Excluded MATH3840.

As for MATH3840 but in greater depth.

MATH3950
Higher Nonparametric Methods
Staff Contact: School Office
CP7.5 S2 HPW2
Prerequisites: MATH2921, MATH2930
Note/s: Excluded MATH3850.

As for MATH3850 but in greater depth.

MATH3971
Higher Probability Theory
Staff Contact: School Office
CP15 S1 HPW4
Prerequisites: MATH2501, MATH2510, MATH2901.
Note/s: Not offered in 1996.

Probability spaces, generating functions. Weak convergence, convergence in probability, weak law of large numbers, central limit theorem. Extreme value distributions. Borel-Cantelli lemma, almost sure convergence, strong law of large numbers. Stable and infinitely divisible distributions.

MATH3980
Higher Statistics Project
Staff Contact: School Office
CP7.5 F HPW1
Prerequisites: MATH2901, MATH2921
Corequisites: At least 60 Credit Points of Level III Statistics.

Mathematics Level IV

To enter Level IV (Honours) Mathematics, students must be in the Advanced Science course and have completed the first three years of one of the programs 0600, 1000, 1006, 1060, 1061, 1066, 1067 or 6810 with an appropriate set of Level III subjects (or the equivalent in the Arts Course or 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 must 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.

MATH4002
Mathematics/Statistics Thesis Project
Staff Contact: School Office
CP30 S1 or S2 HPW8 or F HPW4
Prerequisites: Completion of Stage 3 of Advanced Science programs 6867, 6868 or 6869.

Under supervision of an academic staff member of the School of Mathematics a student will undertake a major project in reading and/or research on a topic in mathematics or statistics or on applications of mathematics or statistics to environmental science. The student will write a thesis summarising the results of their project.

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 Department.
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.

Materials Science and Engineering

Materials Science and Engineering Level II

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 sterology. Electron microscopy. Microchemical analysis.

MATS1072
Physics of Materials
Staff Contact: Dr B Gleeson
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.

MATS1273
Ferrous Physical Metallurgy A
Staff Contact: Dr P Krauklis
S2 L2 T2

Binary and ternary iron-carbon phase equilibria. Carbon steel, phase transformations, 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.

MATS1112
Phase Equilibra
Staff Contact: Dr AG Crosky
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.

MATS2213
Diffusion
Staff Contact: Dr AK Hellier
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.

MATS4363
Metallography and Phase Equilibrium Laboratory
Staff Contact: Dr AG Crosky
S1 T3

Determination of equilibrium phase diagrams. Solidification processes in moulds. Metallography of non-ferrous alloys.

MATS9520
Engineering Materials
Staff Contact: Dr AG 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.

Materials Science and Engineering Level III

MATS1042
Crystallography and XRay Diffraction
Staff Contact: Dr P Munroe
CP7.5 S1 L2 T2
Note/s: Restricted to Combined degree course 3681.

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, chemical analysis, X-ray fluourescence spectroscopy.

MATS1183
Non-Ferrous Physical Metallurgy
Staff Contact: Dr P Krauklis
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.

MATS2213
Diffusion
Staff Contact: Dr AK Hellier
S1 L1 T1
Note/s: Restricted to Combined degree course 3681.

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: Dr B Gleeson
S2 L2 T1
Note/s: Restricted to Combined degree course 3681.

Solidification: single phase, eutectic and near-eutectic, peritectic. Diffusional transformations: precipitation ripening, cooperative transformations, TTT and CCT curves. Diffusionless transformations: crystallography, nucleation and growth modes.

MATS4513
Deformation of Metals
Staff Contact: Dr P Munroe
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: Dr B Gleeson
S2 L1 T1

Strengthening mechanisms, creep, fracture, grain size dependence of strength. Introduction to generation of deformation and recrystallization textures. Measurements of age-hardening, activiation energy of strain ageing.

MATS4533
Metal Forming Processes
Staff Contact: Dr AG Crosky
S1 L2

Metal forming. Introduction to metal forming operation. Factors affecting deformation and workability. Hot working, cold working and recrystallization. Processes: forging, rolling, extrusion and wire drawing. Die materials and geometry. Deformation parameters and processing defects. Plant visits.

MATS4543
Fractographic Analysis
Staff Contact: Dr AG Crosky
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 deficiences 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.

Mechanical and Manufacturing Engineering

Mechanical and Manufacturing Engineering Level I

AVEN1300
Basic Mechanics
Staff Contact: Dr K Zarrabi
F HPW2
Note/s: Restricted to course 3980.

Equilibrium of forces in two and three dimensions. Stress and strain, flexibility and stiffness. Stress and deformation of bars under axial load, beams under bending and torsion. Measurement of strain. Properties of metals and carbon fibre composites. Yielding, brittle fracture and failure. Fluid statics, fluid pressure, pressure variation in the atmosphere. Fluid dynamics, equation of continuity. Bernoullis equation. Applications including venturi meter, pitot tube. Vortices, lifting line theory for wings.

AVEN1500
Computing for Aviation
Staff Contact: A/Prof D W Kelly
S1 HPW2
Note/s: Restricted to course 3980.

Operating systems, hardware configurations, languages including C, Basic and Fortran. Packages for word processing and data analysis. Graphic and interactive display. Interaction with external devices including actuators and sensors. Application of computers in aviation.

AVEN1900
Introduction to Aircraft Engineering
Staff Contact: Mr JR Page
F HPW1
Note/s: Restricted to course 3980.

Organisation of the aviation industry, concepts and nomenclature used in aviation. Introduction to the theory of flight, aircraft configuration, systems and operation.

MANF 1100
Workshop Technology
Staff Contact: Dr P Mathew
CP7.5 S1 HPW3
Note/s: Protective equipment (eg safety glassess, 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 anf 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: Dr RA Platfoot
CP7.5 S1 HPW1 S2 HPW2
Corequisite: MECH1000

Introduction to hardware. Studies of a range of engineering components, considering: what they do, how they do it, how they were made, the range of possible forms for each item, why each item has its particular form. Systematic design techniques from conceptual through embodiment to the detail stage. Problem breakdown, search for solution concepts and decision techniques. Issues for sizing and form of designs, integration with manufacture and assembly. Investment decisions and cost analysis. Specification requirements and group projects.

MECH1110
Graphical Analysis and Communications
Staff Contact: Mr AJ Barratt
CP7.5 S2 L1 T2
Note/s: Excluded MECH0130.

Freehand sketching of machine components, standard drawing methods, orthogonal projections and sections for analysis and communication, dimensions, tolerances and

conventional symbols. Computer graphics modelling of components, assembly and production of detail drawings.

MECH1300
Engineering Mechanics 1
Staff Contact: Dr EH Hahn
CP10 S1 or S2 L2 T2
Prerequisite: HSC Exam Score 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 multiforce 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 IL Maclaine-cross
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

AVEN2200
Aviation Engineering Experimentation 1
Staff Contact: A/Prof DW Kelly
F HPW2
Note/s: Restricted to course 3980.

A selection of experiments from airframes analysis, flight mechanics, aircraft propulsion, aircraft systems and aerodynamics to supplement formal lecture program.

AVEN2210
Aircraft Systems 1
Staff Contact: Dr RA Willgoss
F HPW1.5
Note/s: Restricted to course 3980.

Hydraulics, main power transmissions pneumatics driving control surfaces. Electric power generators, distribution, emergency procedures. Electronics navigation, cabin control.

AVEN2400
Airframe Analysis and Maintenance 1
Staff Contact: A/Prof DW Kelly
S2 HPW3
Prerequisite: AVEN1300
Note/s: Restricted to course 3980.

Aircraft structural layout. Analysis of simple structures with axial force members. Deflections by unit load method. Buckling, fatigue, introduction to safe life and damage tolerant design.

AVEN2600
Aerodynamics for Aviation 1
Staff Contact: Dr NA Ahmed
S2 HPW3
Note/s: Restricted to course 3980.

Fluids in motion and the physical forces exerted by these flows on aircraft. Introduction to fundamental principles and equations of aerodynamics such as dimensional analysis, flow similarity, continuity momentum and energy equations, circulation, vorticity, stream functions and theoretical solutions for low speed, flow over airfoils and finite wings.

AVEN2700
Aviation Propulsion 1
Staff Contact: Dr RT Casey
S2 HPW3
Note/s: Restricted to course 3980.

Elements of internal-combustion (piston) engines, piston engine cycles, performance and operation, piston fuel systems, piston engine performance augmentation, piston engine condition monitoring, elements of propellers, basic propeller thrust equations, variable pitch propellers.

AVEN2900
Aircraft Performance
Staff Contact: Mr J Page
F HPW1.5
Prerequisite: AVEN1300
Note/s: Restricted to course 3980.

Flight environment aircraft classifications, operational requirements, payload-range, economics, break even point airfield requirements. Accelerated and unaccelerated flight manoeuvring and gust envelope, energy height, power and wing loading.

MECH2300
Engineering Mechanics 2A
Staff Contact: A/Prof RB Randall
CP7.5 S1 or S2 L2 T1
Prerequisites: MATH1032 or MATH1231 or MATH1042 or MATH1241, MECH1300 or MECH0360
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
Corequisite: 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.

MECH2401
Mechanics of Solids 2A
Staff Contact: Dr HL Stark
CP5 S1 or S2 L1 T1
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Corequisite: MECH1400
Note/s: Excluded MATH2400

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 guages. 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.

MECH2402
Mechanics of Solids 2B
Staff Contact: Dr HL Stark
CP9 S2 L1.5 T2
Prerequisite: MECH2401
Note/s: Excluded MATH2400

Fatigue, stress concentrations. Fatigue with multiaxial stresses, Miner's rule. Membrane stresses. Simple bending, second moment of area of a cross-section Ix. Unsymmetrical bending of beams, second moments of area Ix,Iy,Ixy. Principal second moments of area Iu and Iv. Bending of composite beams, reinforced concrete beams. Transverse shear stresses in beams. Shear Centre. Combined stresses in beams. Column buckling.

MECH2600
Fluid Mechanics 1
Staff Contact: A/Prof JA Reizes
CP10 F L1 T1
Prerequisites: MATH1032 or MATH1231 or MATH1042 or MATH1241, PHYS1919

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 E Leonardi
CP10 F L1 T1
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, PHYS1919

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 thermomanics. 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

AVEN3200
Aviation Engineering Experimentation 2
Staff Contact: A/Prof DW Kelly
F HPW2
Note/s: Restricted to course 3980.

A selection of experiments from airframes analysis, flight mechanics, aircraft propulsion, aircraft systems and aerodynamics to supplement formal lecture program.

AVEN3210
Aircraft Systems 2
Staff Contact: Mr J Page
F HPW2
Note/s: Restricted to course 3980.

Computation and fly by wire. Communication: internal (ARINC 429) and external (VHF, UHF etc). Control loops servo systems, feedback.

AVEN3400
Airframe Analysis and Maintenance 2
Staff Contact: A/Prof DW Kelly
F HPW2
Note/s: Restricted to course 3980.

Analysis of wing and fuselage structures, stress concentration, fracture mechanics, damage tolerance, fatigue, corrosion, nondestructive inspection, maintenance and repair, aspects of aeroelasticity, introduction to computational modelling.

AVEN3600
Aerodynamics for Aviation 2
Staff Contact: Dr NA Ahmed
S2 HPW2
Note/s: Restricted to course 3980.

The overall aim of the subject is to expose students to the qualitative and quantitative examination of fluids in meteorology and the physical forces exerted by these forces on aircraft. This subject will concentrate on developing theoretical solutions for inviscid and viscous compressible flow over airfoils which will incorporate topics on natural and oblique shock waves, method of characteristics and linearised supersonic flow theories.

AVEN3700
Aviation Propulsion 2
Staff Contact: Dr RT Casey
F HPW2.5
Note/s: Restricted to course 3980.

Propellor noise, stall, gyroscopic effects and slipstreams. Elements of gas turbine engines, gas turbine engine classification, gas turbine engine cycles, performance and operation, gas turbine engine high altitude operating characteristics, gas turbine engine condition monitoring, surge, engine re-starting.

AVEN3900
Stability, Control and Operation of Aircraft
Staff Contact: Mr J Page
F HPW2
Prerequisite: AVEN2900
Note/s: Restricted to course 3980.

Operations: take off and landing performance, range and endurance, under-carriage types, take-off surface effects, sea planes.

Stability and Control: reference axis, longitudinal stability (static, dynamic, origins of), lateral stability (static, dynamic, origins of derivatives), balancing and harmonising controls, flying control systems, enhanced stability.

AVEN3920
Aircraft Evaluation
Prerequisites: AVEN2900, AVEN2600, AVEN2210
Corequisites: AVEN3600, AVEN3210
Note/s: Restricted to Course 3980 program 2001

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. Students with no previous knowledge of biology can do this subject.

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 subjects.

Microbiology and Immunology Level III

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 genetics of nitrogen fixation.

MICR3041
Immunology I
Staff Contact: Prof G Jackson
CP15 S1 HPW6
Prerequisite: BIOC2201
Highly recommended: ANAT2211

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
Animal Virology
Staff Contact: Dr S Hazell, Dr G Grohmann
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 five major themes in basic and applied environmental microbiology: microbial ecology, genes and the environment, water and water pollution, biofilms, 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 nutrient limitation, 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
Medical Bacteriology
Staff Contact: Dr S Hazell
CP15 S1 HPW6
Prerequisite: MICR2011
Highly recommended: MICR3041
Note/s: 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.

Medical Bacteriology 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 4 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.

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 and Faculty of Applied Science Handbooks.

MICR2218
Microbiology
Staff Contact: Dr I Couperwhite

Solely for students enrolled in the Food Technology courses in the Faculty of Applied Science.

MICR3228
Microbiology for Medical Students
Staff Contact: Prof A Lee

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 IA
Staff Contact: Mr G Dick
CP10 S2 L2 T2 HPW4

Optical system of the eye: schematic eye, reduced eye, emmetropia, spherical ametropia, astigmatic ametropia. Correction of ametropia, elementary magnification effects, aphakia. Accommodation, presbyopia, correction of presbyopia. Accommodation and convergence. Aberrations of the eye. Resolution: optical and retinal factors. Modulation transfer function.

OPTM1202
Clinical Optometry I
Staff Contact: Dr P Anderton
CP15 S2 L2 T4 HPW6

Lectures and practical assignments in visual acuity, keratometry, auto-refraction, visual fields, tonometry and

colour vision, frame selection, facial fitting, insertion and removal of contact lenses.

OPTM1203
Physical and Geometrical Optics
Staff Contact: A/Prof D Crewther
CP15 S2 L4 T2 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 T2 HPW2

Mechanical optics and optical dispensing. Practical assignments in spectacle frame measurements, frame materials, basic focimetry, basic lens layout, lens glazing, frame adjustments.

OPTM1211
Ocular & Visual Science 1B
Staff Contact: A/Prof D O'Leary
CP5 S2 L2 HPW2

Introduction to the anatomy and physiology of the eye and adnexa.

OPTM2106
Pathology for Optometry Students
Staff Contact: Dr P Herse
Prerequisite: BIOS1101
Corequisites: PHPH2122
CP4 S1 L1.5 HPW1.5

An introduction to the basic disease processes associated with trauma, acute and chronic inflammation, repair, regeneration, haemorrhage, thrombosis, embolism, ischaemia, infarction, degeneration, hyperplasia, hypertrophy, atrophy, metaplasia, neoplasia, carcinogenesis and aging.

OPTM2107
Microbiology for Optometry Students
Staff Contact: Dr P Anderton
Prerequisite: BIOS1101
Corequisites: OPTM2106
CP4 S1 L1.5 HPW1.5

This subject provides familiarity with the biology of infectious disease. Classification of microbes. Microbial growth and contamination. Nature of infection. Selective toxicity and chemotherapy. Normal and abnormal immune system. AIDS, Conjuctival flora. Mycoses. Viruses. General and ocular infectious diseases.

OPTM2205
Measurement of Light and Colour
Staff Contact: A/Prof S Dain
CP5 S2 L1 T1 HPW2

Sources of radiant energy, detection and measurement of radiant energy. Distribution temperature. Colour temperature. The eye as a photo-receptor. Luminous energy. Relative luminous efficacy. Photometric measures and units. Reflection and transmission of light. Spectrophotometry. Colour mixture. Colorimetric equations. Grassman's Laws. Geometrical representation of colour. Transformation of primaries. CIE System. CIE

Standard Observers. Uniform colour space. Colour differences. Colour rendering. Correlated colour temperature. Colour order systems.

OPTM2208
Diagnosis of Ocular Disease
Staff Contact: Dr P Herse
Prerequisites: OPTM2106, OPTM2107
Corequisites: OPTM2302, OPTM2301
CP7.5 S2 L3 HPW3

An introductory course on the aetiology, pathology, signs, symptoms, prognosis and management of diseases of the eyelids, cornea, conjunctiva, iris, ciliary body, choroid, retina, optic nerve, lens and vitreous. Additional topics include glaucoma and lesions of the visual pathways.

OPTM2301
Ocular and Visual Science II
Staff Contact: Dr P Anderton
Prerequisites: BIOS1101, CHEM1809
Corequisite: PHPH2122
CP15 S3 L2 T2 HPW4

Provides familiarity with the structure and function of the human visual system. Topics include: the embryology of the eye; structure and function in the anterior eye; the orbit; extrinsic and intrinsic muscles; lens and accommodation; lids, glands and conjunctiva; intraocular pressure; the pupil; neural structure and function of the retina and visual pathways; vegetative retinal physiology; control of eye movements; physiology of colour and light perception.

OPTM2302
Clinical Optometry II
Staff Contact: Dr B Junghans
Prerequisite: OPTM1201, OPTM1202, OPTM1204, OPTM1211
Corequisites: OPTM2301, OPTM2303
CP37.5 S3 L4 T4 ,L3 T4 HPW S1 8, S2 7

Refraction, aetiology and treatment of ametropia, objective and subjective refraction, prescribing visual aids. Binocular vision: sensory and motor aspects: *Orthoptics*: Convergence/accommodation anomalies, strabismus, amblyopia. *Contact lenses:* contact lens design and manufacture, fitting techniques, care and maintenance. Interviewing and communication skills. Practical assignments in ophthalmoscopy, biomicroscopy, tonometry, refraction, contact lenses and assessment of binocular vision.

OPTM2303
Spectacle Lens and Optical Systems
Staff Contact: Mr G Dick
Prerequisites: OPTM1201, OPTM1203
CP15 S3 - S1 L1.5 T.5 S2 L3 T4 HPW S1 2 S2 4

Geometrical optics of spectacle and contact lenses. Magnification, field of view and prismatic effects of lenses. Bifocals and progressive power lenses. Lens aberrations and spectacle lens design. The optics of telescopes, microscopes, clinical instruments and low vision aids. Measurement of the ocular components of refraction. Optics of intra-ocular implants and corneal refractive surgery.

OPTM3208
Diagnosis and Management of Ocular Disease
Staff Contact: Dr P Herse
Prerequisites: OPTM2106, OPTM2107, OPTM2208
Corequisites: OPTM3301, OPTM3302, OPTM3309
CP12.5 S3 S1 L3 S2 T2 HPW S1 3 S2 2

An advanced study of the diagnosis, prognosis and management of specific diseases of the eyelids, cornea, conjucntiva, iris, ciliary body, choroid, retina, optic nerve, lens, vitreous, lacrimal apparatus, sclera and orbit. Additional topics include congenital abnormalities, glaucoma, lesions of the visual pathways, ocular manifestations of systemic disease and ocular side effects of therapeutic agents.

OPTM3301
Visual Science III
Staff Contact: Dr P Anderton
Prerequisite: OPTM2301
CP15 S3 L2 T1 HPW 3

Visual Psychophysics: Spatial and temporal effects in vision, form, motion, colour and depth processing; accommodation/convergence relationships; visual perception. Visual neuroscience: Relationship between structure and function in the retina and visual pathways; visual development, neural plasticity and critical periods; ocular motility; visuo-motor coordination; mechanisms underlying visual psychophysics; Neuro-ophthalmology. Applied Visual Science: Visual performance; lighting design.

OPTM3302
Clinical Optometry III
Staff Contact: Dr J Alexander
Prerequisites: OPTM2301, OPTM2302, OPTM2303, OPTM2106, OPTM2107, OPTM2208, PSYC2116
Corequisites: OPTM3301, OPTM3208, OPTM3309
CP65 S3 L7 T6 HPW 13

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. Pharmacology: basic and ocular aspects. Public Health Optometry: basic principles, eye protection, vision screening, visual ergonomics. Dispensing: Practical aspects. Clinical Assessment: gonioscopy, ophthalmoscopy, visual fields, colour vision. Examination of patient: Management and treatment of ocular conditions and diseases.

OPTM3309
Ocular Science III
Staff Contact: A/Prof D O'Leary
Prerequisite: OPTM2301
CP12.5 S3 S1 L2.5 T.5 S2 L1.5 T.5 HPW S1 3 S2 2

Anatomy and Physiology of the eye and adnexae: Aqueous secretion and drainage; maintenance of intraocular pressure; corneal metabolism and hydration; lacrimal secretion and drainage; crystalline lens and transparency; retinal metabolism, blood supply. Pathophysiology: glaucoma; presbyopia; effects of radiation; response to injury and disease; age related changes.

OPTM4301
Visual Science IV
Staff Contact: A/Prof D Crewther
Prerequisite: OPTM3301
CP15 S3 S1 L3 T1 S2 L1 T1 HPW S1 4 S2 2

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 magnetics 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
Prerequisite: OPTM3301, OPTM3302, OPTM3208, OPTM3309, PSYC3506
Corequisite: OPTM4301, OPTM3410, OPTM4311, MDCN8001
CP85 S3 L2 T15 HPW17

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.

OPTM4310
Research Project
Staff Contact: Dr J Alexander
Prerequisite: MATH2819, OPTM3301, OPTM3302, OPTM3309, OPTM3208
CP20 S3 T4 HPW4

Under the supervision of academic staff, students will design and carry out a small research project.

OPTM4311
Current Issues in Optometry and Visual Science
Staff Contact: A/Prof S Dain
Prerequisite: OPTM3301, OPTM3302, OPTM3309
Corequisite: OPTM4301, OPTM4302
CP5 S2 T2 HPW2

Critical analysis of significant recent publications in the fields of Optometry and Visual Science. This will be treated in a forum where conflicting ideas on these topics will be presented and analysed by the students.

OPTM4312
Optometry and the Professional Environment
Staff Contact: Mr D Pye
CP10 S3 L1 T1 HPW2

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.

Pathology

Pathology Level III

PATH3201
Basic and Applied Pathology
Staff Contact: Dr N Hawkins
F HPW3
Prerequisites: ANAT2211, ANAT2111, PHPH2112 or equivalent

Lectures, tutorials and practical class demonstrations. Includes exposition of the basic classification of pathological processes, study of the processes of cell and tissue degeneration, acute and chronic inflammation, vascular disease, including thrombosis, embolism, ischaemia and infarction. Coverage of the processes of healing and regeneration with specific reference to healing of skin wounds and the healing of fractures. Aberrations of cell growth used to introduce the subject of neoplasia and carcinogenesis. Exposure to examples of specific disease entities of general practical importance exemplifying the basic or fundamental processes such as appendicitis, pneumonia, bone diseases, arthritis, pulmonary and myocardial infarction as well as lung, alimentary and cerebral tumours. Correlation of pathological processes with development of specific clinical syndromes.

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 C6 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 Hetherington, Convenor
CP15 C6 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: Stephen Cohen
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: Michaelis Michael
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 totlling 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	Philosphy 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 S2 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Note/s: Excluded 52.304.

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
CP15 S2 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 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Not offered in 1996

Examines several classic metaphysical questions, each of which concerns some kind of *realism.* (i) Realism in general (ii) Realism about *universals* (iii) *Modal* realism: (iv) Realism about *persons.* We will think about truth, about the relation between the general and the particular, about whether this is the only possible world, about whether individuals have essences - and even about whether there are non-existent objects.

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 S2 HPW3
Prerequisite: PHIL2106 or equivalent, or contact School
Note/s: Not offered in 1996

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 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.2002, 52.250.

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 PSYC1002
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 S1 HPW3
Prerequisite: Upper Level status in Philosophy

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 1996.

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 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1996 - Consult the School.

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 1996.

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.

In his book *The Phenomenology of Mind*, Hegel declares that philosophy is not an escape from experience but a form of experience. The life of consciousness is continuous from the simplest bodily reflex to the most sophisticated scientific or cultural reflection. With the *Phenomenology* as our central reading, we look at different writers since Hegel who demand that philosophic thinking bring itself closer to the texture and qualities of lived experience. Discussion will cover Hegel's predecessors as well as opponents and admirers.

PHIL2316
Philosophy of Religion
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: Intensities
CP15 S1 HPW3
Prerequisite: Upper Level status is 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 S2 HPW3
Prerequisite: Upper Level status in Philosophy

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

Examines the philosophy of Nietzsche and Foucault with particular emphasis on their views about the relation between knowledge on the one hand and subjectivity, power relations and freedom on the other. Issues to be addressed include: truth as a vehicle of power; moral values and responsibility; discipline and the body; the relationship between power and freedom.

PHIL2417
Relativism: Cognitive and Moral
CP15 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Note/s: Not offered in 1996

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
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 S1 HPW3
Prerequisite: Upper Level status in Philosophy

Explores an approach to ethics originating in ancient Greek thought and developed 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 and possible applications of this ethics, cultural difference and some issues in medical ethics.

PHIL2506
Classical Political Philosophy
CP15 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.203, 52.2050, 52.240. Might not be offered in 1996 - Consult School

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
CP15 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.523, 52.2230, 52.5232, 52.243. Might not be offered in 1996 - Consult School

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 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.105, 52.2150, 52.241.

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 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.216. Not be offered in 1996

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: Issues in Ethics and Epistemology
Staff Contact: Genevieve Lloyd, Stephen Cohen
CP15 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.2040, 52.2220, PHIL2507. Not offered in 1996.

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
CP15 S2 HPW3
Prerequisite: Upper Level Status - students must be in Year 2 or later of university study.

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.

PHIL2606
Aesthetics
Staff Contact: Rosalyn Diprose
CP15 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1996 - Consult School Excluded 52.273, 52.2260.

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.

PHIL2706
Seminar A
CP15 S1 HPW3
Note/s: Might not be offered in 1996 - 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 1996 - 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 Staines/Convenor
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.

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) 57-100, or 2 unit Science (Chemistry) 60-100, or 3 unit Science 90-150, 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).
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 Kirchoff'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
Prerequiste: PHYS1011

Syllabus identical to PHYS1002, S2

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.

PHYS1159
Environmental Acoustics (Aviation)
Staff Contact Dr J Dunlop
S2 HPW4
Corequisite: PHYS1889
Note/s: Restricted to Course 3980

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.

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 1996.

PHYS1889
Physics 1 (Aviation)
Staff Contact: Dr M Box
CP22.5 F HPW6
Note/s: Restricted to course 3980.

Mechanics of particles, force, energy, momentum, oscillation, rotational motion, gravitation. Electric and magnetic fields; charge, potential, circuit theory, magnetic forces and fields. Alternating current circuits. Waves, sound, light polarisation, interference and diffraction.

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.

PHYS2001
Mechanics, and Computational Physics
Staff Contact: Executive Assistant
CP15 S1 HPW4
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Corequisite: MATH2011
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
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.

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. Energy budgets and transmission. 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 1996

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
Introductory Atmospheric Science
Staff Contact: Executive Assistant
CP7.5 S1 HPW2
Prerequisites: PHYS1002 or PHYS1022, MATH1032 or MATH1231, CHEM1101

Introduction to the properties and problems of the atmosphere: composition and structure, thermodynamics and stability, chemical cycles, air pollution, aerosols, general circulation, solar and terrestrial radiation, ozone layer, physical basis of climate and climate change.

PHYS2819
Atmospheric Science (Aviation)
Staff Contact: Dr M Box
S1 HPW4
Prerequisites: PHYS1889, Mathematics for Aviation
Note/s: Restricted to course 3980

Atmospheric composition, structure and stability, solar and terrestrial radiation, ozone layer, physical basis of climate and climate change, impact of aircraft operations, hazards to aircraft.

PHYS2869
Physics of Measurement (Aviation)
Staff Contact: Executive Assistant
S1 HPW3
Prerequistes: PHYS 1889
Note/s: Restricted to Course 3980.

Mechanical design of apparatus. Optical instruments: application to telescopes, resolving power, optical fibres, polarisation. Properties of electromagnetic waves in the atmosphere and ionosphere.

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
Quantum Mechanics
Staff Contact: Executive Assistant
CP7.5 S1 HPW2
Prerequisite: PHYS2021
Corequisite: MATH2120

Fundamental principles, harmonic oscillator systems, spherically symmetric systems, angular momentum, hydrogen atom, perturbation theory, variational methods, identical particles, quantum theory of atoms.

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
Electromagnetism
Staff Contact: Executive Assistant
CP7.5 S1 HPW2
Prerequisites: PHYS2011, MATH2100, MATH2120

Electromagnetic fields; Maxwell's equations, Poynting theorem, electromagnetic potentials, electromagnetic waves. Reflection and transmission, plasma physics, Fresnel equations, waveguides, radiation fields, dipoles and antenna theory.

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
Corequisite: PHYS3010

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 super-conductivity. 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.

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, MATH2100, MATH2510

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.

PHYS3520
Relativity and Electrodynamics
Staff Contact: Executive Assistant
CP7.5 S2 HPW2
Prerequisites: PHYS2021, MATH2510
Corequisites: PHYS3030
Note/s : PHYS3560 excluded

Electric and magnetic fields of a moving charged particle. Radiation from an accelerated charged particle. 4-D spacetime (covariant) formulation of (Einsteinian) relativistic mechanics. 4-D spacetime (covariant) formulation of Maxwellian electrodynamics.

PHYS3530
Advanced Quantum Mechanics
Staff Contact: Executive Assistant
CP7.5 S2 HPW2
Corequisite: PHYS3010

Formal structure, Hilbert space, Dirac notation, matrix diagonalization. Equations of motion, Schroedinger, Heisenberg and interaction pictures. Relativistic quantum mechanics, Klein-Gordon and Dirac equation, antiparticles. Introduction to group theory, representations, Lie algebras, rotation group, SU(2) and SU(3), quarks.

PHYS3550
General Relativity
Staff Contact: Executive Assistant
CP7.5 S2 HPW2
Prerequisites: PHYS2021, MATH2510, MATH2100

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.

PHYS3601
Computer Applications in Instrumentation
Staff Contact: Executive Assistant
CP15 S2 HPW5
Prerequisite: PHYS2601
Note/s: Not offered in 1996

Developments in computer architecture and hardware such as digital signal processors, parallel computing architectures, neural networks etc; computers and microcontrollers in instrumentation and control applications. Seminars on architecture, instrumentation and control. Projects on peripheral and standalone systems.

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 simulation techniques (phase transitions, molecular dynamics, chaos and stability).

PHYS3620
Computer Based Signal Processing
Staff Contact: Executive Assistant
CP7.5 S2 HPW3
Prerequisites: PHYS2031, MATH2120
Note/s: Excluded ELEC4042.

Measurement and sampling; noise power spectra; signalto noise improvement using digital techniques: digital filters, auto- and cross- correlation, methods based on Fourier transformation; system response including transfer functions, convolution, image enhancement.

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.

PHYS3789
Fundamentals of Instrumentation (Aviation)
Staff Contact:Dr M Box
S1 HPW3
Prerequisite: PHYS1889
Note/s: Restricted to course 3980.

Electronics: power supplies, transistors op-amps, digital electronics.

Optical fibres: properties, coupling, communications diode lasers, sensors.

PHYS3810
Applications of Radiation
Staff Contact: Executive Assistant
CP7.5 S2 HPW2
Corequisite: PHYS3030

Radiation laws, equation of transfer, absorption, emission and scattering of light by molecules and particles, multiple scattering, solution of multiple scattering problems, thermal transfer, band models, applications to planetary atmospheres, remote sensing, climate.

PHYS3829
Dynamic Meteorology
Staff Contact: Dr M Box
S2 HPW2
Note/s: Restricted to course 3980.

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.

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: Dr P Elliston
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: Dr P Elliston
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.

PHYS1919
Physics 1 (Mechanical Engineering)
Staff Contact: First Year Director
Note/s: Not re-run in S2 and/or Summer Session

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. Introduction to electronics and electronic devices. Boolean algebra. Instrumentation.

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: Not re-run in S2 and/or Summer Session.

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 instuments. Fluid mechanics;
Bernoulli's equation, viscosity; Stoke's Law, Nuclear
physics, radioactivity, half-life, nuclear forces, binding
energies, fission and fusion.

PHYS2920
Electronics (Applied Science)
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
**Introduction to Semiconductor Physics (Computer
Engineering)**
Staff Contact: Executive Assistant

Structural properties of solids; free electrons in metals;
introductory quantum physics; band theory; semi
conductors in equilibrium.

PHYS2969
Physics of Measurement (Geomatic Engineering)
Staff Contact: Executive Assistant

Resolution, accuracy and sensitivity of instruments. Errors
of observation; transducers; mechanical design of
apparatus; optical instruments, optical fibres; photometry;
analogue-to-digital conversion and digital instruments.
Measurements of very large and very small quantities.

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, CHEM1002 or
CHEM1101 and CHEM1201, or a credit level pass in
CHEM1302 or CHEM1401 and CHEM1501, MATH1032 or
MATH1131 and MATH1231 or MATH1042 or MATH1141
and MATH1241 or MATH1021
Corequisites: BIOC2101 and BIOC2201 or BIOC2372
Note/s: Students intending to major in Physiology and/or
Pharmacology should note Physiology 2 prerequisites.
From 1994, student numbers in Physiology 1 will be limited
and entry to the course will be allocated on academic merit.

Introduces fundamental physiological principles, dealing
first with basic cellular function in terms of chemical and
physical principles, and with 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 BIOC2372
Note/s: Student numbers in this subject are limited and entry to the course is allocated on academic merit.

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: A/Prof G Graham
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 Developmental Physiology
Staff Contact: Prof ER Lumbers
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 D Garlick
CP120 F HPW10
Prerequisite: Completion of program 7300 including Level III subjects totalling 105 Credit Points 60 Credit Points must be from Physiology

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 D Garlick
CP120 F HPW10
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.

Professional Studies

Professional Studies Level I

PROF0101
Aviation Studies: International Societies
Staff Contact: Ms S Desmarchelier
CP11.3 S1 HPW3
Note/s: Restricted to course 3980.

The historical and sociological perspectives are used to illustrate many world cultures, including the impact of migration. In depth analysis of selected countries indicates how the major social institutions, such as the family, religion and education, incorporate differences in ethnic and cultural identity.

PROF0102
Crew Resource Management 1
Staff Contact: Capt J Faulkner
CP7.5 S1 HPW2
Note/s: Restricted to course 3980.

This subject deals with the effective use of all resources in the 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.

PROF0103
Language of Management
Staff Contact: Ms R Kearney
CP9.4 S2 HPW2.5
Note/s: Restricted to course 3980.

Effective communications is the key to effective cabin resource management. This process involves the organisation and sequencing of ideas to communicate effectively in English; variations of space and intonation; use of standard English pronunciations; de-coding management jargon and persuasive communication in the field of management.

PROF1002
Instructional/Education Techniques 1
Staff Contact: Mr B Buckley
CP7.5 S2 HPW2
Note/s: Restricted to course 3980.

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.

Professional Studies Level II

PROF0202
Crew Resource Management 2
Staff Contact: Capt J Faulkner
CP12.8 S1 HPW4
Prerequisite: PROF0102
Note/s: Restricted to course 3980.

The interrelationships between Captain and crew will be used to illustrate the principles of the hierarchy of command. Effective teamwork will be developed through negotiation of the principles of communication and effective decision management.

PROF0203
Economics of Management
Staff Contact: Ms C Desmarchelier
CP6.4 S2 HPW1.7
Note/s: Restricted to course 3980.

Economic evaluation of the aircraft industry, structure, conduct and performance. Investigation of schemes and the effects of deregulation, economics of scale and scope, pricing policies and market access of aviation. Analysis of the unequal distribution of wealth in society, economics of the aviation industry (suppliers and consumers), economic policies including rationalisation and the economic base of the airline industry.

PROF0204
International Negotiation
Staff Contact: Ms C Desmarchelier
CP6.4 S2 HPW1.7
Note/s: Restricted to course 3980.

The theories of international co-operation and conflict will be analysed in reference to contemporary social and political events. The historical and sociological perspectives will be used to demonstrate patterns of social organisation.

PROF2001
Flight Safety I
Staff Contact: Ms C Desmarchelier
CP5.6 S1 HPW1.5
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This course acts as an introduction to the study of flight safety and its application to aircraft operations.

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 studied.

PROF2002
Instructional/Education Techniques 2
Staff Contact: Ms C Desmarchelier
CP7.5 S1 HPW2
Note/s: restricted to students in course 3980 programs 2002 and 2003.

This subject provides students with models of effective Flight Instruction emphasising principles of effective communication. Aspects of adult learning theory and practices, communication, hyman motivation, attention, perception and memory are incorporated in students' planning, delivery and evaluation of instruction sessions.

Training sessions in the Instructional Micro Laboratory emphasises the process of effective communication and exchange of information. Individual self evaluation is based on video recordings of each students instructional sessions.

Professional Studies Level III

PROF0301
Aviation Studies: Researching Societies
Staff Contact: Ms C Desmarchelier
CP11.3 S1 HPW3
Note/s: Restricted to course 3980.

Frameworks for comparing and contrasting the culture of societies and regions; after selecting a country or region of the world, students prepare a library research report identifying major historical and cultural themes and their impact on contemporary social life.

PROF0302
Human Factors In Aviation
Staff Contact: Ms C Desmarchelier
CP7.5 S2 HPW2
Note/s: Restricted to course 3980.

Cockpit management requires aptitude and interpersonal skills. The ability to analyse and dissect personal interactions; understand health requirements as affected by altitude; personality differences and maturational differences in personnel; the psychology of management; consumer liaison and other science based influences on aviation.

PROF0303
Management Communication Skills
Staff Contact: Ms C Desmarchelier
CP11.3 S2 HPW3
Note/s: Restricted to course 3980.

Mastery of written and oral communication, management modes of communication including report writing; interactive negotiation within an organisational hierarchy.

PROF0304
Stress Management
Staff Contact: Ms C Desmarchelier
CP7.5 S2 HPW2
Note/s: restricted to students in course 3980 programs 2002 and 2003.

Identification and management of levels of stress within a business hierarchy, developing physical and mental competencies to deal with known stressors, leisure activities that compliment work engendered stress.

PROF3001
Flight Safety II
Staff Contact: Ms C Desmarchelier
CP5.6 S1 HPW1.5
Prerequisite: PROF2001
Note/s: restricted to students in course 3980 programs 2002 and 2003.

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.

Psychiatry

Psychiatry Level II

PSCY2201
Human Behaviour
Staff Contact: Dr P Ward
CP15 F HPW3
Note/s: Restricted to Combined degree course 3821.

Objectives: To provide students with key concepts in the five main topic areas and demonstrate the practical application of these concepts in medical practice. The five main topic areas are: research methods in behavioural sciences, psychology in relation to medicine, sociology in relation to medicine, bioethics and human sexuality. Students are thus encouraged to develop an understanding of human behaviour as the result of the complex interaction of a number of factors so that they are more likely to appreciate and respect their patients and colleagues as persons. Taught in both sessions. Didactic material and some case material is presented in lectures and the tutorial program is structured to consolidate this information, frequently using discussion of specific case examples. Emphasis is placed on developing skills in clear professional communication, with feedback on written assignments, tutorial presentations, and encouragement to use visual aids in presentations. Specific topics covered include: risk behaviours; anxiety; stigma; social class and health; the sexual response and how it changes across the lifespan; and a range of bioethical topics including human and animal experimentation, euthanasia, the doctor and the state.

A handbook for the course is produced each session and may be borrowed from the Biomedical Library Closed Reserve or purchased from the School of Psychiatry.

Assessment: In Session 1, assessment consists of two written examinations, a tutorial assignment, and a tutorial presentation. In Session 2, students are required to write a major essay on Bioethics, present a tutorial paper and sit a final written examination.

Psychology

Psychology Level I Subject

PSYC1002
Psychology 1
Staff Contact: Dr A Adams
CP30 F HPW5
Note/s: A high proficiency in English is necessary to pass this subject. Excluded GENB 4001, GENB4002, GENB4003, GENB4004, GENS4620, GENS5050.

Introduces the content and methods of psychology as a basic science, with emphasis on the biological and social bases of behaviour, relationship to the environment, and individual differences. Training in the methods of psychological enquiry, and in the use of elementary statistical procedures.

Credit is given for participating in various School-approved research studies for up to six hours during the year. An alternative is available.

Psychology Level II Subjects

Note: Students may not enrol in more than four Level II Psychology subjects (60 Credit Points).

PSYC2001
Research Methods 2
Staff Contact: Dr K Llewellyn
CP15 S1 HPW4
Prerequisite: PSYC1002 Advanced Pass (a mark of 55 or greater)
Note/s: Excluded GENB4005

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, multiple tests). 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.

PSYC2011
Psychological 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.

PSYC2021
Attention, Memory and Thought
Staff Contact: A/Prof S Andrews
CP15 S2 HPW4
Prerequisite: PSYC1002 Advanced Pass (a mark of 55 or greater)

Introduces the fundamental principles of human cognition underlying pattern recognition, selective attention, memory storage and retrieval, and reasoning and problem-solving. Applications are considered.

PSYC2031
Personality and Social Psychology
Staff Contact: Prof J Forgas
CP15 S1 HPW4
Prerequisite: PSYC1002 Advanced Pass (a mark of 55 or greater)

1. Models of personality and their method of study, personality development and links with social behaviour. 2. Social behaviour and the processes of verbal and nonverbal communication, person perception and interpersonal relationships in particular.

PSYC2042
Psychology 2A
Staff Contact: Prof K McConkey
CP30 F HPW4
Prerequisite: PSYC1002 Advanced Pass (a mark of 55 or greater)
Corequisites: PSYC2001, PSYC2011, PSYC2021 and PSYC2031
Note/s: Restricted to course 3431.

Introduction to several areas of professional practice in psychology and the roles of psychologists in these areas, eg developmental disabilities, and psychology and the law. Discussion of topical issues in the science and practice of psychology.

PSYC2051
Human Development
Staff Contact: A/Prof D Burnham
CP15 S1 HPW4
Prerequisite: PSYC1002
Note/s: Excluded PSYC2116, PSYC3111.

The physical, perceptual, cognitive, and psychosocial development of the human from genetic and pre-natal influences through to old age.

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 eight Level III Psychology subjects (120 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. Test procedures for planned and post-hoc contrasts defined on parameters of fixed and mixed models. General principles of experimental design.

PSCY3011
Research Methods 3B
Staff Contact: Dr P Lovibond
CP15 S2 HPW4
Prerequisite: PSYC3001

Multivariate statistics and computing. Data analysis using the SPSS and PSY computer programs; their statistical basis.

PSYC3021
Perception
Staff Contact: Prof B Gillam
CP15 S2 HPW4
Prerequisites: PSYC2001 and *either* PSYC2021 *or* PSYC2031

The study of the sensory basis of perception; the study of perception as an adaptive process by which individuals are able to correctly apprehend the external environment and localise themselves within it; the study of perceptual development in infants and young children.

PSYC3031
Behavioural Neuroscience
Staff Contact: Dr J Cranney
CP15 S1 HPW4
Prerequisites: PSYC2001 and *either* PSYC2021 *or* PSYC2031

An examination of brain-behaviour relationships with emphasis on contemporary models of the neural bases of

learning, memory and motivation. Topics may include classical and operant conditioning, neuropharmacology, the neural basis of feeding and its disorders, invertebrate and vertebrate models of learning, amnesias and theories of normal memory.

PSYC3041
Learning
Staff Contact: Dr R Richardson
CP15 S2 HPW4
Prerequisite: PSYC3031

The conditions which promote learning, the contents of learning and the mechanisms by which learning is deployed in action. Emphasises the distinction between specialised and general-purpose learning abilities.

PSYC3051
Physiological Psychology
Staff Contact: Prof G Paxinos
CP15 S2 HPW4
Prerequisite: PSYC3031

The neural control of behaviour with special emphasis on cerebral localisation of function in humans. Clinical conditions are considered to the extent that they illuminate mechanisms of brain control or they relate to theorising about brain function.

PSYC3061
Perceptual Theory
CP15 HPW4
Prerequisite: PSYC3021
Note/s: Not offered in 1996.

Some major theoretical influences in perception, beginning with a historical view and then considering the different perspectives represented by Helmholtz, Gestalt psychology, and Gibson; the influence of computer vision (especially Marr) and the modern revolution in knowledge of the physiology of the visual system.

PSYC3071
Abnormal Psychology
Staff Contact: Dr P Birrell
CP15 S1 HPW4
Prerequisite: PSYC2001

Descriptive psychopathology; symptomatology and diagnostic features of schizophrenia, organic brain syndromes, affective disorders, neurotic disorders, psychopathy, sexual aberrations, and addictions.

PSYC3081
Experimental Psychopathology
Staff Contact: Dr P Lovibond
CP15 S2 HPW4
Prerequisite: PSYC3071

An examination of the aetiology and mechanisms of behavioural disorders in the light of experimental research and theory construction. Major topics include: aetiology and mechanisms of schizophrenia, affective disorders; psychophysiological disorders, anxiety, depression, addictive behaviours and amnesia.

PSYC3091
Counselling and Evaluation
Staff Contact: Dr G Huon
CP15 S2 HPW4
Prerequisites: PSYC2001, PSYC2011

Current theoretical perspectives and related empirical findings, the 'generic variables', and methodological procedures used to evaluate the outcome in counselling psychology.

PSYC3101
Individual Differences
Staff Contact: Dr G Huon
CP15 S1 HPW4
Prerequisites: PSYC2011, PSYC2031

Measurement and assessment of intelligence, psychometric assessment of personality, cognitive and affective aspects of personality, the authoritarian personality, achievement motivation, socio-biological models and critique.

PSYC3111
Development Psychology
Staff Contact: A/Prof D Burnham
CP15 S2 HPW4
Prerequisites: PSYC2001 and *either* PSYC2021 *or* PSYC2031
Note/s: Excluded PSYC2051, PSYC2116

Issues, methods, and theories in developmental psychology; the development of infants, toddlers, school children, and adolescents with reference to significant cognitive and social events in each of these periods.

PSYC3121
Social Psychology
Staff Contact: Prof J Forgas
CP15 S2 HPW4
Prerequisites: PSYC2001, PSYC2031
Note/s: Excluded PSYC3131

Human sociability, affiliation and attraction, the development of interpersonal relationships, social influence processes, conformity, obedience, leadership, interaction in groups, affective influences on social cognition and behaviour.

PSYC3131
Cross-Cultural Social Behaviour
Staff Contact: A/Prof S Bochner
CP15 S1 HPW4
Prerequisites: PSYC2001, PSYC2031
Note/s: Excluded PSYC3121.

The social psychology of intergroup relations or contact between culturally diverse individuals and groups. Includes intercultural communication, intergroup conflict and its resolution, culture learning and orientation programs, and cross-cultural social skills training. Illustration by studies of overseas students, migrants, international business persons, and other individuals exposed to second-culture influences.

PSYC3141
Behaviour in Organisations
Staff Contact: Dr S Schneider
CP15 S1 HPW4
Prerequisites: PSYC2001, PSYC2031
Note/s: Excluded GENB4005

Industrial and organisational psychology, job analysis, selection, motivation, management strategies, job design and a systems analytic approach to organisations, training, selection, work satisfaction and organisational climate.

PSYC3151
Cognition and Skill
Staff Contact: A/Prof J Taplin
CP15 S1 HPW4
Prerequisites: PSYC2001, PSYC2021

Cognitive processes underlying skilled behaviour. Topics include detection and discrimination, the representation of knowledge, artificial intelligence, and the basis of expertise in skilled performance.

PSYC3161
Language and Its Development
Staff Contact: A/Prof M Taft
CP15 S2 HPW4
Prerequisites: PSYC2001, PSYC2021

How language is acquired and used in reading, writing, speech comprehension and speech production. Language dysfunction and bilingualism.

PSYC3171
Recent Developments in Experimental Psychology
CP15 HPW4
Prerequisites: PSYC2001, PSYC2021
Note/s: Not offered in 1996.

An occasional elective dealing with recent developments in experimental psychology.

PSYC3181
Issues in Applied Psychology
CP15 HPW4
Prerequisites: PSYC2001, PSYC2011
Note/s: Not offered in 1996.

An occasional elective dealing with issues in applied psychology. Topics may include psychology and the law, career choice and development, stress, forensic psychology and field versus laboratory research.

PSYC3191
Computer Science and Psychology
Staff Contact: Prof B Gillam
CP15 S2 HPW5
Prerequisites: COMP1011, COMP3411, PSYC2001 and PSYC2021

Investigates the burgeoning relationships between cognitive psychology and computer science. Topics include parallel distributed processing models of learning, memory and perception; processes of reasoning, logic and decision making; human expertise and expert systems.

Psychology Level IV Subjects

PSYC4003
Psychology 4 (Thesis/Course 3431)
Staff Contact: Dr G Huon
CP120 F
Prerequisites: PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042, and Level III Psychology subjects totalling 120 Credit Points including PSYC3001, PSYC3011, PSYC3021 and PSYC3031 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 G Huon
CP120 F
Prerequisites: PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042, and Level III Psychology subjects totalling 120 Credit Points including PYSC3001, PSYC3021 and PSYC3031

Psychology 4 in the BSc(Psychol) degree course. Course work and a supervised group research project to be determined in consultation with the Head of School.

PSYC4023
Psychology 4 (Thesis) Honours
Staff Contact: Dr G Huon
CP120 F
Prerequisite: Completion of program 1200 or 1206 or 7312 including Level III subjects totalling 120 Credit Points

A supervised research thesis and course work to be determined in consultation with the Head of School.

PSYC4033
Psychology 4 Honours
Staff Contact: Dr G Huon
CP120 F
Prerequisite: Completion of program 1200 or 1206 or 7312 including Level III subjects totalling 120 Credit Points

Coursework and a supervised group research project 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 1996.

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: A/Prof D Burnham
CP7.5 S1 HPW3
Note/s: Restricted to Course 3950. Excluded PSYC2051, 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.

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
Note/s: Excluded 62.111.

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.

Assessment: 2 short essays, 2 tests, tutorials.

HPST1107
From the Closed World to the Infinite Universe
Staff Contact: Guy Freeland
CP15 S2 HPW3
Note/s: Excluded 62.211.

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.

Assessment: 2 short essays, 2 tests, tutorials.

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.

Assessment: Essay, tutorials, class tests.

SCTS1106
Science, Technology, and Social Change
Staff Contact: David Miller
CP15 S1 HPW3
Note/s: Excluded 62.101.

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.

Assessment: Essay, tutorials, class tests.

SCTS1107
Understanding Technological Controversy
Staff Contact: David Miller
CP15 S2 HPW3
Prerequisite: SCTS1106 or 62.101
Note/s: Excluded 62.103I.

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.

Assessment: Essay, test, individual tutorial and group work.

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
Note/s: Excluded 62.032.

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.

Assessment: One essay, two tests, tutorials.

HPST2107
The Darwinian Revolution
Staff Contact: David Oldroyd
CP15 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.104.

Scientific, philosophical, and social antecedents and consequences of Darwin's theory of evolution. The prevailing ideas in biology in the 18th and early 19th centuries. Classification; Lamarck; the design argument; Malthus; age of the Earth; Darwin's life and work; Mendel. The impact of evolutionary ideas in such fields such as religion, political theory, philosophy, psychology, anthropology, and sociology; Social Darwinism; racism. Sociobiology.

Assessment: One essay, two tests, tutorials.

HPST2108
History of Medicine
Staff Contact: Susan Hardy
CP15 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.043, 62.109, 26.568.

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 62.554.

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.

Assessment: Essay, class tests, tutorials.

HPST2116
History of the Philosophy and Methodology of Science
Staff Contact: Tony Corones
CP15 S2 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.543, 62.551, 62.561, 62.215U, 62.216U. Not recommended for students without some background in philosophy or HPST.

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.

Assessment: Essays, tutorials.

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 26.564, 26.251, 62.022. Not offered in 1996.

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.

Assessment: Essay, tutorials, two tests.

HPST2118
Body, Mind, and Soul: The History and Philosophy of Psychology
Staff Contact: Peter Slezak
CP15 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.106.

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.

Assessment: Essay, tutorial assessment, tests.

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 1996.

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.

Assessment: Essay, class tests, tutorials.

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: Anthony Corones
CP15 S2 HPW3
Prerequisite: As for HPST2106

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 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.

HPST3106
The Discovery of Time
Staff Contact: Guy Freeland
CP15 S2 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.103.

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.

Assessment: Essay, tutorials, two class tests.

HPST3107
Relations Between Science and the Arts
Staff Contact: David Oldroyd
CP15 S1 HPW3
Note/s: Not offered in 1996.

The relationship between science, technology, and the visual arts in the history of Western culture.

HPST3108
Deity and Mother Earth
Staff Contact: Guy Freeland
CP15 S2 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 62.062.

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.

Assessment: Essay, two tests, tutorials.

HPST3117
Philosophical Problems in Evolutionary Biology
Staff Contact: David Oldroyd
CP15 S1 HPW3
Prerequisite or Corequisite: HPST2106 or HPST2107, or permission of lecturer
Note/s: Excluded 62.3001, 62.301U. Not offered in 1996

Current controversies in evolutionary theory with consideration of topics such as essentialism and population thinking, falsifiability of the principle of natural selection, group selection controversy, sociobiology, problems in classification and cladism, the neutral theory of evolution and the role of chance, punctuated equilibrium theory, the origin of life, creation 'science', origins of human beings.

Assessment: Essay(s), seminar presentation(s).

HPST3118
Reading Option in History and Philosophy of Science and Technology
Staff Contact: Randall Albury
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.

Assessment: Essays, tests, tutorials.

HPST3119
Researching Medical History in Australia
Staff Contact: Susan Hardy
CP15 S2 HPW3
Prerequisite: HPST2108
Note/s: Excluded HPST2128

This research-oriented subjects 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.

SCTS2106
Scientific Knowledge and Political Power
Staff Contact: George Bindon
CP15 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Not offered in 1996. Excluded 62.052.

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
Note/s: Excluded 62.062.

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.

Assessment: Essays, tutorials.

SCTS2108
Information Technology, Politics and Policies
Staff Contact: George Bindon
CP15 S1 HPW3
Prerequisite: As for SCTS1106 or completion of Level I science subjects totalling at least 60 Credit Points.
Note/s: Not offered in 1996.

Key issues for 'info-tech' society, including social policies and the future of work and education; mass media and telecommunications in the electronic age; commercial-isation and shifting patterns of trade in the world economy; deregulation and the role of 'info-tech' in global restructuring.

SCTS2109
The New Biotechnologies and their Social Context
Staff Contact: Randall Albury
CP15 S1 HPW3
Prerequisite: SCTS1106, or by permission of the Head of School
Note/s: Excluded 62.245. Not offered in 1996

The social implications of the new technologies, including recombinant DNA techniques, genetic manipulation of animals, and test-tube babies. The present achievements and likely future developments of the new genetic and reproductive technologies, together with detailed discussions of the social, ethical, and political implications of these developments.

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.

Assessment: Class contributions, assignments, tests.

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 1996.

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.

Assessment: Class contributions, assignments, tests.

SCTS2118
Technology, Environment, Politics
Staff Contact: Gavan McDonell
CP15 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Not offered in 1996

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 1996

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 coolling, 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
Note/s: Excluded 62.082.

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.

Assessment: Essay, tutorials.

SCTS3107
Women and Science
Staff Contact: Nessy Allen
CP15 S1 HPW2
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.

Assessment: Seminar presentations, essays, class participation.

SCTS3108
Technological Development in 20th-Century Australia
Staff Contact: George Bindon
CP15 S2 HPW3
Prerequisite: As for SCTS1106
Note/s: Not offered in 1996. Excluded 62.246.

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: Paul Brown
CP15 S1 HPW3
Prerequisite: SCTS1106 or completion of Level I science science subjects totalling at least 60 Credit Points

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: Paul Brown
CP15 S2 HPW3
Prerequisite: As for SCTS3109
Note/s: Excluded 62.222U. Not offered in 1996.

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.

Assessment: Essays, tests, tutorials.

SCST3117
Technology, Globalization, and the Role of the State
Staff Contact: George Bindon
CP15 S2 HPW3
Prerequisite: Completion of SCTS subjects totalling at least 30 Credit Points
Note/s: Not offered in 1996. Excluded 62.3003.

An analysis of the interaction between technology, economic growth, and the internationalism of industry; the growing pressure on the State to adopt an increasingly interventionist role.

SCTS3119
Reading Option in Science and Technology Studies
Staff Contact: Randall Albury
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
The Social Construction of the Environment: Botany Bay and the Sydney Region
Staff Contact: Paul Brown
CP15 S2 HPW2
Prerequisite: Three subjects from the following: GEOG1051, GEOG2081, GEOG2102, GEOG3211, GEOG3062, GEOG3042, HPST3108, SCTS3106, SCTS3109, SCTS3116
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.

Assessment: Group project, assignment, seminar summaries, class participation.

Science and Technology Studies Level IV Honours Program

SCTS4106/SCTS4156
Science and Technology Studies (Honours) (FT/PT)
Staff Contact: Nessy Allen
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.

Wool and Animal Science

Wool and Animal Science Level II

WOOL3803
Genetics 1
Staff Contact: A/Prof J James
CP15 F L2 T1
Note/s: Restricted to Program 6840

Mendelian inheritance. Chromosomes, linkage and the physical basis of heredity. Gene action in physiology and development. Elements of molecular genetics. Principles of quantitative genetics, strength of inheritance and relationships. Selection and crossbreeding. Genetics applied to animal and plant improvement. Applications of genetics in sheep and wool production.

Wool and Animal Science Level III

WOOL3901
Biostatistics 1
Staff Contact: A/Prof J James
CP10 S1 L2 T2
Prerequisite: MATH2819 or BIOS2041
Note/s: Restricted to program 6840

Design and analysis of comparative experiments, for continuous and discrete random variables. Analysis of variance for fixed, mixed and random models. Linear regression and correlation. Multiple comparison methods.

WOOL4813
Genetics 2
Staff Contact: A/Prof J James
CP20 F L2 T2
Prerequisite: WOOL3803
Note/s: Restricted to program 6840.

Genetic structure of populations. Forces causing genetic change. Partition of genetic and phenotypic variation. Resemblance between relatives and estimation of genetic parameters. Direct and correlated selection responses. Aids to selection and selection indexes. Inbreeding and genetic drift. Genotype environment interaction. Heterosis and its utilisation. Interaction of natural and artificial selection. Limits of selective progress. Applications of molecular genetics.

Faculty of Biological and Behavioural Sciences

Dean: Professor WJ O'Sullivan
The Schools of the Faculty of Biological and Behavioural Sciences offer facilities for students to proceed to the award of a Graduate Diploma, the award of a master degree by research and the award of the degree of Doctor of Philosophy; and the award of a master degree by course work in Psychology (8251 and 8252) and in Biotechnology (8042).

Faculty of Science

Dean: Professor JF Scott
The Schools of the Faculty of Science supervise the graduate diploma courses in Computational Science (5535), Food and Drug Analysis (5510), Physical Oceanography (5530) and Physics (5515 and 5516). The Schools of the Faculty also offer facilities for students to proceed to the award of masters degrees in Chemistry (8770), Computational Science (8790), Mathematics (8740), Optometry (8760) and Statistics (8750), masters degrees by research and to the award of Doctor of Philosophy.

Students completing undergraduate science degrees which include an appropriate mix of subjects may qualify for admission to higher degree programs in Faculties other than Biological and Behavioural Sciences and Science.

Enrolment Procedures

All students re-enrolling in 1996 or enrolling in graduate courses should contact the Postgraduate Section for enrolment details.

Faculty of Biological and Behavioural 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 in the Faculty of Applied Science) offers a Graduate Diploma in Biotechnology and a Masters degree course in Biotechnology by formal study, and the School of Psychology offers Master of Psychology (Applied) and Master of Psychology (Clinical) degree courses.

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)
BIOS4013	Biological Science Honours (Full-time)
BIOS4019	Biological Science Honours (Part-time)
BIOS4023	Botany Honours (Full-time)
BIOS4029	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)
BIOS4033	Zoology Honours (Full-time)
BIOS4039	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.

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. It is intended primarily as an advanced training program for graduates from overseas universities who wish to obtain specialised training in particular areas of biological and behavioural science. 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.

Brief descriptions of the courses currently offered within the Schools of the Faculty of Biological and Behavioural Sciences and in the Department of Biotechnology follow.

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 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, plant biochemistry and the study of naturally occurring toxins.

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, the immunology of the intestinal tract, the allergic reaction.

School of Psychology

5330
Psychology Graduate Diploma Course
Full-time
CP120
Graduate Diploma
GradDip

Staff Contact: A/Prof J Taplin

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 experimental psychology, social psychology, clinical psychology, behavioural neuroscience and industrial/occupational psychology. Particular attention within each of these programs is paid to the interrelationship between scientific theory and the practical application of psychological knowledge.

Department of Biotechnology

5015
Biotechnology Graduate Diploma Course
Full-time or Part-time
Graduate Diploma
GradDip

Staff Contact: School Office

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.

Masters Degrees

Centre for Marine Science

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 & Assessment
MSC15002	Management of Marine Resources
MSC15003	Experimental Design & 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).

Master of Psychology (Applied) Degree Course
Full-time or Part-time

Master of Psychology (Applied)
MPsychol(App)

The Master of Psychology (Applied) degree course is aimed at providing psychology graduates with a postgraduate qualification which will equip them to make a distinctive contribution in work and other organisations. The emphasis of the program will be on developing applied research skills that integrate theory and practice. When combined with their undergraduate training and the required work experience, this program will equip psychologists with an understanding of organisational, social and cultural influences on behaviour. They will be able to apply this understanding to many problems through a critical, empirical orientation based on experimental methods, measurement and statistics. Areas of specialization include Industrial and Organisational Psychology, Vocational Psychology, Ergonomics and psychological aspects of Occupational Health.

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.

Applicants who do not satisfy the above entrance requirements may be admitted to the program. Such admissions will be based on an assessment of the applicant's knowledge, experience and occupation. Some additional qualifying subjects may be required of those who are admitted under this provision.

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).

Assessment of student performance is by sessional examinations, class tests, seminar papers and a research thesis.

The course consists of 165 credit points in Year 1 (Core Program) and 210 credit points in Year 2 (A Core Program of 135 credit points and an Elective Program of 75 credit Points).

Subjects from other graduate degrees, including the Master of Psychology (Clinical), the Master of Business Administration, the Master of Commerce (Industrial Relations and Organisational Behaviour) and the Master of Safety Science may be included in the elective program with the permission of the School concerned and the Head of the School of Psychology.

Year 1

Core Program

PSYC7000	Research and Evaluation Methods
PSYC7001	Psychological Assessment 1
PSYC7002	Psychological Assessment 2
PSYC7100	Industrial and Organisational Psychology 1
PSYC7101	Industrial and Organisational Psychology 2
PSYC7102	Psychological Principles of Training
PSYC7104	Applied Cognitive Psychology 1
PSYC7105	Professional Practice (Applied)
PSYC7106	Graduate Colloquium (Applied)
PSYC7109	Principles of Ergonomics

Year 2

Core Program

PSYC7004	Professional and Ethical Issues
PSYC7105	Professional Practice (Applied)
PSYC7108	Research Thesis (Applied)

Elective program

IROB5701	Industrial Relations 1A
IROB5907	Human Resource Management B
MNGT0374	Creativity
PSYC7111	Cross-cultural Perspectives in Applied Psychology
PSYC7112	Vocational Psychology
PSYC7113	Special Topic
PSYC7114	Graduate and Applied Seminars
PSYC7209	Developmental Disabilities
PSYC7210	Human Neuropsychology
PSYC7220	Health Psychology
SAFE9426	Ergonomics and New Technology

Note: 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 is designed to provide professional training in clinical psychology at an advanced level for honours graduates in psychology.

The normal entrance requirements are:

1. a degree of Bachelor, with Honours Class 1 or Class 2 in Psychology;

2. completion of a research thesis or research project in the Honours fourth year;

and

3. completion of approved courses in learning, perception and cognition, physiological psychology, psychological statistics, psychometrics and abnormal psychology, or in such other fields as may be prescribed by the Head of the School.

Selection of students is based on academic qualifications and suitability for the course. It may be necessary to limit the number of new enrolments in any year.

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 coursework program.

To qualify for the degree, students must satisfy the examiners in respect of their academic attainments, and their skill and competence in relevant aspects of practical professional work.

The course consists of lectures, seminars, demonstrations and practical work, supervised clinical and community work, and a research thesis (180 credit points in Year 1 and 180 credit points in Year 2).

The major aims of the course are: 1. to acquaint students with the issues, findings and problems of contemporary clinical and community psychology, and 2. to equip them with basic clinical skills and techniques. A total of 760 hours of supervized clinical practice must be completed.

Assessment of student performance is by sessional examinations, class tests, seminar papers and a research thesis.

It should be noted that the course extends over two calendar years and not just four academic sessions with vacation breaks.

Year 1

PSYC7000	Research and Evaluation Methods
PSYC7001	Psychological Assessment 1
PSYC7002	Psychological Assessment 2
PSYC7003	Graduate Colloquium[+]
PSYC7203	Theory and Research in Psychopathology
PSYC7204	Child Clinical Psychology
PSYC7209	Developmental Disabilities
PSYC7210	Human Neuropsychology
PSYC7212	Experimental Clinical Psychology 1
PSYC7213	Experimental Clinical Psychology 2
PSYC7216	Professional Practice (Clinical) 1
PSYC7217	Professional Practice (Clinical) 2

[+] *PSYC7221 Special Topics offered occasionally as a substitute for Graduate Colloquium.*

Year 2

PSYC7004	Profesional and Ethical Issues
PSYC7206	Research Thesis (Clinical)*
PSYC7214	Experimental Clinical Psychology 3
PSYC7215	Experimental Clinical Psychology 4
PSYC7218	Professional Practice (Clinical) 3
PSYC7219	Professional Practice (Clinical) 4
PSYC7220	Health Psychology

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.

Department of Biotechnology

Biotechnology Degree Course

The Department also offers a formal graduate course at the Masters degree Level (Master of Applied Science in Biotechnology). 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 Higher 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.

To qualify for the degree students must satisfy the examiners in the prescribed examinations, which include the submission and assessment of a report on the specified project.

8042
Biotechnology Degree Course
Full-time or Part-time

Master of Applied Science
MAppSc

See Applied Science Handbook.

Faculty of Science

Facilities are available in each of the schools for research leading to the award of the higher degrees of Master of Science and Doctor of Philosophy.

The following formal courses leading to graduate awards are also offered:

School of Chemistry: Graduate Diploma in Food and Drug Analysis
School of Mathematics: Graduate Diploma in Physical Oceanography
School of Physics: Graduate Diploma in Physics, Graduate Diploma in Physics Research Techniques
School of Chemistry: Master of Chemistry
School of Mathematics: Master of Mathematics, Master of Statistics
School of Optometry: Master of Optometry

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: A/Prof G Crank

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 Mathematics

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.

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 credits for completion, consists of a major project OCEA5115 worth 72 credits of the total accreditation for the program, the remaining 68 being comprised as indicated below.

1. Compulsory Subjects		C
OCEA5115	Experimental Project	72
OCEA5125	Geophysical Fluid Dynamics	15
OCEA5135	Instrumentation	6
OCEA5145	Applied Data Analysis	15

2. Elective Subjects		C
GEOG9290	Image Analysis in Remote Sensing	12
GMAT9606	Microwave Remote Sensing	12
CIVL9835	Coastal Engineering	12
CIVL9836	Coastal Engineering	12
CIVL9863	Estuarine Hydraulics	12
GEOG9150	Remote Sensing Applications	12
OCEA5155	Theoretical Project	32
MATH5285	Ocean Modelling	15

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 840 hours.

School of Physics

5515
Physics Graduate Diploma Course
Full-time or Part-time

Graduate Diploma in Physics
GradDipPhys

Staff Contact: A/Prof GJ Bowden

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 Committee. The course involves two sessions full-time study or four sessions part-time study comprising a total of at least 140 hours of lectures, plus a single research project over the period of study or two different research projects, one in each half of the period of study. The total number of Postgraduate Assessable Hours (PAH) is estimated to be 840 hours. 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: A/Prof GJ Bowden

The Graduate Diploma in Physics Research Techniques offers an advanced training program for graduates from overseas universities who wish to obtain specialized training in research techniques in physics. The Diploma would not normally provide sufficient qualification for direct entry to a higher degree program but could do so if a special choice of study were chosen by a suitably qualified student. The course involves two sessions full-time study or four sessions part-time study comprising (for full-time enrolment) approximately 14 class contact hours per week at Level III/IV, averaged over two sessions, plus a research project and a literature review. The total number of Postgraduate Assessable Hours (PAH) is estimated to be 840 hours. 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.

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 wokstation 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 (3 credit)   C

ANCE8001	Computational Mathematics	3
ANCE8002	Supercomputing Techniques	3
ANCE8003	Project (M Computational Sc Degree)	

2. Generic Computational Subjects (3 credit)   C

ANCE8101	Graphical Interfaces and Scientific Visualization Techniques	3
ANCE8102	Mesh Generation	3
ANCE8103	Fundamental Applied Computation	3
ANCE8104	Advanced Computational Algorithms	3
ANCE9105	Computational Techniques for Fluid Dynamics	3
ANCE8205	Computational Models for Coastal and Inland Waters	3
ANCE8207	Advanced Computational Science	3
ANCE8208	Physics and Modelling of the Atmospheric Boundary Layer	3
MATH5435	Applied Algebraic Computation	

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: Prof 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, 24 credit points, as follows:

I) The two core subjects (ANCE8001, ANCE8002, above)

II) One genereic 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 9 credits. Entry will be competitive and based on the student's record. Trasfer 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 DB Hibbert
Director of Graduate Studies: A/Prof G Crank (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 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 160 hours. An additional 392 hours is spent by students in formal laboratory work.

Research project

A short research project undertaken over approximately 4 months full-time (400 hours laboratory work) is selected in relation to the combined interests of the student and the supervisor.

School of Mathematics

Head of School: Professor C Sutherland
Director of Graduate Studies: A/Prof W Ricker

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 honours graduates in pure or applied mathematics, 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 two of these courses graduate courses offered either within or 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 two years of full-time or four 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 a maximum of half the course. The conditions for the award of the degree are set out elsewhere in this handbook.

The academic requirement for the degree is 240 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)

MATH5815	Experimental Design 1
MATH5835	Stochastic Processes
MATH5855	Multivariate Analysis 1
MATH5905	Statistical Inference
MATH5925	Project (60 Credit Points)
MATH5935	Statistical Consulting (24 Credit Points)

Elective Subjects (offered every second year)

MATH5806	Applied Regression Analysis
MATH5816	Mathematics of Security Markets 2 (*Prerequisite:* MATH5965)
MATH5825	Experimental Design 2 (*Prerequisite:* MATH5815)
MATH5845	Time Series
MATH5865	Multivariate Analysis 2
MATH5875	Sample Survey Design
MATH5885	Sequential Analysis
MATH5895	Non-Parametric 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	Econometrics B
MATH3161	Optimisation Methods
MATH3181	Optimal Control
MNGT0331	Business Forecasting
MNGT0332	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 three 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 1996)
OPTM8003	Behavioural Optometry
OPTM8004	Advanced Contact Lens Studies
OPTM8005	Advanced Contact Lens Practice (Not offered in 1996)
OPTM8006	Occupational Optometry (Not offered in 1996)
OPTM8007	Clinical Photography (Not offered in 1996)
OPTM8008	Project
OPTM8009	Ocular Therapy (Not offered in 1996)
OPTM8010	Public Health Optometry (Not offered in 1996)
OPTM8011	Advanced Studies in Ocular Disease (Not offered in 1996)
OPTM8012	Visual Neuroscience
OPTM8014	Human Visual Development (0.5 unit subject) (Not offered in 1996)

Centre for Advanced Numerical Computation in Engineering and Science

8790
Master of Computational Science

Staff Contact: Prof 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, 30 credits, as follows:

I) The two core subjects (ANCE8001, ANCE8002, 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) Twelve credit project supervised by academic members of the Centre and/or the Faculty of Science.

Graduate 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

ANAT5151
Introductory Functional Anatomy
Staff Contact: Head of School

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.

ANAT6411
Neuroanatomy
Staff Contact: Head of School
S1 HPW6
Prerequisites: ANAT2211, ANAT2111
Note/s: This subject is identical in content as ANAT3411 Neuroanatomy 1 and is offered jointly with that subject.

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.

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
S2 L2 T4
CP15

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 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 BIOS4013 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 BIOS4023 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 BIOS4033 Zoology Honours but designed specifically for students who cannot regularly attend the University.

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

BIOT3011
Biotechnology A
Staff Contact: Prof N Dunn
S1 L3 T3
Prerequisite: BIOC2312

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; scale-up of microbial processes; air and media sterilization; the harvesting, purification and standardization 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, laboratory-scale fermenter operation, microbial enzyme isolation, visits to industrial fermentation plants and industrial seminars.

BIOT3021
Biotechnology B
Staff Contact: Prof P Rogers
S2 L2 T4
Prerequisite: BIOT3011

Application of principles of biotechnology to the analysis and design of microbial processes of industrial relevance (antibiotics, microbial enzymes, single cell protein from carbohydrates and hydrocarbons, fermented foods and beverages, amino acids and vitamins, microbial polysaccharides, activated sludge and photosynthetic processes for waste treatment, microbial leaching of lowgrade minerals). Emphasis on quantitative approach: mass and heat balance calculations, kinetic and thermodynamic analysis, detailed equipment design and specification, process design and layout, process simulation, plant location, application of optimization 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, and a design project.

BIOT3031
Microbial Genetics
Staff Contact: Dr S Delaney
S1 L2 T4
Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2201
Note/s: Excluded MICR3021.

This unit is suitable for students majoring in Microbiology, Biochemistry, Biotechnology or Genetics. It deals with major aspects of the genetics of bacteriophage, bacteria and yeast. Topics include plasmids and transposible genetic elements, gene transfer, mutagenesis and DNA repair, mutants, bacteriophage genetics, gene cloning (vectors, recombinant DNA techniques) and genetics of nitrogen fixation.

BIOT3061
Monoclonal Antibody and Genetic Techniques in Biotechnology
Staff Contact: Dr S Mahler
S2 L2 T4
Prerequisite: BIOC2312

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.

BIOT5013
Practical Biotechnology
Staff Contact: Department Office
F T6

Illustration, demonstration and operation of laboratory-scale and pilot-scale equipment. Visits to appropriate industries. Experimental project or critical review.

BIOT7043
Biotechnology Project (Major)
Staff Contact: Department Office
F T8

An experimental or technical investigation or design project in the general field of biotechnology.

BIOT7051
Applied Genetics
Staff Contact: Prof N Dunn
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.

BIOT7061
Peptide and Protein Technology
Staff Contact: Dr S Mahler
S2 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
S2 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, signle 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 Madgwick
S1 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, cellulosics, aromatics, hydrocarbons and waste-water treatment. Students present research reviews and conduct experimental projects.

BIOT7091
Applied Cellular Physiology
Staff Contact: Department Office
S1 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
S1 or S2 T3

BIOT7020
Reading List in Biotechnology (Biochemistry)
Staff Contact: Prof N Dunn
S1 or S2 T3

BIOT7100
Biological Principles
Staff Contact: Dr S Delaney
S1 L3

A study of the characteristics of living systems. Biological molecules: carbohydrates, lipids, proteins and nucleic acids. Cell structure and function: prokaryotic and eukaryotic cells. Basic biochemistry: thermodynamics and catalysis of metabolism; catabolic and anabolic processes; properties of enzymes; DNA replication; protein synthesis. Comparative metabolism of viruses, bacteria, fungi, plants and animals. Metabolic regulation. Modes of nutrition and nutrient cycles. Reproduction and genetics: eukaryotic and prokaryotic systems; sexual and asexual reproduction; bacterial genetics; recombinant DNA technology. Basic plant biology; plant structure and function; transport. Invertebrate zoology, evolution and animal behaviour. Microorganisms of commercial significance. Biodeterioration and biodegradation.

BIOT7110
Bioengineering Principles
Staff Contact: Department Office
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: Department Office
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
F T2

Chemistry

CHEM7115
Treatment of Analytical Data
Staff Contact: Professor DB Hibbert
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
Staff Contact: A/Prof G Crank
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
Staff Contact: A/Prof G Crank
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, immunoaffinity chromatography, immunoassays, radioimmunoassays, ELISA, HPLC using special phases, chival 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
Staff Contact: A/Prof G Crank
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
Staff Contact: A/Prof G Crank
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
Staff Contact: A/Prof G Crank

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
Staff Contact: School Office
C3 SS HPW3

Contents to be advised

Computational Science

ANCE8001
Computational Mathematics
Staff Contact: CANCES
CP3 S1 HPW3

Discretization, linear algebra, ODE and PDE solvers, appropriate for contemporary computational engineering and scientific applications.

ANCE8002
Supercomputing Techniques
Staff Contact: CANCES
CP3 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
CP12

Case study experience to give the student practice in applying the techniques learnt in specific subjects towards solving or computationally analyzing practical problems.

ANCE8101
Graphical Interfaces and Scientific Visualization Techniques
CP3 SS HPW3

Case study usage of typical graphics systems and packages. Introduction to advanced data manipulation and presentation: videos, physical process evolution. Usage for error assessment. Relationship to post-processing.

ANCE8102
Mesh Generation
Staff Contact: CANCES
CP3 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
CP3 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
CP3 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
CP3 SS HPW3

General and specific computational techniques for fluid flow behaviour occurring in industrial, geophysical and chemical processes etc.

ANCE8205
Computational Models for Coastal and Inland Waters
Staff Contact: CANCES
CP3 SS HPW3

Computational methods for coastal/lake/river modelling. Transport of pollutants and nutrients. Procedures for modelling small-scale environmental flows.

ANCE8207
Advanced Computational Science
Staff Contact: CANCES
CP3 SS HPW3

Special topics taught by visitors or UNSW staff.

ANCE8208
Physics and Modelling of the Atmospheric Boundary Layer
CP3 SS HPW3

Theory of boundary layer flows; numerical modelling of turbulence and flow over complex terrain; Boundary layer parameterisation; dispersion of pollutants and particulates.

Marine Science

MSCI5001
Marine Environmental Monitoring and Assessment
Staff Contact: Director, Centre for Marine Science
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 Science
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 Science
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 Science
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 Science
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 Science
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 Science
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 Science
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.

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
Continous 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
Albegraic 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.

MATH5835
Stochastic Processes
Staff Contact: School of Mathematics Office
CP12

Discrete and continuous time stochastic processes, trajectories, expected values and covariance functions. Discrete time martingales, random walks, optional stopping theorem, ruin problem. Poisson processes, Markov property, independent increments, waiting times, renewals, Gaussian processes, elementary properties, Brownian motion, barrier crossing problem, reflection principle.

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
Non-Parametric 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
CP60

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
CP24

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
Prerequisite: MATH5955
CP12

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
Prerequisite: MATH5815
CP12

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.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following see the Faculty of Engineering Handbook.

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

CMED8201
Population Genetics
Staff Contact: Dr A Stark
U2 S1 HPW5
Prerequisite: One unit of statistical methods, or theory, as approved by the Head of School

The genetic structure of populations: genetic relationships, mating systems (random and assortative mating, inbreeding, sexual selection), finite populations, systematic forces (selection, mutation, migration), genetic distance between populations, genetic load, stable populations, molecular population genetics, evolutionary trees; computer methods.

CMED8202
Human Genetic Analysis
Staff Contact: Dr A Stark
U2 S2 HPW5
Prerequisites: One unit of genetics and one unit of statistical methods, or theory, as approved by the Head of School

Principles and methods of human genetics: design of surveys; estimation and applications of genic and genotypic frequencies, selective values, mutation and migration rates, coefficients of kinship, inbreeding and assortative mating, recombination fractions and heritabilities; segregation analysis; risks of recurrence of disease; consequences of human intervention; computer methods.

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 HPW 4

Clinical work on selected patients, with special emphasis on advanced techniques and new developments. Optometric examination procedures, including: external and internal examination of the eyes; visual functions; tonometry; objective optometry; evaluation of binocular functions; aniseikonia; sub-normal vision; geriatric and pediatric optometry; the clinical application of electrophysiological techniques. Assessment of new instruments, methods and treatment.

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 the PCO; travel and accommodation costs are to be met by the candidate.

OPTM8002
Physiological Optics (Not offered in 1996)
CP30 HPW4

Advanced pathophysiology of the anterior eye; physiology and pharmacology of the intraocular pressure. Physiology of the corneal epithelium, edothelium, 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 HPW4

An integrated subject, in which binocular vision and pleorthoptics 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 HPW4

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 (Not offered in 1996)
CP30 HPW4

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 (Not offered in 1996)
CP30 HPW4

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 (Not offered in 1996)
CP30 HPW4

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-mydriatic 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 HPW8

An investigation into some aspect of Optometry or Visual Science.

OPTM8009
Ocular Therapy (Not offered in 1996)
CP30 HPW4

Pharmacology and clinical pharmacy, anterior segment disease, glaucoma systemic/medical considerations in eye care CPR in emergencies, advanced diagnostic techniques.

OPTM8010
Public Health Optometry (Not offered in 1996)
CP30 HPW4

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
(Not offered in 1996)
CP30 HPW4

Ocular diseases, systemic diseases and their ocular manifestations, tutorials and seminars in which the students will prepare and present detailed information on aetiology, epidemiology, signs, symptoms, clinical manifestations, pathology, mechanisms and management of ocular conditions.

OPTM8012
Visual Neuroscience
CP30 HPW4

Visual development, neural plasticity and critical periods. Non-visual influences on visual function. Visual neuropharmacology. 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 (Not offered in 1996)
CP30 HPW4

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 GJ Bowden.

PHYS7611
Computational Physics
Staff Contact: School Office
SS HPW3

Contents to be advised.

PHYS9183
Methods of Theoretical Physics
Note/s: For PhD degree, MSc and GradDip students.

Response functions and Green's functions. Symmetry and group theory. Many particle systems. Tensor calculus and variational techniques.

PHYS9283
Methods of Experimental Physics
Note/s: For PhD degree, MSc and GradDip students.

Signal processing and retrieval. Resonance spectroscopy techniques. Diffraction and scattering techniques. Electron microscopy.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Architecture handbook.

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: A/Prof J Taplin
CP120F

Refer to the School of Psychology for details.

PSYC7000
Research and Evaluation Methods
Staff Contact: Dr K Bird
CP15 S1 HPW2

Problems of experimental design in clinical and applied fields; measurement and scaling; analysis of change, including sequential analysis, and the application of the experimental methods to the individual cases. Design and evaluation of programs.

PSYC7001
Psychological Assessment 1
Staff Contact: Dr S McDonald
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 IIIR, assessment interviewing, assessment of intellectual functioning, test access and use and computerised testing, neuro-psychological 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 S1 HPW2
Corequisite: PSYC7001

The application of the principles of experimental psychology to problems of behavioural assessment in a wide variety of situations, eg organisational behaviour; lifestyle change; the management of behavioural disorders; institutional behavioural programs. Assessment procedures studied include: psychological tests, behavioural analysis and case history taking, psycho- physiological and other objective measures.

PSYC7003
Graduate Colloquium
Staff Contact: School Office
CP15 F HPW1
Note/s: 1. Excluded PSYC7221. 2. PSYC7221 offered occasionally and may be substituted for PSYC7003 by students enrolled in Course 8251.

Participation in the staff graduate student colloquium.

PSYC7004
Professional and Ethical Issues
Staff Contact: A/Prof S Bochner
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
Industrial and Organisational Psychology 1
Staff Contact: A/Prof S Bochner
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 areas such 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
Industrial and Organisational Psychology 2
Staff Contact: Dr S Schneider
CP15 S2 HPW2
Prerequisite: PSYC7100

An advanced examination of some topics covered in PSYC7100 Industrial and Organisational Psychology 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.

PSYC7104
Applied Cognitive Psychology
Staff Contact: Dr J Bright
CP15 S2 HPW2

Cognitive factors that limit our ability to process information, methods used to cope with these limitations, and the implications for such practical areas as training and artificial intelligence. Topics include memory, reasoning and problem solving, and performance on motor tasks.

PSYC7105
Professional Practice (Applied)
Staff Contact: A/Prof S Bochner
CP30 F
Note/s: 680 hours (340 hours in each of years 1 and 2 of the course).

The application of theoretical aspects covered in the course to a variety of situations. Supervised work experience in a variety of settings together with a weekly meeting to allow systematic discussion of relevant professional, ethical and legal issues.

PSYC7106
Graduate Colloquium (Applied)
Staff Contact: School Office
CP15 F HPW1

Participation in the staff graduate student colloquium.

PSYC7108
Research Thesis (Applied)
Staff Contact: A/Prof S Bochner
CP90 F

Research thesis involving an investigation into some aspect of applied psychology.

PSYC7109
Principles of Ergonomics
Staff Contact: Dr A Adams
CP15 S1 HPW3

Selected topics within the area of ergonomics drawn from anthropometrics and biomechanics; the design of displays and controls, including visual display units, keyboards, and workstations; work physiology and energy expenditure, fatigue and its measurement; the sources and control of stress at the workplace; social and equipment related workplace design problems; the effects on human performance of environmental stressors such as noise, heat, cold and sleep loss (including shiftwork).

PSYC7111
Cross-Cultural Perspectives in Applied Psychology
Staff Contact: A/Prof S Bochner
CP15 S2 HPW2

General issues in cross-cultural psychology; problems of conducting research in more than one cultural setting. Cross cultural organisational psychology including a comparative analysis of production systems. Culture training and orientation including programs aimed at preparing managers to become culturally mediating persons.

PSYC7112
Vocational Psychology
CP15 HPW2
Note/s: Not offered in 1996

Individual career counselling, decision making and work adjustment throughout life, traditional and computerised approaches to occupational information and psychological testing; staff development; relationships between work, leisure, retirement and unemployment. Vocational problems of groups such as minorities and those with disabilities.

PSYC7113
Special Topic
Staff Contact: A/Prof S Bochner
CP15 S1 or S2 HPW2

An occasional elective dealing with applications of some special field of psychology.

PSYC7114
Graduate and Applied Seminars
Staff Contact: A/Prof S Bochner
CP7.5 S1 or S2 HPW1

A weekly seminar during which academic staff, graduate students and visitors from other institutions make presentations about the work they are doing.

PSYC7203
Theory and Research in Psychopathology
Staff Contact: Dr P Lovibond
CP15 S1 HPW2

An illustration of theoretical principles and experimental strategies in research investigating the processes and mechanisms underlying psychological disturbance. Topics include the relationship between genetic and environmental factors in aetiology, the integration of laboratory and clinical evidence, and the status of biological, behavioural and cognitive theories of dysfunction.

PSYC7204
Child Clinical Psychology
Staff Contact: Dr P Lovibond
CP15 S2 HPW3

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: Prof K McConkey
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 S1 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 aphasias.

PSYC7212
Experimental Clinical Psychology 1
Staff Contact: Dr R Bryant
CP15 S1 HPW4

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: Dr J Henry
CP15 S2 HPW4
Prerequisite: PSYC7212

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, pain, and eating disorders.

PSYC7214
Experimental Clinical Psychology 3
Staff Contact: Dr R Bryant
CP15 S1 HPW2
Prerequisite: PSYC7213

The assessment and management of schizophrenia, post-traumatic stress disorders, personality disorders and impulse control disorders.

PSYC7215
Experimental Clinical Psychology 4
Staff Contact: Dr J Henry
CP15 S2 HPWE2
Prerequisite: PSYC7214

An examination of specialised areas of clinical practice, including psychogeriatrics, marital therapy, sexual disorders, rehabilitation and dissociative disorders.

PSYC 7216
Professional Practice (Clinical) 1
Staff Contact: Dr R Bryant
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 School Clinic (80 hours for session).

PSYC7218
Professional Practice (Clinical) 3
Staff Contact: Dr R Bryant
CP15 S1
Prerequisite: PSYC7217
Note/s: 1. Students much complete three field placements, one must be at least 40 days while the other two are completed in at least 20 days.

Attendance at weekly clinical meetings (1 hour), supervised work with clients in the School Clinic and either a 40 day or two 20 day field placements (340 hours for session).

PSYC7219
Professional Practice (Clinical) 4
Staff Contact: Dr J Henry
CP15 S2
Prerequisite: PSYC7218
Note/s: 1. Students must complete three field placements, one must be at least 40 days while the other two are completed in at least 20 days.

Attendance at weekly clinical meetings (1 hour), supervised work in the School Clinic and either a 40 day or two 20 day field placements (340 hours for session).

PSYC7220
Health Psychology
Staff Contact: Dr P Birrell
CP15 S2 HPW3
Prerequisite: PSYC7213

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.

PSYC7221
Special Topics
Staff Contact: School Office
CP15 HPW2
Note/s: 1. Excluded PSYC7003. 2. To be offered occasionally and may be substituted for PSYC7003 by students enrolled in Course 8251. 3. Not offered in 1996.

An examination of special issues and topics in clinical psychology that relate to particular interests and expertise of staff and/or particular events occurring in clinical psychology nationally and internationally.

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 full 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 details 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	Professional Studies
Doctor of Juridicial Science	SJD	Law
Doctor of Medicine	MD	Medicine
Doctor of Philosophy	PhD	Calendar and all handbooks
Master of Applied Science	MAppSc	Applied Science
Master of Architecture	MArch	Built Environment
Master of Archives Administration	MArchivAdmin	Professional Studies
Master of Art	MArt	College of Fine Arts
Master of Art Administration	MArtAdmin	College of Fine Arts
Master of Art Education	MArtEd	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

Title	Abbreviation	Calendar/Handbook
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	Professional Studies
Master of Defence Studies	MDefStud	University College
Master of Design(Honours)	MDes(Hons)	College of Fine Arts
Master of Education	MEd	Professional Studies
Master of Education in Creative Arts	MEdCA	Professional Studies
Master of Education in Teaching	MEdTeach	Professional Studies
Master of Educational Administration	MEdAdmin	Professional Studies
Master of Engineering	ME	Applied Science Engineering University College
Master of Engineering *without supervision*	ME	Applied Science Engineering
Master of Engineering Science	MEngSc	Engineering Applied Science University College
Master of Environmental Engineering Science	MEnvEngSc	Engineering
Master of Environmental Studies	MEnvStudies	Applied Science
Master of Equity & Social Administration	MEqSocAdmin	Professional Studies
Master of Fine Arts	MFA	College of Fine Arts
Master of Health Administration	MHA	Professional Studies
Master of Health Personnel Education	MHPEd	Medicine
Master of Health Planning	MHP	Professional Studies
Master of Higher Education	MHEd	Professional Studies
Master of Industrial Design	MID	Built Environment
Master of Information Management	MIM	Professional Studies
Master of Information Science	MInfSc	Engineering
Master of International Social Development	MIntSocDev	Professional Studies
Master of Medicine	MMed	Medicine
Master of Landscape Architecture	MLArch	Built Environment
Master of Landscape Planning	MLP	Built Environment
Master of Laws	LLM	Law
Master of Librarianship	MLib	Professional Studies
Master of Management Economics	MMgtEc	University College
Master of Mathematics	MMath	Science*
Master of Medicine	MMed	Medicine
Master of Mining Management	MMinMgmt	Applied Science
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 Professional Studies
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

Title	Abbreviation	Calendar/Handbook
Master of Real Property	MRProp	Built Environment
Master of Safety Science	MSafetySc	Applied Science
Master of Science	MSc	Applied Science
		Built Environment
		Engineering
		Medicine
		Science*†
		University College
Master of Science *without supervision*	MSc	Applied Science
		Built Environment
		Engineering
Master of Science (IndDes)	MSc(IndDes)	Built Environment
Master of Social Work	MSW	Professional Studies
Master of Sports Science	MSpSc	Professional Studies
Master of Sports Medicine	MSpMed	Medicine
Master of Statistics	MStats	Science*
Master of Surgery	MS	Medicine
Master of Taxation	MTax	ATAX
Master of Town Planning	MTP	Built Environment
Master of Urban Development and Design	MUDD	Built Environment

Graduate Diplomas

Graduate Diploma	GradDip	AGSM
		Applied Science
		Architecture
		Arts and Social Sciences
		Commerce and Economics
		Engineering
		Medicine
		Professional Studies
		Science*†
	GradDipArts	Arts and Social Sciences
	GradDipC/F Therapy	Professional Studies
	GradDipClinEd	Medicine
	GradDipCommPaed	Medicine
	GradDipEq&SocAdmin	Professional Studies
	GradDipHEd	Professional Studies
	GradDipHPEd	Medicine
	GradDipIndMgt	Engineering
	GradDipIntSocDev	Professional Studies
	GradDipMus	Arts and Social Sciences
	GradDipPaed	Medicine
	GradDipSpMed	Medicine
	DipEd	Professional Studies
	GradDipIM-Archiv/Rec	Professional Studies
	GradDipIM-Lib	Professional Studies
	DipFDA	Science*

Graduate Certificates

	GradCertArts	Arts and Social Sciences
	GradCertHealthAdmin	Professional Studies
	GradCertHEd	Professional Studies
	GradCertMus	Arts and Social Sciences

Faculty of Science.
†Faculty of Biological and Behavioural 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 organization 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.

* '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.

(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)i t 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 reexamination.

(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 at the further work 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 further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the results of any further work, 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 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.

Master of Chemistry (MChem), Master of Mathematics (MMath) and Master of Physics (MPhysics)

1. The degree of Master of Chemistry or Master of Mathematics 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 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 (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 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 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 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 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 Mathematics (MMath) Master of Physics (MPhysics)

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 (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 prescribe, before permitting enrolment.

Enrolment and Progression

3.(1) An application to enrol as a candidte 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 Biological and Behavioural 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 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 (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 four academic sessions from the date of enrolment in the case of a full-time candidate or eight 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 two sessions for a full-time candidate and four sessions for 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.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Diploma (GradDip 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 and prizes listed below are available to students whose courses are listed in this book. Each faculty handbook contains in its Scholarships and Prizes section the scholarships and prizes available with that faculty. The **General Information** section of the Calendar contains a comprehensive list of scholarships and prizes offered throughout the University. Applicants should note that the awards and conditions are subject to review.

Key: **V**   Value   **T**   Year/s of Tenure   **C**   Condition

Scholarships

Undergraduate Scholarships

Provided below is an outline of undergraduate scholarships. Students should check the scholarships listed in the General Section and those listed for their Faculty. Students should also consult the Scholarship information for related Faculties. Applicants should note that the awards, conditions and particularly closing dates may vary from year to year.

Unless otherwise indicated application forms and further information are available from the Student Centre (lower Ground Floor, Chancellery) and applications should by submitted by 31 January each year. Applications normally become available four to six weeks before the closing date. Scholarship information is regularly included in the University publication 'Uniken/Focus'.

Students investigating study opportunities overseas should consult Study Abroad which is published by UNESCO and is available in the University library. The UNSW International Student Centre can provide information about exchange programs (see the 'Go Away Travel Scholarship' included in the General section below).

The British Council (tel 02 3262365) may be of assistance for information about study in Britain. The Australian American Education Foundation (tel 06 2479331) can provide information about study in America. Information may also be obtained from the embassy or consulate of the country in which study is proposed and the proposed overseas institution.

Details of overseas awards and exchanges administered by the Department of Employment, Education and Training can be obtained from the Awards and Exchanges Section, Department of Employment, Education and Training, PO Box 826, Woden, ACT 2606.

General

Alumni Association

V   Up to $1500 pa

T   1 year with the possibility of renewal

C   Available to students enrolled in any year of a full-time course. Candidates must be the children or grandchildren of Alumni of the University of New South Wales and may be either permanent residents of Australia or international students. Applications close 13 January.

Apex Foundation for Research into Intellectual Disability Studentships

V $1000 paid in a lump sum.

C   Applicant should be 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 by 31 May.

Australian Development Co-operation Scholarship (ADCOS)

V Tuition fees. Some students may be eligible for airfares and a stipend.

T Determined by normal course duration

C This award is for international students from selected countries only. Information should be obtained from the Australian Education Centre or Diplomatic Post in the home country. Conditions and entitlements vary depending on the home country. The closing date is normally early in the year before the year of study.

Australian Vietnam Veterans Trust Education Assistance Scheme

V $3,500 pa for the duration of the course.

C Applicant must be a child 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 Trust's Regional Offices in each state capital. Applications close 31 October.

General Accident Australian Bicentennial St Andrews Scholarship

V £4840 (Stg)

T Approximately 12 months

C Applicants should be Australian citizens who are proceding to Honours in Economics, History, Philosophy, Economic and Social History or Social Anthropology. The awards are for study at St Andrews, United Kingdom. Applications close 12 November.

Girls Realm Guild

V Up to $1500 pa

T 1 year with the prospect of renewal subject to satisfactory progress and continued demonstration of need

C Available only to female students under 35 years of age who are permanent residents of Australia enrolling in any year of a full-time undergraduate course. Selection is based on academic merit and financial need

Go-Away Travel Scholarships

V Up to $1500 pa

T 1 year

C 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 for credit overseas. Awards will be granted on the basis of academic merit. Interested students should contact the International Student Centre.

Grains Research and Development Corporation (GRDC) Undergraduate Honours Scholarship

V $6000 (ie $5000 to the student and $1000 to the host School/Department).

T 1 year

C Applicants must be undertaking a full-time Honours program. Study in an area of significance to the grains industry will be viewed favourably. Written applications including a curriculum-vitae, academic record, letter of support from the Head of School/Department and 2 referees' supporting statements should be sent to GRDC Undergraduate Honours Scholarship, PO Box E6, Queen Victoria Terrace, Canberra ACT 2600 (tel 06 2725528). Applications close 25 November.

Great Barrier Reef Marine Park Authority Research Support

V $1500

C 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 16 December.

Mitsui Education Foundation Scholarship

C 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 20-24 and preferably in their third or fourth year. The successful student will travel to Japan during November and December. Applications become available in July and close mid-August with the Scholarship Unit.

National Health and Medical Research Council (NH&MRC) Aboriginal Health Researh Scholarships

V $22,250

T Up to 3 years

C Applicants may be undertaking an undergraduate degree in order to pursue research relevant to Aboriginal health. Applications close 24 July with the Scholarship Unit.

Pig Research and Development Corporation (PRDC) Undergraduate Encouragement Award

V $600 lump sum.

C Applicants must be in the later stage of an undergraduate degree and interested in undertaking a research project related to the Australian pig industry. Applications close 3 times a year (ie 1 March, 1 July, 1 October) with the PRDC, PO Box 4804, Kingston ACT 2604.

River Basin Management Society Ernest Jackson Memorial Research Grants

V Up to $2000

C To assist tertiary students undertaking research in the field of River Basin Management. Applications close with the Research Grants Co-ordinator, PO Box 68, Clifton Hill VIC 3068 on 11 August.

RSPCA Alan White Scholarship

V $2500

C Applicants should be undertaking original research to improve the understanding and welfare of animals. Written applications should be sent to the Executive Officer, RSPCA Australia, PO Box E369, Queen Victoria Terrace, Canberra ACT 2600 (tel 06 2311437) by 31 March.

Sam Cracknell Memorial

V Up to $1500 pa

T 1 year

C 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 7 March.

Sporting Scholarships

V $2000 pa

T 1 year with possibility of renewal

C 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. Apply directly to Sport and Recreation Section, UNSW, Sydney 2052 (tel 385 4878).

The STA Travel Grant

V Up to $3000

C 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 30 April each year.

University Honours Year Scholarships

V $1000

T 1 year

C A number of scholarships will be awarded on the basis of academic merit for students entering an 'add-on' honours year, that is 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 with the Scholarship Unit on 30 November.

W.S. and L.B. Robinson

V Up to $6500 pa

T 1 year renewable for the duration of the course subject to satisfactory progress

C Available only to students who completed their schooling in Broken Hill or whose parents reside in Broken Hill and undertaking a course related to the mining industry. Includes courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering and science. Apply directly to PO Box 460, Broken Hill, NSW 2880. Applications close 30 September each year.

Biological and Behavioural Sciences

Faculty of Biological and Behavioural Sciences Scholarships

V Up to $3000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress.

C A number of scholarships are available and carry the title of Faculty Scholar. Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Biological and Behavioural Sciences

Graduate Scholarships

Provided below is an outline of Graduate Scholarships. Students should check the scholarships listed in the General Section and those listed for their Faculty. Students should also consult the Scholarship information for related Faculties. Applicants should note that the awards, conditions and particularly closing dates may vary from year to year.

Unless otherwise indicated application forms and further information are available from the Student Centre (lower Ground Floor, Chancellery). Applications normally become available four to six weeks before the closing date.

Scholarship information is regularly included in the University publication 'Uniken/Focus'.

Students investigating study opportunities overseas should consult Study Abroad which is published by UNESCO and is available in the University library. The British Council (tel 02 3262365) may be of assistance for information about study in Britain. The Australian American Education Foundation (tel 06 2479331) can provide information about study in America. Information may also be obtained from the embassy or consulate of the country in which study is proposed and the proposed overseas institution.

Details of overseas awards and exchanges administered by the Department of Employment, Education and Training can be obtained from the Awards and Exchanges Section, Department of Employment, Education and Training, PO Box 826, Woden, ACT 2606.

General

The main programs of assistance for postgraduate study are:

Australian Postgraduate Awards (APA)

V $14,961 (1995 rate). Other allowances may also be paid.

T Up to 2 years for a Masters, 3 years for a PhD degree. PhD students may request in certain circumstances up to 6 months extension.

C Applicants must be honours graduates or equivalent or scholars who will graduate in current academic year and proposing to undertake a Masters by Research or PhD. Applicants must be Permanent Residents who have lived continuously in Australia for 12 months or Australian citizens. Applications to Scholarship Unit by 31 October.

Australian Development Co-operation Scholarship (ADCOS)

V Tuition fees. Some students may be eligible for air fares and a stipend.

T Determined by normal course duration

C This award is for international students from selected countries only. Information should be obtained from Australian Diplomatic Posts or Australian Education Centres in the home country. Conditions and entitlements vary depending on the home country.

Overseas Postgraduate Research Scholarships (OPRS)

V Tuition fees and medical cover only.

T 2 years for a Masters and 3 years for a PhD degree

C Eligibility is confined to postgraduate research students who are citizens of countries other than Australia or New Zealand. Applications to the Scholarship Unit by 30 September

Other General Scholarships:

Australian Bicentennial Scholarships and Fellowships Scheme

V £4000 (Stg)

T At least 3 months

C Applicant must be enrolled as a postgraduate student at an Australian higher education institution and usually resident in Australia. Awards are available for study in the UK in any discipline. Applications close with the Executive Director, Australian Vice-Chancellors' Committee, GPO Box 1142, Canberra ACT 2601 on 31 October.

Australian Brewers Foundation Alcohol Related Medical Research Postgraduate Scholarships

V Similar to the NH&MRC (see NH&MRC entry under General).

T 2 years

C Similar to the NH&MRC. Applications and further information may be obtained from the Secretary, ABF - Medical Research Advisory Committee, Level 8, 235 Pyrmont Street, Pyrmont 2008 (tel 552668).

Australian Geographical Survey Organisation (AGSO) Postgraduate Awards in Geosciences

V $20,323 plus allowances

T Up to 3 years

C Applicants must be enrolled or enrolling in a full-time PhD. Applicants must be permanent residents with 12 months continuous residency in Australia or Australian citizens. Applications which include a curriculum-vitae should be sent to the Postgraduate Scholarship Co-ordinator, Human Resources Services, AGSO, GPO Box 378, Canberra ACT 2601 (tel 06 2499673). Applications close 11 August.

Cambridge Australia Scholarships Including the Packer Scholarships

V Fees and maintenance allowance of £5340 (Stg), return air travel to the UK.

T Up to 3 years

C Applicants must be Australian citizens who graduated with honours 1 or equivalent, from an Australian University who have gained admission to a PhD at Cambridge. Applicants must also have won a British Overseas Research Student Award. Applicants should request an application for the scholarship at the time of applying for admission to Cambridge. Enquiries can be directed to the Cambridge Commonwealth Trust, Canberra (tel 06 249 7204). Applications close 30 April.

Commonwealth Scholarship and Fellowship Plan (CSFP)

V Varies for each country. Generally covers travel, living, tuition fees, books and equipment, approved medical expenses. Marriage allowance may be payable.

T Usually 2 years, sometimes 3

C Applicants must be graduates who are Australian citizens. Tenable in Commonwealth countries other than Australia. Applications close at different times depending on the country in which the study is proposed.

Federation of University Women

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 Australian Federation of University Women. The NSW Branch Office is located in the Dymocks Building, 428 George Street, Sydney NSW 2000 (tel 232 5629).

Frank Knox Memorial Fellowships

V $US13,500 pa plus tuition fees and student health insurance

T 1 year with the possibility of renewal for a further year.

C Applicants must be Australian citizens, who are graduates or near graduates of an Australian university. Applications close with the Scholarship Unit mid-October.

Fulbright Postgraduate Student Awards

V Up to $A29,250 depending on the type of award.

T 1 year

C Applicants must be enrolled in a higher degree at an Australian institution and wishing to undertake research at an American institution. The research should be related to School-to-Work transition, Visual Arts, Performing Arts, Journalism, Engineering or Business Administration. Awards are also available for Aboriginal and Torres Strait Islander students. Applications and additional information are available from the Honorary Secretary, Fulbright NSW State Selection Committee, Research and Scholarships Office, Sydney University 2006 (tel 02 3514464).

Gowrie Scholarship Trust Fund

V $6000 pa. Under special circumstances this may be increased.

T 2 years. Under special circumstances this may be extended.

C 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. Applications close with the Scholarship Unit by 31 October.

Grains Reseach and Development Corporation (GRDC) Junior Research Fellowship

V $21,000 plus up to $3,000 to the supporting institution, some conference/workshop attendance allowances.

T Up to 3 years

C Applicants must be undertaking full-time research toward a PhD. Applicants must be Australian citizens or entitled to reside permanently in Australia. Applications should be sent to the Junior Research Fellowship, GRDC, PO Box E6, Queen Victoria Terrace, Canberra ACT 2600 (tel 06 2725525) on 25 November.

Great Barrier Reef Marine Park Authority Research Support

V $1000

C Applicants must be enrolled in a full-time PhD or Honours year with a 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 07 7818811). Applications close 16 December.

The Harkness Fellowships

V Travel and other allowances for travel and study in the USA

T 12-21 months

C Candidates must be Australian citizens or have taken steps to achieve citizenship. The candidate will usually have an honours degree or equivalent, or an outstanding record of achievement in creative arts, journalism or other career. The award focuses on health care, education, employment and training schemes and issues which affect the quality of life in cities. Applicants should be over 21 years of age. Applications and further information are available from Mr R Beale, Department of the Prime Minister and Cabinet, 3-5 National Circuit, Barton ACT 2600. Applications close 30 September.

Kobe Steel Scholarship for Postgraduate Study at St Catherine's College, Oxford University

V Maintenance allowance of at least £7,000 (stg) plus tuition fees and dues and travelling expenses to and from Oxford.

T Up to 2 years with the possibility of some extension.

C Applicants must be Australian nationals. Students should have a past or future interest in Japan. Applications close on 31 October with the Australian Vice-Chancellor's Committee (AV-CC), GPO Box 1142, Canberra ACT 2601.

Land and Water Resources Research and Development Corporation (LWRRDC)

V $20,000 pa plus $5,000 for operating expenses

T 2 years for a Masters, 3 years for a PhD degree

C The scholarships are available for research that will lead to better management, sustainable use and conservation of land, water and vegetation resources in Australia. Applications close with the LWRRDC on 28 July. Applications should be forwarded to the LWRRDC, GPO Box 2182, Canberra, ACT (tel 06 2573379).

Menzies Research Scholarship in the Allied Health Sciences

V Up to $24,000 pa

T 2 years

C The scholarship is awarded to stimulate research by persons working in the health field in disciplines other than medicine. Applications close on 25 September with the Menzies Foundation, 210 Clarendon St, East Melbourne Vic 3002.

National Drug Strategy (NDS) Postgraduate Research Scholarship

V $21,666 pa

T Initially for 1 year, with the possibility of renewal for a further 2 years

Applicants must have completed Year 1 of a PhD program. Scholarships aim to develop expertise in researching and

evaluating non-biomedical approaches to the prevention and treatment of drug misuses. Selection is based on academic merit, work experience and the potential of the project. Applications close 15 July.

National Health and Medical Research Council (NH&MRC) Aboriginal Health Research Scholarships

V $22,250

T Up to 3 years

C Applicants must enrol for a diploma, certificate, undergraduate degree or postgraduate research degree in order to pursue research relevant to Aboriginal health. Applications close 24 July with the Scholarship Unit.

National Health and Medical Research Council (NH&MRC) Dora Lush Postgraduate Scholarships

V $14,961 (or $19,307 for AIDS research) plus allowances

T Up to 3 years

C Applicants should be permanent residents living in Australia or Australian citizens who have already completed a Science honours degree or the equivalent at the time of submission of the application. Students enrolled in the honours year at the time of application are **not** eligible. Applications close 24 July with the Scholarship Unit.

National Health and Medical Research Council (NH&MRC) Medical Postgraduate Scholarships

V $22,250 plus allowances

T Up to 3 years

C Applicants must be Australian citizens or permanent residents who are medical graduates. Applications are particularly encouraged from students in the following fields - alcohol and substance abuse, prostate cancer, nursing and allied health services, breast cancer, dementia, injury and HIV/AIDS. Applications close 23 June with the Scholarship Unit.

National Health and Medical Research Council (NH&MRC) Public Health Postgraduate Scholarships

V $19,500 (science graduates), $22,000 (medical graduates) plus allowances

T Up to 3 years

C The scholarship is designed to enable graduates to obtain formal academic training in public health research. Applications close 23 June with NH&MRC.

Pig Research and Development Corporation (PRDC) Postgraduate Top-Up Scholarships

V A supplement to other scholarship(s) up to a maximum of $21,000 plus possibility of other allowances.

C Applicants must be Australian citizens or permanent residents who are eligible for another scholarship. Applicants must be undertaking a research project that will provide training relevant to establishing a career in the Australian pig industry. Applications close with the PRDC, PO Box 4804, Kingston ACT 2604 on 1 December.

Pig Research and Development Corporation Research Fellowship

V $25,000 plus allowances

T Up to 3 years

C Applicants must be undertaking a PhD with research relevant to the increased competitiveness of the Australian pig industry. Applications close with the PRDC, PO Box 4804, Kingston ACT 2604 on 1 December.

The Rhodes Scholarship to Oxford University

V Approximately $15,000 pa, fees and assistance with travel

T 2 years, may be extended for a third year

C Australian citizens aged between 19 and 25 who have an honours degree or equivalent. Applications close September each year with The Honorary Secretary to the NSW Rhodes Selection Committee, Building G17, University of Sydney, NSW 2006 (tel 3514567).

River Basin Management Society Ernest Jackson Memorial Research Grants

V Up to $2000

C To assist tertiary students undertaking research in the field of River Basin Management. Applications close with the Research Grants Co-ordinator, PO Box 68, Clifton Hill VIC 3068 on 11 August.

Robert Gordon Menzies Scholarship to Harvard

V Up to $A25,000. Students who enrol in the Harvard Business School may be provided an additional $12,000.

T To be determined

C Tenable at Harvard University. Applicants must be Australian citizens or permanent residents and graduates of an Australian tertiary institution. The successful applicant will be expected to repay the scholarship in later years when circumstances permit. Applications and additional information may be obtained by writing to the Management Services Office, ANU, Canberra ACT 0200. Applications close 5 January.

RSPCA Alan White Scholarship

V $2500

C Applicants should be undertaking original research to improve the understanding and welfare of animals. Written applications should be sent to the Executive Officer, RSPCA Australia, PO Box E369, Queen Victoria

Terrace, Canberra ACT 2600 (tel 06 2311437) by 31 March.

Shell Scholarship in Science or Engineering

V $20,000 pa

T Up to 3 years

C Applicants must be Australian citizens or permanent residents. Applicants should intend to study a Doctorate in science, engineering, economics/commerce, computer science, or a closely related discipline. Applications close with Shell Australia, Box 872k GPO, Melbourne VIC 3001 (tel 03 9666 5666) on 27 October.

STA Travel Grant

V Up to $3000

C 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 30 April each year.

The Wenkart Foundation Grants

V Up to $22,000 pa

T 2 years but may be renewed

C Applicants must be permanent residents or undergraduates educated in Australia and planning to reside in Australia. Applicants must be undertaking full-time research in clinical, biomedical and health related sciences. Applications close with the Scholarship Unit on 24 May.

Biological and Behavioural Sciences

Australian Biological Resources Postgraduate Research Scholarship

V $14,961 pa plus $2,500 support grant.

T A maximum of 3 years

C Applicants must be permanent residents with 12 months continuous residence in Australia or Australian citizens who are proposing to undertake full-time study in a PhD. Applicants should be strongly motivated to make a professional career as a taxonomist. Applications close 16 October with the Scholarship Unit.

Community Health and Anti-Tuberculosis Association - The Harry Windsor Biomedical and Medical Research Scholarship

V $22,250 pa (Medical graduates), $14,961 - $18,866 (Biomedical Science graduates) plus allowances

T Up to 3 years

C Applicants must be proposing to undertake medical research in the areas of tuberculosis, respiratory disease (particularly community aspects) or community health. Applicants must be Australian citizens or Permanent Residents who are currently residing in Australia. Applications close 23 August with the Scholarship Unit.

CSIRO Division of Fisheries Supplementary PhD Awards

V $10,000 pa

T Up to 3 years

C This scholarship is a supplement to any primary scholarship (eg Australian Postgraduate Award). Written applications should be sent to the Assistant Chief, CSIRO Division of Fisheries, PO Box 1538, Hobart TAS 7001 (tel 002 325222). Applications close 10 March.

John Clark Memorial Award in Psychology

V $1000

T 1 year

C Applicants must be enrolled in a graduate 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 1 July with the Registrar.

National Heart Foundation of Australia

V $15,961 (science), $22,250 (medical) plus $1,200 departmental allowance

T 1 year renewable up to a maximum of 3 years

C Medical applications close 24 May and Science applications close 31 October with the Scholarship Unit.

Science

Arthritis Foundation Research Scholarships

See above under Medicine

Australian Institute of Nuclear Science and Engineering (AINSE) Student Scholarships

See above under Engineering

Australian Telecommunications and Electronics Research Board (ATERB) Postgraduate Scholarships

See above under Engineering

Contact Lens Society of Australia

V $3500 pa

C 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 Mr Ken Ball. Secretary, Contact Lens Society (tel 243 3997).

Gordon Godfrey Scholarship in Theoretical Physics

V $1500 pa

T 2 years

C To enable a suitable graduate to undertake a research degree in Theoretical Physics. May be held concurrently with another award. Enquiries to School of Physics.

Laporte Centenary Scholarship

V Economy air travel to the UK, reasonable maintenance for between 3 to 6 months, university fees.

T 3 to 6 months

C Candidates should be graduates in one of the sciences and working towards a higher degree in a science-based discipline preferably in the practical application of special chemicals. Applications close 31 October with the Australian Vice-Chancellor's Committee.

Lionel Murphy Australian Postgraduate Bicentennial Scholarship

See above under Law

Prizes

Undergraduate University Prizes

The following information summarises undergraduate prizes awarded by the University. Prizes which are not specific to any School are listed under General. All other prizes are listed under the faculty, school or department in which they are awarded. 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 Enrolments and Assessment Section located on the Ground Floor of the Chancellery.

General

The Sydney Technical College Union Award

V $400.00 and Bronze Medal

C Leadership in student affairs combined with marked academic proficiency by a graduand

The University of New South Wales Alumni Association Prize

V Statuette

C Achievement for community benefit by a student in the final or graduating year

School of Biochemistry and Molecular Genetics

The Beckman Instruments Prize of the Biochemical Graduates Association

V $200.00

C The best performance in the fourth year Biochemistry honours program by a student proceeding to the award of the degree of Bachelor of Science

The Biochemical Graduates Association Prize

V $200.00

C The best performance in the examinations in level 3 Biochemistry subjects by a student proceeding to the award of the degree of Bachelor of Science

The Biotech International Prize of the Biochemical Graduates Association

V $200.00

C The best performance in the examinations in level 2 Biochemistry subjects by a student proceeding to the award of the degree of Bachelor of Science

School of Mathematics

The Applied Mathematics Prize

V $100.00

C Excellence in level 3 Applied Mathematics subjects in a Bachelor degree or Diploma course

The C H Peck Prize

V $50.00

C The best performance in Year 2 Mathematics by a student proceeding to Year 3 in the School of Mathematics

The Coca-Cola Amatil Prize

V $200.00

C 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

V $100.00

C Excellence in four or more mathematics units in Year 2 in a Bachelor degree or Diploma course

The J. R. Holmes Prize

V $100.00

C The best performance in Level 3 Pure Mathematics subjects by a student in a Bachelor degree or Diploma course

The Michael Mihailavitch Erihman Award

V $1,000.00

C 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 Ltd Prize

V $100.00

C Excellence in Higher Theory of Statistics 2 subjects in a Bachelor degree course

The School of Mathematics Prize

V $100.00

C The best performance in MATH1131 Mathematics 1A or MATH1141 Higher Mathematics 1A, and MATH1231 Mathematics 1B or MATH1241 Higher Mathematics 1 by a student in a Bachelor degree or Diploma course

The School of Mathematics Prize

V $100.00

C 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

V $200.00

C The best performance in Theory of Statistics subjects

The T P F & C Fourth Year Prize

V $200.00

C The best performance in the fourth year project by by a student proceeding to the degree of Bachelor of Science at honours level within the School of Mathematics

The T P F & C Third Year Prize

V $200.00

C The best performance in both MATH3610 Higher Pure Maths 3 - Real Analysis, and MATH3620 Higher Pure Mathematics 3 - Functional Analysis, or in MATH3181 Applied Maths 3 - Optimal Control Theory

School of Microbiology and Immunology

The Bio-Rad Prize in Immunology

V $250.00

C The best performance in MICR3051 Immunology 2

The Clinical Microbiology Update Programme Prize

V $300.00

C The best performance in MICR3081 Medical Bacteriology by a student proceeding to the award of the degree of Bachelor of Science at pass or honours level

School of Optometry

The ACBO / Learning Frontiers Prize for Excellence in Binocular Vision

V $150.00

C The best performance in the Binocular Vision component of OPTM9042 Optometry B and OPTM9041 Clinical Optometry in the Bachelor of Optometry degree course

The Australian Optometrical Association Prize

V $500.00

C The best performance in OPTM4302 Clinical Optometry 4

The Eycon Lens Laboratories Pty Ltd Prize

V Trial fitting set of contact lenses

C The best essay or project on contact lenses in the Bachelor of Optometry degree course

The Hoya Lens Australia Pty Ltd Prize

V $250.00

C The best academic record in the Bachelor of Optometry degree course

The Hydron Contact Lens Prize

V $100.00

C The best performance in OPTM4302 Clinical Optometry 4 in the Bachelor of Optometry degree course

The Hydron Contact Lens Prize

V $100.00

C The best performance in Year 4 of the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $250.00

C The best performance in OPTM2301 Ocular & Visual Science 2 in the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $250.00

C The best final year essay in the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $250.00

C The best performance in OPTM3208 Diagnosis and Management of Ocular Disease in the Bachelor of Optometry degree course

The Optical Products Ltd Prize

V $250.00

C The best performance in OPTM2303 Spectacle Lens and Optical Systems

The Optometric Vision Research Foundation Prize

V $200.00

C The best research project in the final year of the Bachelor of Optometry degree course

The Optometrists Association of NSW Prize

V $100.00

C The best performance in OPTM1202 Clinical Optometry

The Optyl (Australia) Pty Ltd Prize

V $100.00

C The best performance in the practical work of OPTM3302 Clinical Optometry 3 in the Bachelor of Optometry degree course

The Safilo Australia Prize

V $150.00

C The best performance in OPTM2302 Clinical Optometry 2

The Theo Kannis Prize for Clinical Optometry

V $250.00

C The best performance in OPTM4302 Clinical Optometry 4 by a student in the Bachelor of Optometry degree course

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School of Physics

The Australian Institute of Physics Prize

V $100.00and One years membership of the Institute

C 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

V $150.00

C The best performance in PHYS3160 Astrophysics by a student in the Bachelor of Science degree course.

The Bob Dalglish Prize

V $100.00

C The best performance in a project carried out within PHYS2601 Computer Applications

The Bob Dalglish Prize

V $100.00

C The best performance in a competition based on the use of microcomputers in PHYS1601 Computer Applications.

The Coherent Scientific Prize for Lasers, Optoelectronics & Applications

V $150.00

C The best performance in PHYS3710 Lasers and Applications or PHYS3720 Optoelectronics

The Gordon and Mabel Godfrey Award in Theoretical Physics 4

V $200.00

C 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

V $200.00

C 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 & Plasmas Physics

The Head of School's Prize in Physics

V $50.00

C The best Year 4 Honours Thesis in Physics in the Bachelor of Science degree course.

The Parameters Prize in Electronics

V $200.00and Electronic Test Equipment

C Excellence in PHYS3630 Electronics or PHYS3041 Experimental Physics A and PHYS3760 Laser and Optoelectronics Technology Laboratory 1

The Physics Staff Prize for Physics 1

V $100.00

C The best performance in PHYS1002 Physics 1

The Physics Staff Prize for Physics 2

V $150.00

C 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

V $200.00

C   The best performance in the Physics Honours Year by a student in the Bachelor of Science degree course.

The Spex Prize for Advanced Optics

V $150.00

C   The best performance in PHYS3060 Advanced Optics by a student proceeding to the degree of Bachelor of Science

School of Psychology

The Australian Psychological Society Prize

V $300.00

C   The best performance in Psychology 4 Honours

The Istvan Tork Prize in Neuroscience

V $100.00

C   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

V $80.00

C   The best performance in Year 2 of the Bachelor of Science (Psychology) degree course

The Psychology Staff Prize

V $80.00

C   The best performance in Year 2 Psychology

Undergraduate and Graduate University Prizes

School of Mathematics

The J R Holmes Prize

V $100.00

C   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

School of Optometry

The Theo Kannis Prize for Advanced Clinical Optometry

V $250.00

C   The best performance in OPTM8001 Advanced Clinical Optometry by a student in the Master of Optometry degree course

The Bausch & Lomb Prize

V   Ray-Ban Sunglasses valued at $300.00 and a plaque

C   The best performance in the contact lens section of OPTM4302 Clinical Optometry 4 in the Bachelor of Optometry degree course

Notes

The University of New South Wales • Kensington Campus

Theatres
Biomedical Theatres E27
Central Lecture Block E19
Chemistry Theatres
   (Dwyer, Mellor, Murphy, Nyholm, Smith) E12
Classroom Block (Western Grounds) H3
Fig Tree Theatre B14
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
Sir John Clancy Auditorium C24
Webster Theatre G15

Buildings
Applied Science F10
Arcade D24
Architecture H14
Barker Street Gatehouse N11
Basser College (Kensington) C18
Central Store B13
Chancellery C22
Dalton (Chemistry) F12
Goldstein College (Kensington) D16
Golf House A27
Gymnasium B5
Heffron, Robert (Chemistry) E12
International House C6
John Goodsell (Commerce and Economics) F20
Kensington Colleges (Office) C17
Library (University) E21
Link B6
Main, Old K15
Maintenance Workshop B13
Mathews F23
Menzies Library E21
Morven Brown (Arts) C20
New College L6
Newton J12
NIDA D2
Parking Station H25
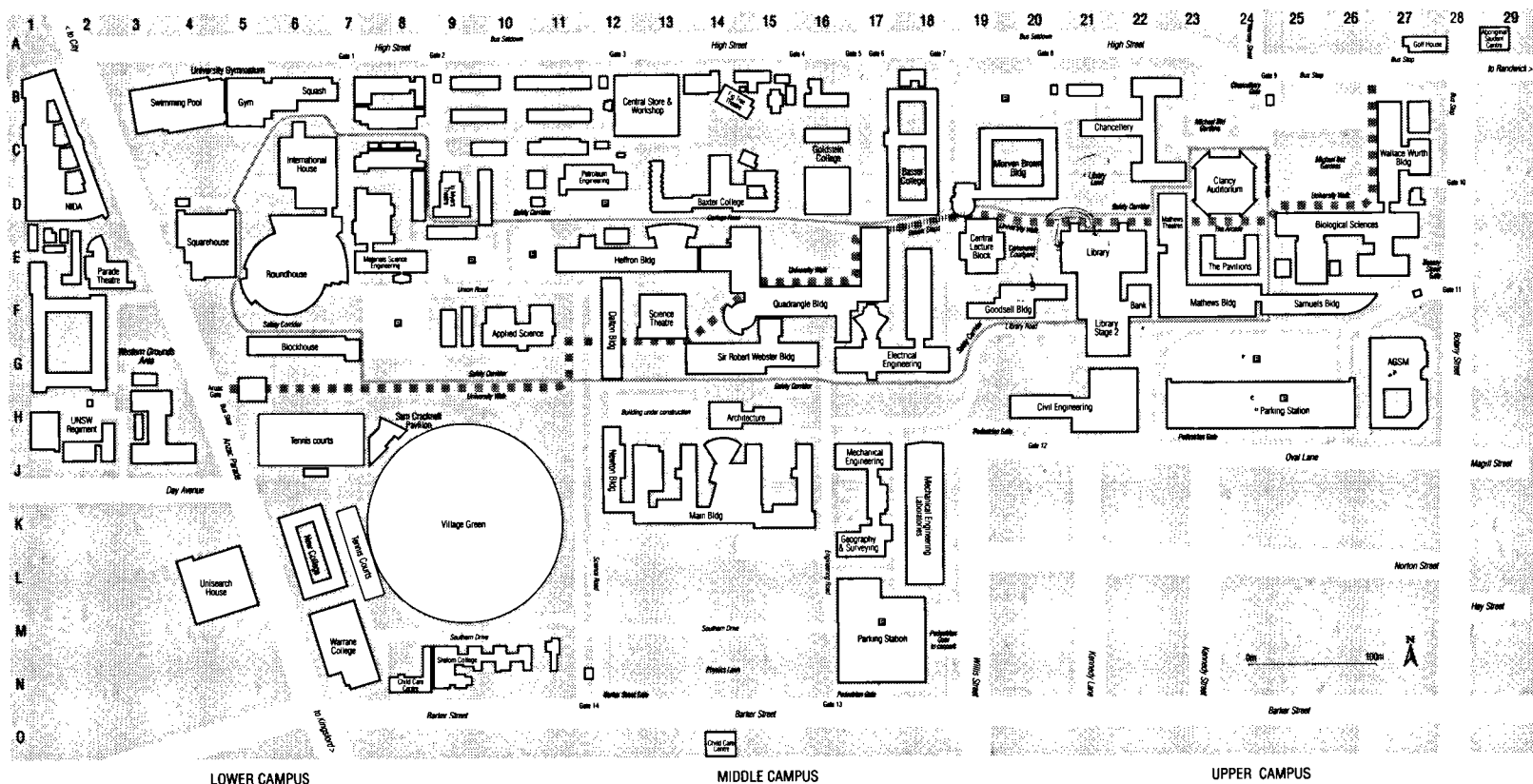Parking Station N18
Pavilions E24

Philip Baxter College (Kensington) D14
Quadrangle E15
Sam Cracknell Pavilion H8
Samuels Building F25
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 & Research Centre E20
Aboriginal Student Centre A29
Accommodation (Housing Office) E15
Accounting E15
Admissions C22
Adviser for Prospective Students C22
Alumni Relations: Pindari, 76 Wentworth St, Randwick
Anatomy C27
Applied Bioscience D26
Applied Economic Research Centre F20
Applied Geology F10
Applied Science (Faculty Office) F10
Archives, University E21
Arts and Social Sciences (Faculty Office) C20
Asia-Australia Institute: 45 Beach Street Coogee
Audio Visual Unit F20
Australian Graduate School of Management G27
Banking and Finance E15
Biochemistry and Molecular Genetics D26
Biological and Behavioural Sciences (Faculty Office) D26
Biomedical Engineering F25
Biomedical Library F23
Biotechnology F25
Built Environment (Faculty Office) H14
Campus Services C22
Cashier's Office C22
Centre for Membrane Science & Technology F10, K14
Chaplains E4
Chemical Engineering and Industrial Chemistry F10
Chemistry E12
Civil Engineering H20
Co-op Bookshop E15
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
Equal Employment Opportunity: 30 Botany Street Randwick
Examinations C22
Facilities Department C22, B14A
Fees Office C22
Fibre Science and Technology G14
Food Science and Technology B8
French C20
Geography K17
Geomatic Engineering K17
German and Russian Studies C20
Graduate School of the Built Environment H14
Groundwater Management and Hydrogeology F10
Health Service, University E15
Health Services Management C22
History C20
Human Resources C22
Industrial Design G14
Industrial Relations and Organizational Behaviour F20
Information, Library & Archives Studies F23
Information Systems E15
Information Technology Unit F25
International Student Centre F9
IPACE Institute F23
Japanese Economic and Management Studies E15
Landscape Architecture K15
Law (Faculty Office) F21
Law Library F21
Legal Studies & Taxation F20
Liberal and General Studies C20
Library Lawn D21
Lost Property C22
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
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
Political Science C20
Printing Section C22
Professional Development Centre E15
Professional Studies (Faculty Office) G2
Psychology F23
Publications Section C22
Remote Sensing K17
Research Office: 34-36 Botany Street Randwick
Safety Science B11a
Science (Faculty Office) E12
Science and Technology Studies C20
Social Science and Policy C20
Social Policy Research Centre F25
Social Work G2
Sociology C20
Spanish and Latin American Studies C20
Sport and Recreation Centre B6
Squash Courts B7
Student Centre (off Library Lawn) C22
Student Services:
   Careers, Loans, Housing etc E15
   Counselling E15
Students' Guild E15
Swimming Pool B4
Textile Technology G14
Theatre and Film Studies B10
Town Planning K15
WHO Regional Training Centre C27
Wool and Animal Sciences G14
Works and Maintenance B14A

The University of New South Wales • Kensington Campus

LOWER CAMPUS   MIDDLE CAMPUS   UPPER CAMPUS

University Gymnasium
Swimming Pool
Gym
Squash
International House
Squarehouse
Roundhouse
Magnus Science Engineering
Parade Theatre
NIDA
Blockhouse
Western Grounds Area
UNSW Regiment
Tennis courts
Sam Cracknell Pavilion
Day Avenue
New College
Tennis Courts
Unisearch House
Warrane College
Shalom College
Child Care Centre
Village Green
Southern Drive
Barker Street

High Street
Central Store & Workshop
Baxter College
Goldstein College
Basser College
Baxter College
Petroleum Engineering
Heffron Bldg
University Walk
Applied Science
Science Theatre
Dalton Bldg
Sir Robert Webster Bldg
Quadrangle Bldg
Electrical Engineering
Building under construction
Architecture
Newton Bldg
Main Bldg
Mechanical Engineering
Geography & Surveying
Mechanical Engineering Laboratories
Parking Station
Physics Lane
Barker Street
Child Care Centre
Union Road
Science Road
Middle Street

High Street
Chancellery
Morven Brown Bldg
Library Lawn
Central Lecture Block
Library
Goodsell Bldg
Library Stage 2
Civil Engineering
Clancy Auditorium
Mathews Theatre
The Pavilions
Bank
Mathews Bldg
Parking Station
Oval Lane
Kennedy Lane
Barker Street

Golf House
Michael Birt Gardens
Wallace Wurth Bldg
Michael Birt Gardens
University Walk
Biological Sciences
Samuels Bldg
AGSM
Magill Street
Norton Street
Hay Street
Botany Street

to Randwick >
to Kingsford >

Gate 1, Gate 2, Gate 3, Gate 4, Gate 5, Gate 6, Gate 7, Gate 8, Gate 9, Gate 10, Gate 11, Gate 12, Gate 13, Gate 14
Bus Station
Bus Stop
Anzac Parade

UNSW

This Handbook has been specifically designed
as a source of detailed reference information for
first year re-enrolling undergraduate and
postgraduate students.

Separate handbooks are published for:

Applied Science

Arts and Social Sciences

Built Environment

Commerce and Economics

Engineering

Law

Medicine

Professional Studies

Science

Australian Graduate School
of Management (AGSM)

Australian Taxation Studies Program (ATAX)

College of Fine Arts (COFA)

University College,
Australian Defence Force Academy (ADFA)

General Education

For fuller details about the University –
its organization; staff members; description
of disciplines; scholarships; prizes and so on,
consult the University Calendar (Summary
Volume). For further information on student
matters consult the UNSW Student Guide.