THE UNIVERSITY OF NEW SOUTH WALES

HANDBOOK

1995

SCIENCE

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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 1994, but may be amended without notice by the University Council.

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Message to New Students

Welcome to The University of New South Wales

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

In such a large institution as the University of New South Wales, Science based subjects are taught by Schools in a number of different Faculties. At the undergraduate level they are brought together through a cross-Faculty organisation known as the Board of Studies in Science and Mathematics (BSSM), which embraces topics from chemistry to psychology, from biology to mathematics. The Science & 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.

W.J. O'Sullivan
Dean
Board of Studies in Science and Mathematics

Calendar of Dates

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

Session 1 commences on the Monday nearest 1 March.

All Faculties (other than AGSM, Medicine and University College)

	1995	1996
Session 1		
(14 weeks)	27 February to 13 April	4 March to 4 April
	24 April to 9 June	15 April to 14 June
Mid-session recess	14 April to 23 April	5 April to 14 April
Study period	10 June to 15 June	15 June to 20 June
Examinations	16 June to 4 July	21 June to 9 July
Mid-year recess	5 July to 23 July	10 July to 28 July
Session 2		
(14 weeks)	24 July to 22 September	29 July to 27 September
	3 October to 3 November	8 October to 8 November
Mid-session recess	23 September to 2 October	28 September to 7 October
Study period	4 November to 9 November	9 November to 14 November
Examinations	10 November to 28 November	15 November to 3 December

Important dates for 1995

January

M 2 New Year's Day - Public Holiday
M 9 Medicine IV - Term 1 begins
M 16 Medicine V - Term 1 begins
Th 26 Australia Day - Public Holiday
T 31 Enrolment period begins for new undergraduate students and undergraduate students repeating first year.

February

M 6 Re-enrolment period begins for second and later year undergraduate students and graduate students enrolled in formal courses. Students should consult the *Re-enrolling 1995* leaflets applicable to their courses for details.
M 13 Semester 1 begins - AGSM Open Learning Graduate Management Qualification program
M 20 Term 1 begins - AGSM MBA program - Year 1 classes
Semester 1 begins - AGSM Open Learning Graduate Diploma in Management program
Medicine VI - Term 2 begins
F 24 Last day for acceptance of enrolment by new and re-enrolling students
(Late fee payable thereafter if enrolment approved)
M 27 Session 1 begins - all courses except Medicine IV, V, VI
Term 1 begins - AGSM MBA program - Year 2 classes

March

M 6 Session 1 begins - University College, ADFA
F 10 Last day applications are accepted from students to enrol in Session 1 or whole year subjects
Su 12 Medicine IV - Term 1 ends
M 13 Medicine IV - Term 2 begins
Su 19 Medicine V - Term 1 ends

M 27 Medicine V - Term 2 begins
F 31 Last day for students to discontinue without failure subjects which extend over Session 1 only
HECS Census Date for Session 1

April

Su 9 Medicine VI - Term 2 ends
F 14 Good Friday - Public Holiday
Mid-session recess begins
S 15 Easter Saturday - Public Holiday
M 17 Easter Monday - Public Holiday
Medicine VI - Term 3 begins
Su 23 Medicine IV - Term 2 ends
Mid-session recess ends
T 25 Anzac Day - Public Holiday

May

M 1 Medicine IV - Term 3 begins
F 5 Term 1 ends - AGSM MBA program - all classes
S 6 Mid-session recess begins - University College, ADFA
M 8 Examinations begin - AGSM MBA program - all classes
T 9 Publication of provisional timetable for June examinations
F 12 Examinations end - AGSM MBA program - all classes
S 13 Examination - AGSM Open Learning Graduate Diploma in Management program
W 17 Last day for students to advise of examination clashes
Su 21 Mid-session recess ends - University College, ADFA
Su 28 Medicine V - Term 2 ends
Medicine VI - Term 3 ends
M 29 Term 2 begins - AGSM MBA program - all classes
Medicine VI - Term 4 begins
T 30 Publication of timetable for June examinations

June

S 3 Examination - AGSM Open Learning Graduate Management Qualification program
Semester 1 ends - AGSM Open Learning Graduate Management Qualification program
M 5 Medicine V - Term 3 begins
F 9 Session 1 ends
Semester 1 ends - AGSM Open Learning Graduate Diploma in Management program
S 10 Study recess begins
Su 11 Medicine IV - Term 3 ends
M 12 Queen's Birthday - Public Holiday
T 13 Medicine IV - Term 4 begins
College of Fine Arts assessment week begins
Th 15 Study recess ends
F 16 Examinations begin
College of Fine Arts assessment week ends
F 23 Session 1 ends - University College, ADFA
S 24 Mid-year recess begins - University College, ADFA
M 26 Examinations begin - University College, ADFA

July

T 4 Examinations end
W 5 Mid-year recess begins
S 8 Examinations end - University College, ADFA
M 10 Semester 2 begins - AGSM Open Learning Graduate Diploma in Management program
M 17 Semester 2 begins - AGSM Open Learning Graduate Management Qualification program
F 21 Medicine VI - Term 4 ends
Su 23 Mid-year recess ends
Mid-year recess ends - University College, ADFA
M 24 Session 2 begins - all courses except Medicine IV, V, VI
Session 2 begins - University College, ADFA
M 31 Medicine VI - Term 5 begins

August

F 4 Last day applications are accepted from students to enrol in Session 2 subjects.
Last day for students to discontinue without failure subjects which extend over the whole academic year
Term 2 ends - AGSM MBA program - all classes
Su 6 Medicine IV - Term 4 ends
Medicine V - Term 3 ends
M 7 Bank Holiday
Examinations begin - AGSM MBA program - all classes
F 11 Examinations end - AGSM MBA program - all classes
M 14 Medicine IV - Term 5 begins
Medicine V - Term 4 begins
M 28 Term 3 begins - AGSM MBA program - all classes
Th 31 Last day for students to discontinue without failure subjects which extend over Session 2 only
HECS Census Date for Session 2

September

Su 10 Medicine VI - Term 5 ends
M 11 Medicine VI - Term 6 begins
S 23 Mid-session recess begins
Mid-session recess begins - University College, ADFA
Su 24 Medicine IV - Term 5 ends
M 25 Medicine IV - Term 6 begins
F 29 Closing date for applications to the Universities Admission Centre

October

M 2 Labour Day - Public Holiday
Mid-session recess ends
Mid-session recess ends - University College, ADFA
T 3 Publication of provisional timetable for the November examinations
W 11 Last day for students to advise of examination clashes
S 14 Examinations - AGSM Open Learning Graduate Diploma in Management program
Su 15 Medicine V - Term 4 ends
Su 22 Medicine VI - Term 6 ends
T 24 Publication of timetable for November examinations
F 27 Session 2 ends - University College, ADFA
M 30 Examinations begin - University College, ADFA

November

F 3 Session 2 ends
Term 3 ends - AGSM MBA program - all classes
S 4 Study recess begins
Final Examination - AGSM Open Learning Graduate Management Qualification program
Examination - AGSM Open Learning Graduate Diploma in Management program
Semester 2 ends - AGSM Open Learning Graduate Management Qualification program and AGSM Open Learning Graduate Diploma in Management
Su 5 Medicine IV - Term 6 ends
M 6 Examinations begin - AGSM MBA program - all classes
College of Fine Arts assessment week begins
Th 9 Study recess ends
F 10 Examinations begin
Examinations end - AGSM MBA program - all classes
College of Fine Arts assessment week ends
F 17 Examinations end - University College, ADFA
T 28 Examinations end

December

Th 21 Last day for acceptance of applications by the Admissions Section for transfer to another undergraduate course within the University
M 25 Christmas Day - Public Holiday
T 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 Course 3970: 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)

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Professor H. G. L. Coster

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Handbook Guide

The information in this handbook is set out as follows:

1. Faculty Information

2. Undergraduate Study
This contains:

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

3. 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:

C	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
U	unit value
WKS	weeks of duration
X	external

Prefixes

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

Prefix	Organisational Unit	Faculty/Board
ACCT	School of Accounting	Commerce and Economics
ANAT	School of Anatomy	Medicine
BIOC	School of Biochemistry and Molecular Genetics	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

Faculty Information

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

The Board of Studies in Science and Mathematics administers these courses and is therefore responsible for the undergraduate studies of students specialising in disciplines associated with the faculties of 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 A.R. Hyland who is also the Dean of the Faculty of Science.

The Presiding Member is Associate Professor G. Russell.

The Coordinator of Studies in Science and Mathematics is Associate Professor H. A. 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 (Room G27, Biological Sciences Building, map reference D25).

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 1995 should obtain a copy of the leaflet *Re-Enrolling 1995: 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, Room G27, Biological Sciences Building. All re-enrolling students should collect one of these timetables along with a preliminary enrolment form (SM95). 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 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.*

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 summarized 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:

NSC 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 30-54

NCS Computer Science
This is applicable specifically to a major in Computer Science in course 3978 as outlined on page 34

NIT Information Systems
This is applicable specifically to a major in Information Systems in course 3979 as outlined on page 41

NSA 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 30, and in course 3973 as outlined in the Medical Physics program on page 47.

NSB 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 30.

NSV Advanced Science (Environmental Science)
This is applicable to study in environmental science in course 3976 as outlined in programs 6861 - 6869 commencing on page 36.

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

There is a limited number of places available each year in the Advanced Science courses, which is reflected in a higher TER cut-off.

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 28 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 1 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 units or their equivalent in the light of the overall performance of a student in those units for single session and whole year subjects.

If a student's overall performance in the science units or their equivalent is rated as:
good -i.e. if the average in those units is 55.0 or higher;
reasonable -i.e. if the average in those units is 50.0 or higher and less than 55.0;
poor -i.e. if the average in those units 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 unit for each unit passed. 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 23 Science units 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 eight nor more than ten units of Level I subjects. All students must complete 2 Level 1 units of Mathematics as specified for individual programs.

Unit Requirement

2. Students must complete subjects with a total value of 23 Science units and 2 General Education units. Each subject available in Science programs has a unit value (usually 1 but ranging from 0.5 to 4 units) based on the number of hours taught and the mode of study.

Students wishing to take units 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 2 General Education units - Category A and Category B subjects totalling 56 hours each. 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 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 4 Science units 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 units 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 more than 50% of subjects attempted in an academic year;
- failing to pass at least four science units in one year;
- failing to complete eight units 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 units 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 24 Science units 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 23 units for Stages 1—3, since this is the requirement for course 3970. Students in Advanced Science courses must take a total of 24 units in stages 1—3. Except where otherwise indicated, the additional unit would normally be an elective unit. 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 units (where specified), totalling at least 8 Science units, 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 30.

All Advanced Science students also complete General Education units in Categories A, B and C - see Table 1 below.

Students must not complete more than eight units of Level I subjects except where specified in particular programs. All students must complete 2 Level 1 units of Mathematics as specified for individual programs.

Unit Requirement

2. Students must complete subjects and units specified for their program.

Each subject available in Science programs has a unit value (usually 1 but ranging from 0.5 to 4 units) based on the number of hours taught and the mode of study.

Students wishing to take units 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 2 General Education units - Category A and Category B subjects totalling 56 hours each, and the Category C requirement for Advanced Science. 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 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 4 Science units 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 units 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 at least four science units 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 unit 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. Category A and Category B General Education units 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 3974 - 3979; 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.

General Education Program - Subject Categories

Table 1

Category A. The External Context (all courses)

An introduction in non specialist terms to an understanding of the environments in which humans function.

Course Requirement: 1 x 56 hour subject (or equivalent)

1. Australia and the Development of the World Economy. How do we, can we, generate wealth?

2. Human Inequality. How can we, ought we, distribute wealth, status and power?

3. Science and Civilization. What steps should we take, and what policies should we adopt, in science and technology?

4. Ecosystems, Technology and Human Habitation. What effects do our wealth generating and technoscientific activities have on the environment?

5. Mass Media and Communication. What are the effects of the new mass media of communication?

6. Australian Society and Culture. What are the key social and cultural influences on Australia today?

Category B: The Internal Context of Assumptions And Values: (all courses)

An introduction to, and a critical reflection upon, the cultural bases of knowledge, belief, language, identity and purpose.

Course Requirement: 1 x 56 hour subject (or equivalent)

1. The Self and Society. How do we define ourselves in relation to the larger human community?

2. Changing Conceptions of Human Nature and Well-Being. How do our conceptions of human nature and well being influence both individual and social behaviour?

3. The Pursuit of Human Rationality. What are the prevailing conceptions of and challenges to human rationality?

4. The Use of Language, Images and Symbols. How do language, images and symbols function as means and media of communication?

5. The Computer: Its Impact, Significance and Uses. What is the impact of the computer on human society and culture?

6. Beliefs, Values and the Search for Meaning. Which systems of belief and configurations of values are most conducive to the survival and enhancement of the human species and the planet earth?

Category C. (Courses 3971 - 3980; 3985; 3990; 3950; 3431 only)

An Introduction To The Design And Responsible Management Of The Human And Planetary Future. An introduction to the systems over which human beings exercise some influence and control.

The central question to be addressed by students in a systematic and formal way is: for what purpose or purposes will I use my intellectual skills, my expertise, or my technological prowess?

Will these abilities be used, for example:

- in a creative and innovative way?
- to widen the circle of human participation in the benefits they bring?
- to break down the barriers of exclusion and discrimination?
- to enhance the prospects for survival of the human species?
- to enhance the capacity of the planet earth to sustain life?

The exact way in which the Category C requirement is satisfied depends on the program in which the student is enrolled.

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	NSC, NSB
BIOCHEMISTRY	4100	3970, 3990	NSC, NSB
BIOLOGICAL SCIENCE	1700	3970, 3990	NSB
BIOLOGICAL SCIENCES			
Holding Program	6817	3970, 3990	NSC NSB
BIOMEDICAL SCIENCE	7370	3990	NSB
BIOTECHNOLOGY	4200	3970, 3990	NSC, NSB
BOTANY	1743	3970, 3990	NSC, NSB
CHEMISTRY	0200	3970, 3985	NSC, NSA
COMPUTER SCIENCE	0600	3978	NCS
EARTH AND			
ENVIRONMENTAL SCIENCE	2527	3970, 3985	NSC, NSA
ECOLOGY			
Geographical Ecology	6851	3970, 3990	NSC, NSB
Mathematical Ecology	6852	3970, 3990	NSC, NSB
Biological Ecology	6853	3970, 3990	NSC, NSB
ENVIRONMENTAL SCIENCES			
Biological Environments (Terrestrial)	6861	3976	NSV
Biological Environments (Marine)	6862	3976	NSV
Biological Environments (Microbial)	6863	3976	NSV
Environmental Chemistry	6864	3976	NSV
Earth Environments (Geography)	6865	3976	NSV
Earth Environments (Geology)	6866	3976	NSV
Environmental Mathematics (Fluid Dynamics)	6867	3976	NSV
Environmental Mathematics (Statistics)	6868	3976	NSV
Environmental Mathematics (Population Dynamics)	6869	3976	NSV
GENETICS	6840	3970, 3990	NSC, NSB
GEOGRAPHY	2700	3970, 3985	NSC, NSA
GEOLOGY	2500	3970, 3985	NSC, NSA
GEOPHYSICS	2503	3970, 3985	NSC, NSA
INFORMATION SYSTEMS	1400	3979	NIT
MARINE SCIENCE			
Physical Oceanography	6831	3970, 3990	NSC, NSB
Biological Oceanography	6832	3970, 3990	NSC, NSB
Earth Science Oceanography	6833	3970, 3990	NSC, NSB
Environmental Chemistry	6834	3970, 3990	NSC, NSB

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

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), **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 and the function 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 normally limited to students enrolled in Advanced Science. Entry 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
BIOS1011, BIOS1021
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
4 elective units

Stage 2
ANAT2111, ANAT2211
5 or 6 elective units *Recommended:* Biological Science, Biochemistry, Physiology, Psychology
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
At least 4 Level III Anatomy units (may include PATH3201)
One 56 hour or two 28 hour Category B General Education subjects
Further units to give a total of 23 science units

Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

Stage 4 (Honours)
ANAT4000, or ANAT4509 and 4 other units (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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units (*Recommended:* Physics, Computing)

Stage 2
BIOC2101 and BIOC2201 or BIOC2372*
BIOS2011 or MICR2201
BIOS2021
CHEM2021 or CHEM2041
2 or 3 elective units
One 56 hour or two 28 hour Category A 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
2 or more units from Level III Biochemistry to make a total of at least 4 Level III Biochemistry units (one of these units may be replaced by a Level III unit offered by the Department of Biotechnology or Immunology units offered by the School of Microbiology and Immunology)
Further elective units to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete 8 Level III units

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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

1700
Biological Science

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and
2 units from BIOS2031, BIOS2061 or MICR2201
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
5 units from BIOS3011, BIOS3021, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3101, BIOS3111, BIOS3121, BIOS3131, BIOS3151, MICR3071
2 elective units (which may be also from this list)
One 56 hour or two 28 hour Category B General Education subjects

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

Stage 4 (Honours)
BIOS4013 (F/T), BIOS4019 (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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
One of the following subjects:
PHYS1002 or PHYS1022 or COMP1811 and 1 other unit 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 7 or 8 units, with at least 5 units from: ANAT2111, ANAT2211, BIOC2101 and BIOC2201 or BIOC2372**, BIOS2021, MICR2201 or MICR2011*, PHPH2112**
One 56 hour or two 28 hour Category A General Education subjects

Elective units 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 7 or 8 units (to complete a total of 23 or 24 units) from the following subject areas: Physiology and Pharmacology***, Anatomy, Biochemistry, Microbiology and Immunology, Pathology, Biotechnology

One 56 hour or two 28 hour Category B 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 Stages 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 also expanded 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.

4200
Biotechnology

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021
MICR2201
2 elective units (Recommended: Chemistry, Microbiology)
One 56 hour or two 28 hour Category A and One 56 hour or two 28 hour Category B General Education subjects

Stage 3
BIOT3011, BIOT3021, BIOT3031, BIOT3061
Additional elective units to give a total of 23.

Students proposing to undertake Stage 4 (Honours) must complete 8 Level III units.

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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021, BIOS2041, BIOS2051
2 elective units to make a total of 8
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 units from BIOS3071, BIOS3061, BIOS3091, BIOS3121 or BIOS3151, MICR3071
3 elective units (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 Category B General Education subjects

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

Stage 4 (Honours)
BIOS4023 (F/T), BIOS4029 (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 7300 (strand 2: Pharmacology) are mutually compatible as a 24 unit program.

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
2 elective units

Stage 2*
CHEM2011, CHEM2021, CHEM2031, CHEM2041
3 elective units
One 56 hour or two 28 hour Category A and one 56 hour or two 28 hour Category B General Education subjects

Stage 3
Choose 4 Level III Chemistry units of which at least 3 are from:
CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose 4 elective units
Students proposing to proceed to Stage 4 (Honours) must complete 8 Level III units.

Stage 4 (Honours)
CHEM4003

** Students wishing to specialise in Chemistry with either Geology or Biotechnology may vary specified units 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
2 elective units

Stage 2
CHEM2011, CHEM2021, CHEM2031, CHEM2041
4 elective units (Recommended: Biochemistry, Biotechnology, Computer Science, Geology, Mathematics, Physics, Physiology)
One 56 hour or two 28 hour Category A and One 56 hour or two 28 hour Category B General Education subjects

Stage 3
CHEM3011, CHEM3021, CHEM3031, CHEM3041
4 Level III Chemistry units

Stage 4 (Honours)
CHEM4003

COMPUTER SCIENCE

Entry to this program is restricted to students who have been offered a place directly (UAC code NCS). 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 (program 1060) Psychology (program 1206 (UAC entry code NCS)); Philosophy (program 5206 (UAC entry code NCS))

0600
Computer Science

Stage 1
COMP1011, COMP1021
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
3 elective units*

Stage 2
COMP2011, COMP2021, COMP2031
5 elective units*
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 Level III Computer Science units including at least 1 unit from COMP3111, COMP3121, COMP3131 and at least 1 unit from COMP3211, COMP3221, COMP3231, COMP3331
Further elective units to make a total of 7*
One 56 hour or two 28 hour Category B General Education subjects

Students may not include more than 6 Level III Computer Science units

Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

Stage 4 (Honours)
COMP4914

** Up to 8 units 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
CHEM1401, CHEM1501 or CHEM1101, CHEM1201
GEOG1031, GEOG1051
GEOL1101, GEOL1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021

Stage 2
BIOS1011, BIOS1021
GEOG2021, GEOG2032, GEOG3051
GEOL6231, GEOL7223, GEOL7233
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
GEOL6321, GEOL7323, GEOL7333
Plus 4 Level III units of Geology and/or Biology and/or Geography
One 56 hour or two 28 hour Category B 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 units, Biological Ecology (6853), Geographical Ecology (6851) and Mathematical Ecology (6852). Optional units allow students to match their interests and career aspirations. The selection of these units must be discussed with a Program adviser.

6851
Geographical Ecology

Stage 1
BIOS1011, BIOS1021
GEOG1062, GEOG1073
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Choose 1 of the strands:
1. CHEM1101, CHEM1201
2. GEOL1101, GEOL1201
3. 2 elective units

Stage 2
BIOS2011, BIOS2051 and BIOS2031 or BIOS2061
BIOS2041 or GEOG2013
GEOG2021, GEOG3021
At least 1 unit from:
BIOC2101, BIOS2021, BIOS2031, BIOS2061, GEOG2032, GEOG3051, GEOL7223, GEOL6231, MICR2201, MICR2011

One 56 hour or two 28 hour Category A General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG3042,GEOG3062, GEOG3211
At least 1 unit from:
BIOS3011, BIOS3031, BIOS3051, BIOS3081, BIOS3091,BIOS3121, BIOS3131, BIOS3151, GEOG2032, GEOG3011, GEOG3032, GEOG3051, MICR3071
Further elective units (to be discussed with Program adviser) to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Stage 4 (Honours) must complete at least 6 Level III units

Stage 4 (Honours)
BSSM4023 (F/T), BSSM4029 (P/T)

6852
Mathematical Ecology

Stage 1
BIOS1011, BIOS1021
COMP1811
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
Choose 1 of the strands:
1. CHEM1101, CHEM1201
2. GEOG1062, 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, MATH2821
At least 1 unit from: BIOS2021, BIOS2031, BIOS2061, GEOG2021, GEOG2032, GEOG3032, GEOG3042, GEOG3062, MATH2160, MATH2180, MATH2220, MATH2301, MATH2520, MATH2810, MATH2830, MICR2201 or MICR2011
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
BIOS3061, BIOS3111 and GEOG3021 or GEOG3211
At least 3 units from subjects related to the strand chosen in Stage 2:
1. MATH3161, MATH3181, MATH3201, MATH3540, MATH3550, MATH3870, MATH3880
2. MATH2810, MATH2830, MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3861
At least 1 unit from: BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3151, GEOG2013, GEOG3011, GEOG3021, GEOG3051, GEOG3062, MICR3071
Further elective units (to be discussed with program adviser) to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete at least 6 Level III units

Stage 4 (Honours)
BSSM4023 (F/T), BSSM4029 (P/T)

6853
Biological Ecology

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
GEOG1062, GEOG1073
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021

Stage 2
BIOC2101
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and BIOS2031 or BIOS2061
at least 1 unit from: BIOC2201, BIOS2031, BIOS2061, GEOG2021, GEOG2032, GEOG3021, GEOG3042, MICR2011, MICR2201
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG3211
2 further Level III units from: BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3151, GEOG2032, GEOG3032, GEOG3042, GEOG3051, MICR3071
Further elective units (to be discussed with Program adviser) to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete at least 6 Level III units

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 15 core subjects and electives as set out below.

Core subjects to be completed by all students in Course 3976 are:
BIOS1021, BIOS3071
CHEM1101, CHEM1201, CHEM3091
ECON1107
ENVS1011, ENVS2010, ENVS2020
GEOG1073, GEOG3042
GEOL1101 or GEOL1201 or GEOL6231 or GEOL6321
LAWS8000
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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1011 *or* MATH1131 *or* MATH1141
MATH1021 *or* MATH1231 *or* MATH1241

Stage 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020
GEOG3021
GEOL1201 or GEOL6231
LAWS8000
2 units from BIOS2031, BIOS2051
BIOS2061,GEOG2021, MSCI2001, MICR2201
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071, BIOS3111
CHEM3091
GEOG3042, GEOG3211
BIOS3061 or GEOG3062
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B General Education subjects

Stage 4
BIOS4063/BIOS4069 (Full Stage honours thesis project) with permission of Program Adviser and Head of School or
BIOS4065 (Combination of an honours thesis project and course work in Biological Science approved by Program Adviser) or
BIOS4066 (Half Stage honours thesis project) and additional units approved by Program Adviser to make up full Stage
Category C General Education requirement

6862
Biological Environments (Marine) (Advanced Science only)

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1011 *or* MATH1131 *or* MATH1141
MATH1021 *or* MATH1231 *or* MATH1241

Stage 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
MSCI2001
2 units from BIOS2031, BIOS2051, BIOS2061, GEOG2021, MICR2001, MICR2201
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071, BIOS3081, BIOS3091, BIOS3111
CHEM3091
GEOG3042
at least one unit from GEOG3062, GEOG3211, GEOL6231, GEOL6321, MSCI3001
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B 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 units approved by Program Adviser to make up full Stage
Category C General Education requirement

6863
Biological Environments (Microbial) (Advanced Science only)

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1011 *or* MATH1131 *or* MATH1141
MATH1021 *or* MATH1231 *or* MATH1241

Stage 2
BIOS2011
ECON1107
ENVS2010, ENVS2020
LAWS8000
MICR2011, MICR2201
3 units from BIOS2031, BIOS2041, BIOS2051, BIOS2061, GEOG2021, GEOL1101, GEOL1201, MSCI2001
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071
CHEM3091
GEOG3042,
MICR3011, MICR3071
1 unit from BIOS2041, GEOG3021, GEOG3062
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B 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 units approved by Program Adviser to make up full Stage
Category C General Education requirement

6864
Environmental Chemistry (Advanced Science only)

Stage 1
BIOS1021
CHEM1101, CHEM1201
ENVS1011
GEOG1073
GEOL1101
MATH1011 *or* MATH1131 *or* MATH1141
MATH1021 *or* MATH1231 *or* MATH1241

Stage 2
CHEM2011, CHEM2021, CHEM2031 CHEM2041
ECON1107
ENVS2010, ENVS2020
LAWS8000
PHYS1002
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071
CHEM3091
CHEM3311, CHEM3421*, CHEM3431*, CHEM3441*
GEOG3042
1 statistics unit from BIOS2041, GEOG2013, or MATH2841.
Further units for major sequence to complete core subjects and a total of at least 24 units
One 56 hour or two 28 hour category B General Education subjects

** These subjects will be offered in 1995 only if student numbers warrant; students considering them should contact Program adviser in School of Chemistry for further information*

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

6865
Earth Environments (Geography) (Advanced Science only)

Stage 1
CHEM1101, CHEM1201
ENVS1011
GEOG1073,
GEOG1062
GEOL1101 or GEOL1201
MATH1011 *or* MATH1131 *or* MATH1141
MATH1021 *or* MATH1231 *or* MATH1241

Stage 2
BIOS1021
ECON1107
ENVS2010,ENVS2020
GEOG2013, GEOG2021, GEOG2032, GEOG3051, GEOG3211
LAWS8000
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071
CHEM3091
GEOG3011, GEOG3032, GEOG3042, GEOG3062,
Further units for major sequence to complete core subjects and a total of at least 24 units.

One 56 hour or two 28 hour category B 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 units approved by Program Adviser to make up full Stage
Category C 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
BIOS1021
ECON1107
ENVS2010,ENVS2020
GEOL7223, GEOL7233
LAWS8000
MSCI2001
Additional units to make 8
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071
CHEM3091
GEOG3042
GEOL6231, GEOL6321, GEOL7323, GEOL7333
1 unit from GEOG2021, GEOG3032, GEOG3062, GEOL6221
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B 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 units approved by Program Adviser to make up full Stage
Category C 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
BIOS1021,
ECON1107
GEOL1101
ENVS2010, ENVS2020
LAWS8000
MATH2100, MATH2120, MATH2240, MATH2220, MATH2301, MATH2520, MATH2510
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071,
GEOG2021, GEOL1101
MATH3121, MATH3301, MATH3241, MATH3261,
Further units for major sequence from Table ENVS to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B General Education subjects

Stage 4
CHEM3091
GEOG3042, GEOG3062
MATH5265 or MATH5285 or MATH5295
Major Project involving analysis and interpretation of existing data, or modelling of a simple process.
An additional unit will be taken in a topic associated with environmental fluid dynamics, numerical modelling or data analysis, chosen after consultation.
Category C General Education requirement

6868
Environmental mathematics (statistics) (Advanced Science only)

Stage 1
BIOS1011, BIOS1021
ENVS1011
GEOG1073
CHEM1101, CHEM1201
MATH1131 *or* MATH1141
MATH1231 *or* MATH1241

Stage 2
BIOL2011
ENVS2010, ENVS2020
ECON1107
GEOL1101,
LAWS8000
MATH2501, MATH2510, MATH2520, MATH2801,

MATH2821
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3071, BIOS3101, BIOS3111
GEOG2021
MATH2810, MATH2830, MATH3811, MATH3820, MATH3830
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B General Education subjects

Stage 4
CHEM3091
GEOG3042, GEOG3062
MATH4XXX (Thesis Project 2 units)
Additional units to make a final total of 32.
Category C General Education requirement

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

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
ENVS1011
GEOG1073
MATH1131 *or* MATH1141
MATH1231 *or* MATH1241

Stage 2
BIOL2011
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
MATH2200, MATH2220, MATH2501, MATH2510, MATH2520, MATH2841
One 56 hour or two 28 hour category A General Education subjects

Stage 3
BIOS3061, BIOS3071, BIOS3111
GEOG2021, GEOG3062
MATH3201, MATH3540, MATH3550
Further units for major sequence to complete core subjects and a total of at least 24 units.
One 56 hour or two 28 hour category B General Education subjects

Stage 4
CHEM3091
GEOG3042
MATH3161, MATH3181
MATH4XXX (Thesis Project 2 units)
Additional units to make a final total of 32.
Category C 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 (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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101 and BIOC2201 or BIOC2372*
BIOS2011 or MICR2201
BIOS2021
MATH2841 or BIOS2041
2 or 3 elective units, (Recommended: BIOS2031, BIOS2051, BIOS2061, CHEM2021, COMP1811, MICR2011, WOOL3803 or CMED3111)
One 56 hour or two 28 hour Category A 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
At least 4 units from: BIOC3121, BIOC3131, BIOC3281, BIOC3291, BIOT3031 or MICR3021, CMED8201, CMED8202 or CMED8302, CMED8303, WOOL4813 and further elective units to give a total of 23
Recommended: BIOC3111, BIOS3071, BIOS3121, BIOS3141, BIOT3011, COMP1821, MICR3041, WOOL3901
One 56 hour or two 28 hour Category B 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
GEOG1062 and at least one of GEOG1031 and GEOG1073
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
Elective units to make a total of 8

Stage 2
3 Geography units
5 elective units
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 Level III Geography units
GEOG3000
3 elective units
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 8 Level III units 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
CHEM1401, CHEM1501 or CHEM1101, CHEM1201
GEOL1101, GEOL1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
and either
BIOS1011 and BIOS1021* or
GEOG1031, GEOG1051 or
PHYS1002 or PHYS1022

** Students following a combination of Applied Geology with Botany and/or Zoology at Level I must take Biology subjects, BIOS1011, BIOS1021. At Level II they should take BIOS2031, BIOS2041, BIOS2051, BIOS2061 and 3 units of Geology which must include GEOL2031 and GEOL2062. At Level III at least 4 units of Geology which must include GEOL3031 plus BIOS3131 and 3 units 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 Category A General Education subjects

Stage 3
GEOL3011, GEOL3021, GEOL3031, GEOL3052,
GEOL3072, GEOL3082, GEOL3092, GEOL3101,
GEOL3102
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 8 Level III units

Stage 4 (Honours)
GEOL4303 or GEOL4343 (Only offered over two Stages)

2503
Geophysics

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
CHEM1101 or CHEM1401
GEOL1101, GEOL1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002 and PHYS1601

Stage 2
GEOL2042, GEOL2051, GEOL2062,
GEOL8220
MATH2100, MATH2120
PHYS2001, PHYS2011, PHYS2601
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
GEOL3052, GEOL3072, GEOL3082, GEOL8320,
GEOL8330, GEOL8340, GEOL8350, GEOL8360
Plus 3 units from Level III Physics and/or Mathematics
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 8 Level III units

Stage 4 (Honours)
GEOL4303

INFORMATION SYSTEMS

Entry to this program is restricted to students who have been offered a place directly (UAC code NIT). 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 units. 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
3 elective units
One 56 hour or two 28 hour Category A General Education subjects

Stage 2 (Direct Stage 2 Entrants)*
ACCT1501, ACCT1511,
COMP1821
INFS1602, INFS1603, INFS2603, INFS2607, INFS2609
One 56 hour or two 28 hour Category A 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
4 elective units including at least one at Level III
One 56 hour or two 28 hour Category B General Education subjects

*** Stage 2 direct entry students must complete MATH2841 or MATH2801 in lieu of one elective unit*

Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

Stage 4 (Honours)
INFS4794
The Category C 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, PHYS1611 or PHYS1601
2 units from 1 of the strands:
1. BIOS1011, BIOS1021 or
2. CHEM1101, CHEM1201 or
3. GEOL1101, GEOL1201
MATH1081 or 1 further unit from the above strands

Stage 2
MATH2120, MATH2160, MATH2180, MATH2501, MATH2200 or MATH2220
MSCI2001
PHYS2001
Continue the strand chosen in Stage 1:
1. CHEM2041 or CHEM2011 or
2. at least 1 unit from: BIOS2011, BIOS2051, BIOS3111 or
3. GEOL6201
Additional elective units to give a total of 8
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
MATH2280, MATH3121, MATH3201, MATH3241, MATH3261
MSCI3001
2.5 units from: PHYS2021, PHYS2031, PHYS2601, PHYS3150, PHYS3631, MATH3101, MATH3301, GEOL6330, BIOS3081 or GEOL6311 or GEOL6231 or BIOS3091
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

Stage 4 (Honours)
MSCI4003 F/T, MSCI4009 P/T

Units in waves, turbulence and geophysical fluid mechanics are offered

6832
Marine Science (Biological Oceanography)

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 units from 1 of the strands:
1. GEOL1101, GEOL1201
2. PHYS1002 or PHYS1022

Stage 2
BIOC2101
BIOS2031, BIOS2051
CHEM2011 or CHEM2041
MICR2201
MSCI2001
1 unit from the subjects related to the strand chosen in Stage 1:
1. GEOL6231
2. MATH2021 or MATH2801 or MATH2841
An additional unit from: BIOS2011, BIOS2021, BIOS2041, BIOS2051, BIOS2061, to give a total of 8 for the Stage
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
BIOS3081, BIOS3091
MICR3071
2 Level III units which may include the subjects corresponding to the strand chosen in Stages 1 and 2:
1. GEOL6321
2. MATH3021, MSCI3001
2 elective units
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete at least 6 Level III units

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

4 units from 2 of the strands:
1. BIOS1011, BIOS1021
2. CHEM1101, CHEM1201
3. PHYS1002 or PHYS1022

Stage 2
MSCI2001
GEOL6201, GEOL6221, GEOL6231
Continue both of the strands chosen in Stage 1:
1. At least 1 unit from: BIOS2011, BIOS2031, BIOS2051
2. CHEM2011 or CHEM2041
3. MATH2021 or MATH2841 or MATH2801
Additional elective units to give a total of 8
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
GEOL6311, GEOL6321, GEOL6330, GEOL6331
3 Level III units 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 units to make a total of 7
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

Stage 4 (Honours)
MSCI4003 (F/T) MSCI4009 (P/T)

6834
Marine Science (Environmental Chemistry)

Stage 1
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241
4 units from 2 of the strands:
1. BIOS1011, BIOS1021
2. GEOL1101, GEOL1201
3. PHYS1002

Stage 2
CHEM2011, CHEM2041
MSCI2001
Continue both of the strands chosen in Stage 1:
1. At least 1 unit from: BIOS2011, BIOS2051, BIOS2031
2. GEOL6231
3. MATH2021 or MATH2841
Additional elective units to give a total of 8
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
CHEM3041, CHEM3311
2 Level III units 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 units to give a total of 7
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 6 Level III units

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 program 1006. Students wishing to proceed to Stage 4 (Honours) should select some higher mathematics subjects.

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 dvelopment 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 four units of Pure Mathematics Level III. 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, MATH3420 and MATH3430 in Stage 3.

2. Pure Mathematics subjects relevant to mathematics teaching are MATH3500, MATH3510, MATH3520, MATH3530, 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 MATH3540, MATH3550, MATH3570 and MATH3580 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 four units of Level III Applied Mathematics.

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 two of* the following: BIOS1011 and BIOS1021; PSYC1002; PHYS1002; CHEM1101 and CHEM1201.

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

Statistics majors
See programs 1006,1066 or 1067.

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
6 elective units*
(MATH1081 is recommended)

Stage 2
MATH2100, MATH2120, MATH2501, MATH2510, MATH2520
1 further Level II or Level III Mathematics unit
4 elective units*
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 Level III Mathematics units
3 elective units*
One 56 hour or two 28 hour Category B General Education subjects
Advanced Science students must complete 6 Level III Mathematics units and 2 elective units*. In special cases other units may be substituted for these units. 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 8 units 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
MATH1141, MATH1241
MATH1081
3 elective units*

Stage 2
COMP2011, COMP2031
MATH2501, MATH2301, MATH2510 or MATH2100, MATH2400,
MATH2801 or MATH2841
2 elective Level II or III units*
(*Recommended alternative strands:* Applied Mathematics: MATH2120. Pure Mathematics: MATH2410.)
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
2 Computer Science Level III units from:
COMP3111, COMP3121, COMP3311, COMP3411
1 unit from MATH3301, MATH3400, MATH3430
4 Level III Mathematics units
1 elective unit*
(*Recommended alternative strands:* Applied Mathematics: MATH3101 *and at least one of* MATH3161, MATH3181, MATH3201. Pure Mathematics: MATH3420, MATH3430, MATH3520.)
One 56 hour or two 28 hour Category B 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 3 Level III Computer Science units.

Stage 4 (Honours)
MATH4003 or MATH4103 or MATH4603

** Up to 6 units 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
4 elective units*

Stage 2
COMP1821
MATH2100, MATH2120, MATH2301, MATH2501, MATH2510, MATH2520, MATH2841
1 unit from: MATH2160, MATH2200, MATH2400, MATH2410
1 elective unit from Mathematics and/or Computer Science
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
COMP2011
MATH3301
3 further Level III Mathematics units
(MATH3400, MATH3420, MATH3430 are recommended)
2 elective units from Mathematics and/or Computer Science
One 56 hour or two 28 hour Category B General Education subjects

Advanced Science students must complete 3 elective units 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)
MATH4003 or MATH4103 or MATH4603

** Up to 4 units 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
6 elective units*

Stage 2
MATH2120, MATH2501, MATH2510, MATH2520, MATH2801, MATH2810, MATH2821, MATH2830
2.5 elective units*
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 units from: MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3861, MATH3971
3 elective units*
One 56 hour or two 28 hour Category B General Education subjects
Advanced Science students must complete 6 Level III Mathematics units including 4 Level III Statistics units including MATH3980 and, in addition, 2 elective units*. 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 8 units 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
MATH1141, MATH1241
MATH1081
3 elective units*

Stage 2
COMP2011, COMP2031
MATH2501, MATH2510
MATH2801, MATH2810, MATH2821, MATH2830
1.5 elective Level II or III units*
(MATH2301, MATH2400 are recommended)
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
2 Computer Science Level III units from:
COMP3111, COMP3121, COMP3311, COMP3411
MATH3861, MATH3980
2.5 Level III Statistics units from:

MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3971
1 Level III Mathematics unit
1 elective unit*
One 56 hour or two 28 hour Category B 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 5 units 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
4 elective units*

Stage 2
COMP1821
MATH2120, MATH2501, MATH2510, MATH2520
MATH2801, MATH2810, MATH2821, MATH2830.
1.5 further units from Mathematics and/or Computer Science
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
MATH3861
4 further Level III Statistics units
2 further units from Mathematics and/or Computer Science
One 56 hour or two 28 hour Category B General Education subjects
Advanced Science students must complete 6 Level III Mathematics units including 4 Level III Statistics units including MATH3980 and, in addition, 2 elective units*. 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 4 units 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.*

6810
Mathematics of Management (Advanced Science only)

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

Stage 1
ACCT1501, ACCT1511
ECON1101, ECON1102
MATH1131 or MATH1141
MATH1231 or MATH1241
2 elective units*

Stage 2
MATH2100, MATH2120, MATH2160, MATH2180, MATH2501, MATH2510, MATH2520, MATH2801 or MATH2841
ACCT2522, INFS1602
1 unit from: ACCT2542, INFS2603, FINS2613
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
2 units from: MATH2821, MATH3101, MATH3121, MATH3161, MATH3181,
MATH3801, MATH3870, MATH3880.
3 further Level III Mathematics units
2 units from one of the strands:
1. ACCT3563, ACCT3583
2. INFS3605, INFS3607, INFS3608
3. FINS3614, FINS3615
1 elective unit*
One 56 hour or two 28 hour Category B 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 3 units may be from subjects that are restricted to this program or Arts subjects from the following subject areas: Chinese, Economics, English, French, German, History, Indonesian, Modern Greek, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre and Film Studies. Japanese and Korean are also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104.*

MEDICAL PHYSICS

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

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

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

0141
Medical Physics (Advanced Science only)

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141
MATH1231 or MATH1241
PHYS1002 (or PHYS1022 at distinction level)

Stage 2
BIOC2372
MATH2510, MATH2100
PHYS2410, PHYS2001, PHYS2021, PHYS2011, PHYS2031
.5 elective units
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
ANAT2111 or ANAT2120
MATH2120
PHPH2112
PHYS3410,PHYS3041,PHYS3060,PHYS1601
Plus elective units to make a total of 8 chosen from:
MATH2520, MATH2160, MATH2841, MATH3121
PATH3201
PHYS3630, PHYS3620, PHYS3710, PHYS3720, PHYS2601,
PHYS3010*, PHYS3050*, PHYS3760
One 56 hour or two 28 hour Category B General Education subjects

Stage 4
PHYS3021, PHYS3030, PHYS4411, PHYS4413, SAFE4410
1 General Education (Category C) subject
2 elective units 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 encompasses the scientific study of the smallest forms of life, namely bacteria, viruses, algae, fungi and protozoa. Microorganisms are probably best known as agents of disease in people, in other animals and in plants. Other micro organisms cause food spoilage, as well as serious deterioration in textiles and structural materials. As a result of their ubiquity, diverse metabolic capabilities and large enzymatic activity the major role of micro organisms is that of biogeochemical cycling within the ecosphere. We also depend on microorganisms for the recycling of organic wastes, for biodegradation of pollutants, for maintenance of soil fertility, and for production of foods, beverages, pharmaceuticals (especially antibiotics), and other industrially important materials. Molecular biology and microbial genetics are increasingly important in microbiology.

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.

4400
Microbiology and Immunology

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021
MICR2201, MICR2011
2 elective units*
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
MICR3021
At least 3 units from MICR3041, MICR3051, MICR3061, MICR3071, MICR3081
Additional elective units to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to undertake Stage 4 (Honours) must complete 8 Level III units

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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101 and BIOC2201 or BIOC2372*
BIOS2011 or MICR2201
BIOS2021
CHEM2021 or CHEM2041
MICR2011
1 or 2 elective units
One 56 hour or two 28 hour Category A 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
At least 1 unit from:
BIOC3131, BIOT3031 or MICR3021
1 or 2 units from:
BIOC3111, BIOC3291, BIOT3011, CMED8303, MICR3041 to give a total of at least 5 Level III units from the above.
A further 2 or 3 units to give a total of 23
Highly recommended: BIOC3271, BIOT3061, CMED8302, MICR3051
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 8 Level 3 units

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 units 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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
PSYC1002

Stage 2
ANAT2111
BIOC2372* (BIOC2312 may, with approval, be accepted)
PHPH2112*
PSYC2001, PSYC2021
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
ANAT3411, ANAT3421
PHPH3121**, PHPH3131**
PSYC3021, PSYC3031
Two additional units at Level II or Level III to complete 23 units***
One 56 hour or two 28 hour Category B 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 units 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
BIOS1011, BIOS1021
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
CHEM1101 and CHEM1201
and either
PHYS1002 or PHYS1022 or
COMP1811 and 1 other unit

Stage 2
ANAT2111
BIOC2372* (BIOC2312 may, with approval, be accepted)
PHPH2112*
and 2 units from the following:
ANAT2211, BIOS2041, BIOS2021
CHEM2011, CHEM2021, PSYC1002
or 2 Level II units from units offered from the Schools of Mathematics, Physics or Computer Science and Engineering and
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
ANAT3411, ANAT3421
PHPH3121**, PHPH3131**
and 4 other Level III units 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 units 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 Category B 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
All Level II/III subjects in Philosophy have one unit value in science.

Specialisation in Philosophy
Students specialising in Philosophy must complete, in addition to PHIL1006 and PHIL1007 (Introductory Philosophy A and Introductory Philosophy B), the equivalent of six full point Upper Level (II/III) units. Of these, at least four units 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 the equivalent of two Level II/III units in Stage 2, and the equivalent of four Level II/III units 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 one unit 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
PHIL2206	Contemporary Philosophy of Mind
PHIL2207	Issues in the Philosophy of Psychology
PHIL2208	Epistemology (Scepticisms)
PHIL2209	Epistemology (Knowledge and Justification)
PHIL2216	Human Nature and Human Understanding: the Empiricist Approach
PHIL2217	Personal Identity
PHIL2218	Philosophical Foundations of Artificial Intelligence
PHIL2219	Topics in Philosophy of Language
PHIL2226	Twentieth Century Analytic Philosophy
PHIL2227	Hume, Leibniz, Kant: Themes in Metaphysics
PHIL2308	Reason and the Passions: Descartes, Spinoza and Hume
PHIL2417	Relativism: Cognitive and Moral
PHIL2518	Greek Philosophy: Issues in Ethics and Epistemology
PHIL3106	PreHonours Seminar

The remaining two units 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 one unit 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
PHIL1006, PHIL1007
4 elective Units

Stage 2
2 Philosophy units*
6 elective units
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 Philosophy units*
3 elective units
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 7 Level II/III or Level III units including PHIL3106.

Stage 4 (Honours)
PHIL4000

** Refer to List A above for compulsory subjects.*

5206
Philosophy and Computing (Advanced Science only)

Stage 1
COMP1011, COMP1021
MATH1131 or MATH1141
MATH1231 or MATH1241
MATH1081
PHIL1006, PHIL1007
1 elective unit

Stage 2
COMP2011,COMP2031
PHIL2218
At least 2 Philosophy units from: PHIL2106, PHIL2806, PHIL2207, PHIL2108,
PHIL2218, PHIL2116, PHIL2107, PHIL2217, PHIL2216, PHIL2109, PHIL2208,
PHIL2209
One 56 hour or two 28 hour Category A 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 Category B 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
1 unit from: HPST1106, HPST1107, HPST1108 or PHIL1006 PHIL1007
5 elective units

Stage 2
PHIL2106
PHIL2116 or HPST2106
HPST2116
Further elective units to make a total of 8
one 56 hour or two 28 hour Category A General Education subjects

Stage 3
*PHIL2107 or *PHIL2117, and
3 units from: PHIL2107, PHIL2109, PHIL2116, *PHIL2117, PHIL2207, PHIL2208, PHIL2209, PHIL2218, HPST2014, HPST2109, HPST3106, HPST3117

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

3 elective units
One 56 hour or two 28 hour Category B General Education subjects

Stage 4 (Honours)
PHIL4000 or SCTS4106

PHYSICS

The programs offered by the School (0100, 0121, 0141 and 0161) 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
4 elective units** ***

Stage 2
MATH2100, MATH2120, MATH2510, MATH2520*
PHYS2001, PHYS2011,
PHYS2021, PHYS2031
2 elective units****
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
PHYS3010, PHYS3021, PHYS3030, PHYS3041,
PHYS3050***, PHYS3060***
3 elective units*****
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 Honours must complete 7 Level III units.

Stage 4 (Honours)
Choose one of PHYS4103, BSSM4013 (A Category C 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, BIOS1011 and BIOS1021 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 4 elective units 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 unit and projects in the Honours Stage.

Stage 1
MATH1131 or MATH1141*
MATH1231 or MATH1241*
PHYS1002
4 elective units**

Stage 2
MATH2100, MATH2120, MATH2510, MATH2520*
PHYS2001, PHYS2011, PHYS2021, PHYS2031, PHYS2160
1.5 elective units
One 56 hour or two 28 hour Category A General Education subjects.

Stage 3
PHYS3010, PHYS3021, PHYS3030, PHYS3041, PHYS3050, PHYS3060, PHYS3160
3.5 elective Level III units
One 56 hour or two 28 hour Category B General Education subject.

Stage 4 (Honours)
PHYS4103 (A Category C 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
2 elective units

Stage 2
COMP1821
MATH2100, MATH2120, MATH2510, MATH2520
PHYS2011, PHYS2021, PHYS2031

COMP2011
1 unit from PHYS2601, MATH2301, COMP2021
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
PHYS2001, PHYS3010, PHYS3021, PHYS3030
2 further Level III Physics units*
2 Level III Computer Science units
One 56 hour or two 28 hour Category B General Education subjects

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

**In Advanced Science an additional level III Physics or Mathematics unit is required*

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 Physiology 2, normally: satisfactory completion of PHPH2112 Physiology 1 and BIOC2101 and BIOC2201 or BIOC2372 or BIOC2101 and BIOC2201. Physiology 2 provides the 4 units at Stage 3 level 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 BIOC2101 and BIOC2201 or BIOC2372 or BIOC2101 and BIOC2201. Pharmacology is a 2 unit subject at the Stage 3 level 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 units 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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective Units

Stage 2*
PHPH2112*
BIOC2312 or BIOC2372* or BIOC2101 and BIOC2201
4 elective units (*Recommended electives:* Anatomy, Biological Science, Biochemistry, Chemistry, Psychology)
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
PHPH3114**
Further units to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects
Students taking Stage 4 (Honours) must complete 7 Level III units

Stage 4 (Honours)
PHPH4218

The Category C 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 PHPH3114 and PHPH3152 are limited and entry is based on academic merit.*

7301 Pharmacology

Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units.

Stage 2
PHPH2112*
BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201
4 elective units (Recommended electives: Anatomy, Biological Science, Chemistry, Psychology)
One 56 hour or two 28 hour Category A General Education subjects

** Student numbers in PHPH2112 and BIOC2372 are limited and entry is based on academic merit.*

Stage 3
PHPH3152* and either:
at least 2 units selected from PHPH3121, PHPH3131 and PHPH3142

or at least 2 units selected from BIOC3111, BIOC3121, BIOC3261, BIOC3271 and BIOC3281
or MICR3011 and at least 2 units selected from MICR3041, MICR3051 and MICR3061
or at least 2 units selected from CHEM3021, CHEM3041, CHEM3141, CHEM3221, CHEM3630 and CHEM3640
Further units to give a total of 23
One 56 hour or two 28 hour Category B 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 7 Level III units.

Stage 4 (Honours)
PHPH4258
The Category C 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 PHPH3114 and PHPH3152 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.

To become a member of the professional body, the Australian Psychological Society, and for registration as a psychologist in New South Wales, students will first need to complete a University degree which includes four Stages of approved academic training in psychology. In the Board of Studies in Science and Mathematics the academic requirements can be met by completing a four Stage BSc(honours) program in psychology, or the four Stage BSc(Psychol) degree course (3431) described later in this handbook. In addition, full registration and full membership require two Stages of either postgraduate study or supervised practical experience in 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
4 elective units*

Stage 2**
PSYC2001
2 units from:
PSYC2011, PSYC2021, PSYC2031, PSYC2051
5 elective units* (no more than 1 additional unit from Level II Psychology)
One 56 hour or two 28 hour Category A General Education subjects

Stage 3**
4 Level III Psychology units
3 elective units*
One 56 hour or two 28 hour Category B 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 3 other elective units (a total of 7 units in Stage 2), and 8 Level III Psychology units including PSYC3001, PSYC3011, PSYC3021 and PSYC3031. Entrance to PSYC4023 requires students to have completed Psychology units 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.*

1206
Psychology and 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
1 elective unit

Stage 2
COMP2011 and COMP2031
PSYC2001, PSYC2011 and PSYC2021
2 elective units from the list below*

One 56 hour or two 28 hour Category A General Education subjects

Stage 3
COMP3111, COMP3411 and COMP3511
PSYC3001 and PSYC3191
3 units from the list below, including at least 2 Level III Psychology units
One 56 hour or two 28 hour Category B General Education subjects

Stage 4 (Honours)
COMP4913 or PSYC4023 or PSYC4033
Students proposing to proceed to the honours Stage in Psychology must take 4 Level II and 4 Level III Psychology units, including PSYC2031, PSYC3021 and PSYC3031, in Stages 2 and 3. Entrance to PSYC4023 requires students to have completed Psychology units 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.
Students proposing to proceed to the honours Stage in Computer Science must take 4 Level III Computer Science units

***Elective List**
COMP2021, Level III Computer Science units 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
Any Level I HPST or SCTS unit
5 elective units

Stage 2
HPST2106
SCTS2107
1 additional HPST or SCTS unit
5 elective units
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 HPST or SCTS units
3 elective units
One 56 hour or two 28 hour Category B General Education subjects
Students intending to proceed to Stage 4 (Honours) must complete 8 HPST or SCTS units including 7 Level II/III units an average of credit or better

Stage 4 (Honours)
SCTS4106

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
BIOS1011, BIOS1021
CHEM1101, CHEM1201
MATH1131 or MATH1141 or MATH1011
MATH1231 or MATH1241 or MATH1021
2 elective units

Stage 2
BIOC2101, BIOC2201
BIOS2011, BIOS2021, BIOS2031, BIOS2041, BIOS2061
1 elective unit
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
4 units from BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3071, BIOS3081,
BIOS3091, BIOS3111, BIOS3131
3 elective units (which may be also from this list)
One 56 hour or two 28 hour Category B General Education subjects
Students proposing to proceed to Stage 4 (Honours) must complete 7 Level III units

Stage 4 (Honours)
BIOS4033 (F/T), BIOS4039 (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 Psychology Full-time Degree Course 3431 (UACNPS), Business Information Technology Course 3971 (UACNIT), Optometry Course 3950 (UACNOP), 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 (3980) leads to the award of the degree of Bachelor of Aviation on the completion of a three Stage program. It is offered jointly by the Faculties of Engineering, Professional Studies and Science. 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.

Degree Program

The Bachelor of Aviation incorporates a range of operationally oriented subjects designed to provide students with a broad base on which to build a career in professional aviation. It should be noted that due to the block training nature of the program, teaching periods may not correspond to standard academic sessions.

Stage 1
AVEN1300, AVEN 1500, AVEN1900, AVEN1910
MATH1079
PHYS1889
PROF0101, PROF0102, PROF0103
Industrial Experience

Stage 2
AVEN2200, AVEN2210, AVEN2400, AVEN2600, AVEN2700, AVEN2900, AVEN2910
MATH2079
PROF0202, PROF0203, PROF0204

Stage 3
AVEN3200, AVEN3210, AVEN3400, AVEN3600, AVEN3700, AVEN3900, AVEN3910
PHYS2819, PHYS 3789, PHYS3829
PROF0301, PROF0302, PROF0303, PROF0304

Note: Students must complete one Category B General Education subject during course of the degree.

3431
Psychology Degree Course
Full-time

Bachelor of Science (Psychology)
BSc(Psychol)

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

The four-Stage full-time course leads to the degree of Bachelor of Science (Psychology). The course is designed to provide the student with (1) a sound understanding of psychological theory, research skills, and psychological techniques, (2) elective studies in areas of individual interest, and (3) supporting studies in mathematics and/or biology (a minimum of one Stage is compulsory), and in arts or social sciences (a minimum of one Stage is compulsory).

This course meets the academic requirements for registration as a psychologist in New South Wales and for membership in the Australian Psychological Society. In addition, full registration and full membership require two Stages of either postgraduate study or supervised practical experience in psychology.

Degree Program

Stage 1
PSYC1002
BIOS1011 and BIOS1021 or
one of MATH1131 or MATH1141 or MATH1011 and
one of MATH1231 or MATH1241 or MATH1021
ECON1101 and ECON1102, or PHIL1006 and PHIL1007
or
12 Arts credit points of Level I Sociology or Political Science or other approved Arts and Social Sciences discipline
Choose 1 elective Level 1 subject from Arts and Social Sciences or Science

Stage 2
PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042
One Level II subject following on from one of the Level 1 non-psychology subjects taken which constitutes a recognised sequence of two Stages (one Level II subject is equivalent to 2 Science Level II units or 12 Arts Upper Level credit points)
Category A General Education (56 hours) and Category B General Education (56 hours)

Note: If one of the Stage 1 non-psychology subjects is divided into 2 single session subjects students may be able to replace the Session 2 subject with the Category A General Education (56 hours) requirement and in Stage 2 take the other non-psychology subject and the Category B General Education (56 hours) requirement.

Stage 3
Choose 8 Level III Psychology units including PSYC3001, PSYC3021 and PSYC3031
Students intending to take PSYC4003 in Stage 4 must also include PSYC3011 as one of the 8 units

Stage 4
PSYC4003 or PSYC4013

Examples of recognised sequences:

Arts and Social Sciences
Stage 1
12 Level I credit points of Economics, Philosophy, Political Science, Sociology or other approved discipline.

Stage 2
12 Upper Level credit points following on from the Stage 1 choice

Biochemistry
Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201

Stage 2
BIOC2101, BIOC2201

Genetics
Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201 (for BIOS2021 only)

Stage 2
Choose 2 units from BIOS2021 and BIOC2101 and BIOC2201, BIOS2011, BIOS3071, CMED3111

Mathematics or Statistics
Stage 1
MATH1131 or MATH1141
MATH1231 or MATH1241

Stage 2
Choose either 2 Level II units of Pure or Applied Mathematics for Mathematics, or MATH2801 and MATH2821 for Statistics

Physiology
Stage 1
BIOS1011, BIOS1021
CHEM1101, CHEM1201

Stage 2
PHPH2112
For students in Course 3431 the additional prerequisite of MATH1032 or MATH1231 or MATH1042 or MATH1241 or MATH1021 for PHPH2112 has been waived by the School of Physiology and Pharmacology.

Zoology
Stage 1
BIOS1011, BIOS1021

Stage 2
Choose 2 units from BIOS2011, BIOS2031, BIOS2051, BIOS2061, BIOS3011

Note: For details of Arts and Social Sciences subjects refer to the Faculty of Arts and Social Sciences handbook.

Award of the Degree

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.

Advanced Standing

1. Graduates may be admitted with exemption from no more than five subjects or their unit equivalents that they have completed. No more than two Psychology subjects may be included in these exemptions.

2. Undergraduates who transfer from another course to the Psychology Course may be admitted with exemption in no more than seven subjects or their unit equivalents that they have completed.

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 the Office of Industry Linked Education 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
1 elective unit
One 56 hour or two 28 hour Category A General Education subjects

Stage 3
INFS3605, INFS3608, INFS3616, INFS3692
MATH2841
2 elective units
Honours students additionally take INFS3606 and a further elective unit

Stage 4 (Pass Degree)
INFS3606, INFS3611, INFS4693
2 units including at least one at Level III
One 56 hour or two 28 hour Category B 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 1 elective Level III unit
One 56 hour or two 28 hour Category B 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. A new course structure for Stage 4 has been implemented from 1994. 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

BIOS1011	Biology A
CHEM1809	Biological Chemistry for Optometry Students
MATH1051	Mathematics 1F
OPTM1201	Ocular and Visual Science I
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

One 56 hour or two 28 hour Category A and one 56 hour or two 28 hour Category B General Education subjects

Stage 4 (Commencing 1994)

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

Stage 4 (Repeating Students)

MDCN8001	Principles of Medicine for Optometry Students
OPTM9041	Clinical Optometry
OPTM9042	Optometry B
OPTM9043	General Education C: Optometry and the Professional Environment
PSYC4106	Psychology (Optometry)

3951
Combined Science / Optometry Course

BSc BOptom

Conditions for the combined course leading to the award of the degrees of BSc BOptom

1. Undergraduates of The University of New South Wales who have satisfied the examiners in at least the first two Stages of the Optometry degree course may be admitted to the Science degree course with advanced standing for the purpose of qualifying for the award of the two degrees of BSc BOptom. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean of the Faculty of Science.

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 four units of either Level II or Level III and four other Level III units, in accordance with the Science and Mathematics Course regulations. The units submitted for the award of the Bachelor's degree under these regulations must include at least four Level III units 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 5.5 or 6 Science Units and 12 Arts Credit Points.

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 5.5 or 6 Science Units and 12 Arts Credit Points.

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

3995
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.

Accounting

Accounting Level I

ACCT1501
Accounting and Financial Management 1A
Staff Contact: School Office
U1 S1 or S2 L2 T2
Note/s: Restricted to programs 0600, 1000, 1400, 6810, Courses 3681 and 3971. Not available in Year 1 of programs 0600, 1000, 1400. May be counted in combined degree courses 3611, 3661 and 3701 only in special circumstances.

This is the first unit 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
U1 S1 or S2 L2 T2
Prerequisite: ACCT1501
Note/s: Restricted to programs 0600, 1000, 1400, 6810 and Course 3971.

The second unit 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
U1 S1 L2 T2
Prerequisite: ACCT1511
Note/s: Excluded ACCT2532. Restricted to programs 0600, 1000, 1400, 6810 and Course 3971.

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.

ACCT2532
Accounting and Financial Management 2A (Hons)
Staff Contact: School Office
U1 S1 L2 T2
Prerequisite: ACCT1511
Note/s: Restricted to programs 0600, 1000, 1400, 6810 and Course 3971. Excluded ACCT2522.

The content of this subject includes that of ACCT2522 Accounting and Financial Management 2A as well as additional and more advanced work in management accounting.

ACCT2542
Accounting and Financial Management 2B
Staff Contact: School Office
U1 S2 L2 T2
Prerequisite: ACCT1511
Note/s: Excluded ACCT2552. Restricted to programs 0600, 1000, 1400, 6810 and Course 3971.

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.

ACCT2552
Accounting and Financial Management 2B (Hons)
Staff Contact: School Office
U1 S2 L2 T2
Prerequisite: ACCT1511
Note/s: Restricted to programs 0600, 1000, 1400, 6810 and Course 3971. Excluded ACCT2542.

The content of this subject includes that of ACCT2542 Accounting and Financial Management 2B as well as additional and more advanced work in financial accounting.

Accounting Level III

ACCT3563
Accounting and Financial Management 3A
Staff Contact: School Office
U1 S1 or S2 L2 T2
Prerequisite: ACCT2542
Note/s: Excluded ACCT3573.

The final financial reporting unit 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.

ACCT3573
Accounting and Financial Management 3A (Honours)
Staff Contact: School Office
U1 S1 L2 T2.5
Prerequisite: ACCT2552
Note/s: Excluded ACCT3563. Restricted to program 6810.

Includes ACCT3563 Accounting and Financial Management 3A as well as additional and more advanced work in both accounting theory and in the financial management and accountability of corporate enterprises.

ACCT3583
Accounting and Financial Management 3B
Staff Contact: School Office
U1 S1 or S2 L2 T2
Prerequisite: ACCT2522
Note/s: Excluded ACCT3593. Restricted to programs 1400, 6810 and Course 3971

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, 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.

ACCT3593
Accounting and Financial Management 3B (Honours)
Staff Contact: School Office
U1 S2 L2 T2.5
Prerequisite: ACCT2532
Note/s: Excluded ACCT3583. Restricted to program 6810.

Includes ACCT3583 Accounting and Financial Management 3B, as well as more advanced work dealing with theoretical and research issues in management accounting.

Anatomy

Anatomy units may be taken in programs other than 7000 only with the special permission of the Head of the School of Anatomy.

Anatomy Level II

ANAT2111
Introductory Anatomy
Staff Contact: Dr P. Pandey
U1 S1 HPW6
Prerequisites: BIOS1011, BIOS1021
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
U1 F HPW3
Prerequisites: BIOS1011, BIOS1021
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 K. Ashwell
U1 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: A/Prof D. Tracey
U1 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: A/Prof D. Tracey
U1 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.

ANAT3211
Histology 2
Staff Contact: Dr B. Freeman
U1 F HPW3
Prerequisite: ANAT2211
Note/s: ANAT3211 and ANAT3220 are mutually exclusive. Students who have completed ANAT3220 may undertake additional work for ANAT3211. The two subjects together count as 1 unit. Restricted to program 7000 or in the Anatomy Quota.

Advanced mammalian histology, with particular reference to the human. Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry. Project work. Electron microscopy.

ANAT3220
Histological and Histochemical Techniques
Staff Contact: Dr B. Freeman
U.5 S2 HPW3
Prerequisites: BIOS1011, BIOS1021 and any 1 of BIOC2101 and BIOC2201, BIOS2061 or ANAT2211
Note/s: Excluded ANAT3211.

Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry.

ANAT3311
Mammalian Embryology
Staff Contact: Dr M. Smith
U1 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. 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
U1 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
U1 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
U10 F
Prerequisites: Completion of Year 3 of program 7000 or equivalent including 6 Level III units, at least 4 of which must be Anatomy units.

An honours program consisting of the preparation of a thesis proposal, an undergraduate thesis and participation in School seminars.

The Category C 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
U6 F
Prerequisites: Completion of Year 3 of Program 7000 or equivalent, including 6 Level III units of which at least 4 must be Anatomy units.

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 4 other units (normally including ANAT4510) approved by the Head of School.

ANAT4510
Basic Research Methods
Staff Contact: Dr K. Ashwell
U1F
Prerequisites: 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

AVEN1910

Flying Training 1

Staff Contact: Flight Standards Officer
F
Note/s: Restricted to course 3890.

Practical flying training and associated ground training by contracted flying school. (See Note re Flying Training Syllabus)

AVEN2910
Flying Training 2
Staff Contact: Flight Standards Officer
F
Prerequisites: Flying Training 1
Note/s: Restricted to course 3890.

Practical flying training and associated ground training by contracted flying school. (See Note re Flying Training Syllabus)

AVEN3910
Flying Training 3
Staff Contact: Flight Standards Officer
F
Prerequisites: Flying Training 2
Note/s: Restricted to course 3890.

Practical flying training and associated ground training by contracted flying school. (See Note re Flying Training Syllabus)

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

Industrial Experience
Staff Contact: Flight Standards Officer
Note/s: Restricted to course 3890.

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
U1 S1 or S2 L2 T1
Prerequisites: FINS2612 *OR* any two of ACCT1511, ECON1102 and ECON1203
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
U1 S1 or S2 L2 T1
Corequisites: ECON1102 and ECON1203 or completion of Stage 1 for students from other faculties.
Note/s: Restricted to program 1400.

Analysis of markets for the 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
U1 S1 or S2 L2 T1
Prerequisite: FINS2613
Note/s: Excluded FINS2714 and FINS3615. Restricted to program 6810.

Introduces to 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
U1 S1 or S2 L2 T1
Prerequisites: 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 and Mr. H. Shoory
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021, CHEM1101 and CHEM1201 or CHEM1002
Note/s: Excluded BIOC2312, BIOC2372, CHEM2929. Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit 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
U1 S2 HPW6
Prerequisite: BIOC2101
Note/s: Excluded BIOC2312, BIOC2372

Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit as an elective part of their program.

This unit 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: A/Prof M. Edwards
U2 F HPW6
Prerequisites: BIOS1011 and BIOS1021, 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
U1 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: A/Prof A. Mackinlay
U1 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
U1 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
U1 S2 HPW6
Prerequisite: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

This unit 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
U1 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
U1 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
U1 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: Dr I. McFarlane
U10 F
Prerequisites: Completion of program 4100 including 8 Level III units 4 of which must be Biochemistry units.

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 Category C 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:
BIOS 2011 Evolutionary and Physiological Ecology
BIOS 2021 Introductory Genetics
BIOS 2051 Flowering Plants
BIOS 2061 Vertebrate Zoology
BIOS 3071 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 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

BIOS1011
Biology A
Staff Contact: Dr M.L. Augee
U1 S1 HPW6
Prerequisites: HSC Exam Score Required: 2 unit Science (Physics) 53100, or 2 unit Science (Chemistry) 53100, or 2 unit Science (Geology) 53100, or 2 unit Science (Biology) 53100, or 3 unit Science 90150, or 4 unit Science 150
Note/s: Prerequisites for BIOS1011 are minimal (and may be waived on application to the Director) but students without knowledge of chemistry will find BIOS1011 difficult. Practical and tutorial seat assignments must be obtained at UNISEARCH HOUSE 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 it for details of the course and assessments.

The biology of cells; their structure as seen with light and electron microscope;how they move, take in and excrete substances; their chemistry and use of energy. Inheritance and mutations; genes and how they work. The theory covered in the lectures and tutorials is illustrated by observation and experiment in laboratory classes.

BIOS1021
Biology B
Staff Contact: Dr M.L. Augee
U1 S2 HPW6
Prerequisites: BIOS1011 (however, students without this prerequisite may seek the permission of the Director to enrol)

The evolution, diversity and behaviour of living things and the ways in which they have adapted to varying environments. Emphasis on the structure and function of flowering plants and vertebrate animals, and their roles in Australian ecosystems. The theory covered in lectures and tutorials is illustrated by observation and experiment in laboratory classes, which include dissection of a toad and a rat.

Biological Science Level II

BIOS2011
Evolutionary and Physiological Ecology
Staff Contact: Dr P Steinberg
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021
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
U1 S2 HPW6
Prerequisites: BIOS1011 and BIOS1021
Corequisite: BIOC2201
Note/s: Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit as an elective part of their program. Students must enrol at the Biological Science Registration Centre, Room G20, 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
U1 S2 HPW6
Prerequisites: BIOS1011 and BIOS1021
Note/s: Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit 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
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021
Note/s: Excluded MATH2801, MATH2901, MATH2841.

Application of statistics to biological data. The main probability distributions (chi square, normal, student's t, F). Estimation statistics and tests of hypotheses. Parametric and nonparametric anovas and linear regression/correlation. Goodness of fit testing. *A. priori* and *A. posteriori* comparisons. Introduction to factorial analysis.

BIOS2051
Flowering Plants
Staff Contact: A/Prof A. Ashford
U1 S2 HPW6
Prerequisites: BIOS1011 and BIOS1021
Note/s: Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit as an elective part of their program. Students must enrol at the Biological Science Registration Centre, Room G20, 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
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021
Note/s: Excluded 45.301, 17.732. Practical class allocations must be obtained during re-enrolment week from room G20, Biological Science Building. Enrolment in this unit may be subject to quota restrictions. Such restrictions will only apply to students taking this unit 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. 1

The course includes projects or field excursions. Field excursions may incur personal expenses.

Biological Science Level III

BIOS3011
Animal Behaviour
Staff Contact: Dr D. Croft
U1 S2 HPW6
Prerequisites: 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
U1 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
U1 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 J. Anderson and Dr. C. Orton
U1 S1 HPW6
Prerequisites: 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
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS102 and any 2 Level II Science subjects

Interactions of plants with their soli 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 using the BIOCLIM package.

BIOS3071
Conservation Biology and Biodiversity
Staff Contact: Dr W. Sherwin
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021, plus any 2 Level II Biological Science subjects
Note/s: Students must enrol at the Biological Science Registration Centre, Room G20, 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
U1 S1 HPW6
Prerequisite: MSCI2001 or 2 Level II units in Biological Science
Note/s: Students intending to enrol in this unit 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 Biology.

BIOS3091
Marine Botany and Ecology
Staff Contact: A/Prof R. King
U1 S2 HPW6
Prerequisite: MSCI2011 or 2 Level II units in Biological Science

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
U1 S1 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
U1 S1 HPW6
Prerequisite: BIOS2051
Note/s: Not offered in 1995. Offered in 1996.

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
U1 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: A/Prof A Ashford
U1 S1 HPW6, 2 hrs lectures, 4 hrs lab per week
Prerequisite: BIOS2051

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

BIOS4013/BIOS4019
Biological Science 4 (Honours)
Staff Contact: A/Prof C. Quinn
U10 F
Prerequisites: Completion of program 1700 including 7 Level III units

BIOS4023/BIOS4029
Botany 4 (Honours)
U10 F
Prerequisites: Completion of program 1743 including 7 Level III units, 4 of which must be Botany units or a closely related discipline

BIOS4033/BIOS4039
Zoology 4 (Honours)
U10 F
Prerequisites: Completion of program 1745 including 7 Level III units 4 of which must be Zoology units

The Category C 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 N Dunn
S1 L3 T3
Prerequisite: BIOC2101 and 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 (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 low grade 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 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, and a design project.

BIOT3031
Microbial Genetics
Staff Contact: Dr S. Delaney
U1 S1 L2 T4
Prerequisites: BIOS2011, BIOS2021, BIOC2101, BIOC2201and 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 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
U1 S2 L2 T4
Prerequisite: 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
U10 F
Prerequisites: Completion of 8 Level III units 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 Category C 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)
U10 F
Prerequisites: Completion of program 0100 including 8 Level III units

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
U10 F
Prerequisites: Completion of Program 6851, 6852 or 6853 including 6 Level III units

BSSM4103/BSSM4109
Genetics 4 (Honours)
Staff Contact: Prof I. Dawes
U10 F
Prerequisites: Completion of Program 6840 including 6 Level III units

The Category C General Education requirements are met by participation in the Category C program offered by the supervisor's School.

Chemical Engineering and Industrial Chemistry

Polymer Science

POLY3010
Polymer Science
Staff Contact: A/Prof R. Burford
S1 L2 S2 Lab2
Prerequisites: CHEM2011, CHEM2021, MATH2021, MATH2819
Co or prerequisites: 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
U1 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
U1 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 two Level I Chemistry units may be counted towards a Science degree.

CHEM1401
Introductory Chemistry A
Staff Contact: Dr P. Chia
U1 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.

CHEM1501
Introductory Chemistry B
Staff Contact: Dr P. Chia
U1 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
Note/s: Not offered in 1995

CHEM1601
Living with Chemistry
Staff Contact: Dr P. Chia
U1 S1 or S2 HPW6
Prerequisite: 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 is a terminating subject for students who are interested in Chemistry, but for whom it is not a compulsory subject in that course.

This course is a study of the impact of chemistry on the development of our civilisation. The physical and chemical properties of matter and the rules that govern these properties will be introduced through the study and analysis of some everyday materials. Topics include elements and compounds; chemical energy as a source of electricity; atomic and molecular structure; stoichiometry and solution stoichiometry; energy: food, fuels and chemical; acids and bases: acidity of common substances; the gas laws; organic chemistry and its importance in biological systems.

Chemistry Level II

CHEM2011
Physical Chemistry
Staff Contact: Prof R. F. Howe
U1 S1 or S2 HPW6
Prerequisites: CHEM1002, 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
U1 F or S2 HPW6
Prerequisite: CHEM1002

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
U1 S1 or S2 HPW6
Prerequisite: CHEM1002

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
U1 S1 or S2 HPW6
Prerequisites: CHEM1002, 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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 S2 HPW6
Prerequisite: CHEM2011
Note/s: Not available in 1995

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
U1 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
U1 S1* or S2* HPW6
Prerequisites: CHEM2011 or CHEM2021 or CHEM2031 or CHEM2041
Note/s: Not available in 1995 Session 1

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
U1 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
U1 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.

CHEM3421
Materials and Processes Affecting the Environment
Staff Contact: Prof I. Dance
U1 S1 HPW6
Prerequisite: CHEM2011, CHEM2021, CHEM2031, CHEM2041
Note/s: Excluded CHEM3221, CHEM3231

Metal ions in aquatic environments: sources, distribution and transport. Organometallic compounds: industrial and biological sources, reactivities and transformations. Compounds of heavy metals and their environmental effects. Naturally occurring and man-made radioisotopes; mechanisms of transport; radionuclides in the food chain. Production and properties of hydrocarbons, solvents, agricultural chemical and pesticides. Common plastics and cellolosic products. Toxic byproducts of industrial processes. Types and origins of air pollution.

CHEM3431
Chemistry of Pollution Control
Staff Contact: A/Prof G. Crank
U1 S2 HPW6
Prerequisite: CHEM2011, CHEM2021, CHEM2031, CHEM2041, CHEM3421

Handling and disposal of reactive and toxic chemicals. Modes of dispersal of organic materials in the environment. Chemical transformations in the environment; oxidations , hydrolysis, photochemical and microbiological changes. Catalytic and photochemical processes for the degradation of wastes. Detoxification of heavy metals. The chemistry of waste water and sewage treatment. Catalytic processes for air pollution control. Isolation and disposal of radiochemical wastes.

CHEM3441
Environmental Monitoring
Staff Contact: Prof B. Hibbert
U1 S1 HPW6
Prerequisite: CHEM2011, CHEM2021, CHEM2031, CHEM2041
Note/s: Excluded CHEM3041

Environmental sampling. Theory and operating principles of analytical methods: chromatography, spectrophotometry, ICP mass spectrometry and radiochemical assay. EPA standard methods and their relevance to Australia pollution problems. Remote sampling. Interpretation of analytical data from environmental samples.

CHEM3510
Quantum Chemistry and Symmetry
Staff Contact: Prof R. Howe
U.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
U.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
U.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
U.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
U1 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)
U10 F
Prerequisites: Completion of Program 0200 or 0205 Including 8 Level III Units 4 of which must be Chemistry units.

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

The Category C General Education requirements are met within the Honours Program by seminars, discussion and the safety training program.

Students intending to seek admission to this program should consult the School re selection of units 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
U.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
U1 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
U1 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
U2 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 R. F. 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 R. F. 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
U1 S2 HPW6
Prerequisite: BIOS1011

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
U1 S1 HPW5
Prerequisites: 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
U1 S2 HPW5
Prerequisites: A unit of genetics and a 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.

CMED8302
Human Biochemical Genetics
Staff Contact: Dr L. Lai
U1 S2 HPW6
Prerequisites: BIOC2312 and 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
U1 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
U10 F
Prerequisites: Completion of *at least* 3 of the following: BIOC3111 and BIOC3121, BIOT3031, MICR3041, BIOS3071, CMED3111, CMED8201, CMED8202, CMED8302, CMED8303 as well as 6 Level III units

Computer Science and Engineering

Computer Science and Engineering Level I

COMP1011
Computing 1A
Staff Contact: Dr A. Taylor
U1 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
U1 S1 or S2 L3 T3
Prerequisite: COMP1011
Note/s: Excluded COMP1821, 6.621, 6,021D.

Introduction to the procedural programming and Modula-2. *Control structures:* selection, recursion and iteration. *Abstract data types:* Lists, stacks, queues, trees. Implementation in a procedural language (Modula-2) 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: A/Prof P. Compton
U1 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 (Modula-2) 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
U1 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) 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
U1 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
U1 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 J. Zic
U1 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
U1 S1 L3 T2
Prerequisites: 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
U1 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
U1 S2 L3 T2
Prerequisites: 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, liner 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
U1 S1 L3 T2
Prerequisites: 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
U1 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
U1 S1 or S2 L3 T2
Prerequisite: COMP2011, 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
U1 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
U1 SS L3 T2
Prerequisite: COMP2011
Note/s: Excluded 6.647, 6.661G. Not offered in 1995.

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: A/Prof J. Lions
U1 S2 L3 T2
Prerequisites: 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. Sammutt
U1 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
U1 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
U1 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
U10 F
Prerequisites: Completion of program 0600 including 6 Level III units.

The Honours year consists of advanced coursework electives and a thesis. Category C 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
U1 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
U1 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
U1 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
U1 S2 HPW3
Prerequisite: ECON1102 or ECON1103
Note/s: Excluded ECON2101. 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
U1 S1 HPW3
Prerequisite: ECON1102 or ECON1104
Note/s: Excluded ECON2102. 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 E.H. 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 and Laboratory
Staff Contact: Prof I.F. 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. Three-phase circuits: balanced and unbalanced steady-state operation; real and reactive power in balanced circuits, transient analysis. Operational amplifiers and ideal transformers.The use of the computer aided circuit analysis package Micro-Cap III. Laboratory Technique.

ELEC2033
Analog Electronics and Laboratory
Staff Contact: Dr S.R. Wenham
S2 L2 T2.5
Prerequisites: ELEC2030, PHYS2949 or PHYS2859
Note/s: Excluded ELEC2020. Restricted to Program 0600

Operating principles and terminal characteristics of PN diodes, bipolar and field effect transistors and thyristors. Small signal models of devices. Analysis and design of low-frequency Class-A amplifiers, including choice of biasing method. Consideration is given to stability, impedence matching,output voltage swing and the various accompanying tradeoffs. Laboratory work on circuits devices and systems. Computer aided experimental work.

Environmental Science

Environmental Science Level I

ENVS1011
Environmental Science 1
Staff Contact: A/Prof B. Fox
U1 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
U.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 and compared to the Australian situation.

ENVS2020
The Urban Environment
Staff Contact: A/Prof B. Fox or Dr B Parolin
U.5 S2 HPW3
Prerequisites: 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.

Geography

Geography Level I

GEOG1031
Environmental Processes
Staff Contact: Dr I. Prosser
U1 S2 L3 T1
Note/s: Excluded GEOG1073

The subject is an introduction to physical geography outlining the processes and history of physical and biological components of the environment. This knowledge is then used to improve our understanding of global environment problems.Aspects of the environment considered include the Earth's energy balance, atmospheric systems, ecosystems, soils and erosion processes.

GEOG1062
Australia and Global Development
Staff Contact: A/Prof I. Burnley & Dr M. Sant
U1 S1 L2 T1

The main concern is the progressive integration of Australia into global capitalism and the developmental and environmental consequences of this process in Australia and Pacific Rim countries and adjacent territories. Topics covered include colonial and dependent development in Australia and resource use; applications of development theory as applied to coreperiphery relationships between world financial centres and Australia, and between Australia and Pacific Island territories; transnational organisations and technology transfer and investment in Australia and Pacific countries; the relationship between changing trade patterns, production and development in Australia and Pacific Rim countries; Australia in a future world.

GEOG1073
Environmental Processes and Analysis
Staff Contact: Dr I. Prosser
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: A/Prof J. Dodson
U1 S1 L1 T3
Prerequisite: Either GEOG1073 or both GEOG1031 and GEOG1062

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
U1 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.

GEOG2032
Geomorphology
Staff Contact: Drs W. Erskine, I. Prosser
U1 S2 L2 T2
Prerequisites: GEOG3051

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.

GEOG2092
Australian Social and Economic Landscapes
Staff Contact: A/Prof I. Burnley
U1 S1 L2 T2
Prerequisite: GEOG1062

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

GEOG3000
Field Project 3
Staff Contact: A/Prof M. Melville (Physical), Prof B. Garner & Dr B. Parolin (Economic)
U0 F T1.5
Prerequisite: One of GEOG3011, GEOG3021, GEOG2032. This prerequisite does not apply to students registered in course 3010
Note/s: Students will incur personal costs.

A five days field project normally undertaken during a recess, designed to support teaching in Year 3 Level III subjects in physical and economic geography and to demonstrate the application of field methods in problem solving and research projects. Students will incur some personal expenses in connection with this subject, which is a compulsory part of the course.

GEOG3011
Pedology
Staff Contact: A/Prof M. Melville
U1 S1 L2 T2
Prerequisites: GEOG1073 and one of CHEM1101 or CHEM1401 or both GEOL1101 and GEOL1201 or both BIOS1011 and BIOS1021

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.

GEOG3021
Biogeography
Staff Contact: A/Prof J. Dodson & A/Prof M. Fox
U1 S2 L2 T2
Prerequisites: GEOG1073 and both BIOS1011 and BIOS1021

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.

GEOG3032
Remote Sensing Applications
Staff Contact: Mr A. Evans
U1 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
U1 S2 L2 T2
Prerequisites: GEOG1031 or GEOG1073 or by permission from Head of School

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.

GEOG3051
Soils and Landforms
Staff Contact: Drs W. Erskine, I. Prosser
U1 S1 L2 T2
Prerequisite: GEOG1031 or 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.

GEOG3062
Environmental Change
Staff Contact: A/Prof J. Dodson
U1 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.

GEOG3122
Geographic Information Systems
Staff Contact: Prof. B.J. Garner & Mr S. Filan
U1 S2 L2 T2
Prerequisite: GEOG3161 or by permission from the Head of School This prerequisite does not apply to students enrolled in course 3010.

An introduction to information systems of particular relevance for geographers with special reference to computerbased 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
U1 S1 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. B.J. Garner
U1 S1 L1 T3
Prerequisites: Successful completion of a Year 1 program in Science or Arts or equivalent as approved by Head of School
Note/s: Not offered in 1995.

Introduction to theoretical and practical problems in displaying data graphically and constructing thematic maps by computer using the GIMMS 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
U1 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
U1 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
U1 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 and Dr I. Prosser
U1 S1 L2 T2
Prerequisite: GEOG1073 or GEOG1031

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: A/Prof J. Dodson
U1 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

GEOG4032
Honours Geography
Staff Contact: Mr A. Evans
U10 F
Prerequisites: Completion of program 2700, 2527 or 6851 including GEOG2013 and 8 Level III units.

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 Category C 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 M. D. Buck
U1 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 in connection with the fieldwork component. 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 M. D. Buck
U1 S2 L3 T2
Prerequisites: 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 in connection with the fieldwork component. 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.

Applied Geology Level II

GEOL2011
Mineralogy & Igneous Petrology
Staff Contact: Dr P.C. Rickwood/ A/Prof B.J. Hensen
U1 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.

Mineralogy. Principles of optical crystallography and the use of the 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. M.D. Buck/ A/Prof B.J. Hensen/Dr P.G. Lennox
U1 S2 L3 T2
Prerequisite: GEOL2011
Note/s: Fieldwork of up to 4 days is a compulsory part of this subject. Students will incur personal costs.

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 C.R. Ward/A/Prof A.D. Albani
U1 S1 L3 T2 Field 1
Prerequisite: GEOL1201
Note/s: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

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. Palaeontology. Morphology and geological significance of invertebrates including Foraminifera, Coelenterata, Brachiopoda, Mollusca, Arthropoda, Echinodermata and Protochordata. Introductory paleobotany, biogeography, ichnology (trace fossils) and biostratigraphy.

GEOL2041
Geological Computing
Staff Contact: Dr D. R. Cohen
U.5 S1 L2 T1
Prerequisite: GEOL1101

Introduction to the use of PC, Network and VAX computer systems with emphasis on geological software. Introduction to programming in FORTRAN with statistical applications pertinent to geoscience.

GEOL2042
Geological Statistics
Staff Contact: Dr D.R. Cohen
U1 S2 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
U1 S1 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.

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 A.D. Albani/Mr G. McNally
U1 S2 L2 T1
Prerequisite: GEOL1101 or GEOL1201
Note/s: Field work of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

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. Photogeology. The use of air photos for geological mapping and geomorphologic evaluation of land. Techniques and principles of multi-band photography; photo-interpretation of geological features. Relationships between geology, drainage, soil and vegetation, orebody expression gossans, colouration halos. An introduction to remote sensing.

GEOL2072
Environmental Geology
Staff Contact: Dr J. Jankowski
U.5 S2 L2 T1

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. 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 P.C. Rickwood/ Mr P.R. Atherden
U.5 S2 L2 T1
Prerequisite: GEOL1201

Geochemistry. Accuracy, precision and quality of geochemical data. Graphical display of analyses. Norms. The natural distribution of elements in terrestrial rocks. Heavy metals in unconsolidated sediments. Nature and origin of meteorites and tektites. Aqueous Geochemistry. Redox potentials in nature. Oxidation/reduction and sediment formation. Solubilities, metal transport and ore deposition. The formation of minerals from solution. Particular aqueous geochemical systems.

GEOL6201
Marine Geology 1
Staff Contact: A/Prof A.D. Albani
U1 F L1 T2
Prerequisites: GEOL1101 and GEOL1201
Note/s: Field work of five days in a compulsory part of the subject. Students will incur personal costs.

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. Mineralogy and Petrology. Igneous and sedimentary rock types of the ocean floor and their significance.

GEOL6221
Introductory Geophysics
Staff Contact: Mr D. Palmer
U1 S1 HPW3
Note/s: Excluded GEOL2051. Fieldwork of up to 5 days is a compulsory part of the subject. Students will incur personal costs.

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: A/Prof C. R. Ward/ Dr. M.D. Buck
U1 F L2 T1
Prerequisite: GEOL1101 or GEOL1201
Exclusions: GEOL2011, GEOL2022, GEOL3102

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 A.D. Albani
U1 F L2 T1
Prerequisite: GEOL1101 or GEOL1201
Exclusions: GEOL2031, GEOL2072
Note/s: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

Flow regimes and sedimentary structures. Depositional processes and sedimentation in modern and ancient environments. The facies concept. Pollutants and water quality principles, waste disposal. Geological hazards and urban planning. Assessment and impact of dams and mining. Exploration for ground water and monitoring ground water resources.

GEOL8220
Sedimentology
Staff Contact: A/Prof C.R. Ward
U.5 S1 L1 T1
Prerequisite: GEOL1201
Note/s: Excluded GEOL2031. Field work of up to 5 days in a compulsory part of the subject. Students will incur personal costs.

As for Sedimentology in GEOL2031 Sedimentology and Palaeontology.

Applied Geology Level II/III

GEOL6231
Coastal Monitoring Techniques
Staff Contact: A/Prof A.D. Albani
U1 S1 L1 T2 (only offered in S2 in 1995)
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 P.C. Rickwood
U.5 S1 L2 T1
Prerequisite: GEOL1201

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 B.J. Hensen
U1 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.

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 metamorphosism. 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
U1.5 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.

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
U1 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 G. McNally
U.5 S2 L2 T1
Note/s: Fieldwork of up to 2 days is a compulsory part of this subject. Students will incur personal costs.

Rock and soil masses and their engineering behaviour. Influence of composition and fabric. Discontinuities in rocks and soils and their analysis for engineering purposes. Mechanical properties and their measurement. Stress-strain theory. Examples of Engineering Geology applications.

GEOL3082
Structural Geology
Staff Contact: Dr P.G. Lennox
U1 S2 L2 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 A.C. Dunlop/ Prof G.J.S. Govett/ Dr D. R. Cohen
U.5 S2 L2
Prerequisites: GEOL2092 and GEOL3101

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

GEOL3101
Ore Deposits
Staff Contact: Dr A.C. Dunlop
U1 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 and specimens, thin sections and polished sections from these ore deposit categories.

GEOL3102
Fossil Fuels & Nonmetallic Resources
Staff Contact: A/Prof C.R. Ward
U1 S2 L3T2 Field 1
Prerequisites: GEOL1201
Note/s: Fieldwork of up to 2 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. Geology of oil shale. Petroleum Geology. Geological factors critical to the occurrence of oil and natural gas. Geochemistry of hydrocarbons and formation fluids; techniques of petroleum exploration. Assessment and development of reserves. Typical petroleum occurrences in Australia and overseas. 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 A.D. Albani
U1 S2 L1 T2
Prerequisite: GEOL6201

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. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. The hydrological cycle. Hydrological characteristics of rocks and their measurement. Aquifer

boundaries. Exploration for groundwater development. Case studies from Australia. Geological evolution of the Australian continent. Depositional regions within and adjacent to continents, islands and ocean basins. Development of the Pre-Cambrian craton. Palaeozoic-Mesozoic evolution of the eastern Australian mobile belt.

GEOL6321
Coastal Environmental Assessment
Staff Contact: A/Prof A.D. Albani
U1 S2 L1 T2
Note/s: Field work of up to 3 days is a compulsory part of this subject. Students will incur personal costs.

The physical nature of the various coastal environments: their morphology and the relationship between water masses and the sedimentary benthos characteristics of the 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
U1 S2 L2 T1
Note/s: Excluded GEOL3052. 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.

GEOL6331
Geochemistry
Staff Contact: Dr. P.C. Rickwood/ Mr P.R. Atherden
Prerequisites: GEOL1201
U0.5 S2 L2
Note/s: Excluded programs 2500, 2503, GEOL2092.

As for GEOL2092

GEOL7323
Environmental Techniques
Staff Contact: Dr P. C. Rickwood/ Mr P. R. Atherden
U1 F L2 T1
Prerequisites: GEOL7223
Note/s: Excluded GEOL2092, GEOL3011

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. Accuracy, precision, quality and display of geochemical data, Norms. Element distribution in terrestrial rocks. Heavy metals in unconsolidated sediments. Radiogenic dating. Redox potentials. Solubilities, metal transport and ore deposition. The formation of minerals from solution.

GEOL7333
Environmental Statistical Methods
Staff Contact: Dr D. R. Cohen
U1 F L2 T1
Prerequisites: GEOL1101 or GEOL1201
Note/s: Excluded GEOL2041, GEOL2042

Introduction to the use of PC, network and VAX computer systems with emphasis on geological software. Introduction to programming in FORTRAN 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
U.5 S1 L2 T1
Prerequisites: PHYS1002 and 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.

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
U.5 S1 L2 T1
Prerequisites: PHYS1002 and MATH1032 or MATH1231.
Note/s: Excluded program 2500. Restricted to program 2503. It is desirable that students taking this unit have a background in geology. Field work of one day is a compulsory part of this subject. Students will incur personal costs.

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
U.5 S1 L2 T1
Prerequisites: PHYS1002 and MATH1032 or MATH1231.
Note/s: Excluded program 2500. Restricted to program 2503. It is desirable that students taking this unit have a background in geology. Field work of one day is a compulsory part of the subject. Students will incur personal costs.

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. M.B. Katz
U.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. 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. M.B. Katz
U.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.

Applied Geology Level IV

GEOL4303
Geology Honours
Staff Contact: Dr P. G. Lennox
U10 F
Prerequisites: Completion of program 2500 or 2503, including 8 Level III units.
Note/s: An extensive field project is a compulsory part of this subject. Students will incur personal costs.

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.

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

GEOL4313
Earth and Environmental Science (Honours)
Staff Contact: A/Prof A. D. Albani
U10 F
Prerequisites: Completion of program 2527 including 8 Level III units
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
U10 F
Prerequisites: Completion of Programs 2527 including 8 Level III units.
Note/s: Extensive field work is a compulsory part of this subject and students will incur personal expenses.

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.

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

GEOL4343
Geology Honours P/T
Staff Contact: Applied Geology Office
Prerequisites: Completion of Programs 2500 or 2503 including 8 Level III units.
Note/s: Extensive field work is a compulsory part of this subject and students will incur personal expenses.

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.

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

GEOL7401
Earth Environments Honours by research
Staff Contact: A/Professor A.D. Albani
U10 F
Prerequisites: Completion of three years of Program 6866 including 6 Level III units.
Note/s: Field work is a compulsory part of this subject and students will incur personal expenses.

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/Professor A.D. Albani
U10 F
Prerequisites: Completion of three years of Program 6866 including 6 Level III units.
Note/s: Field work is a compulsory part of this subject and students will incur personal expenses.

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/Professor A.D. Albani
U10 F
Prerequisites: Completion of three years of Program 6866 including 6 Level III units.
Note/s: Field work is a compulsory part of this subject and students will incur personal expenses.

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/Professor A.D. Albani
U5 S1 or S2
Prerequisites: Completion of three years of Program 6866 including 6 Level III units.
Note/s: Field work is a compulsory part of this subject and students will incur personal expenses.

Subject to the approval by the Program advisor, students will undertake a project that involves writing of a thesis.

Information Systems

Information Systems Level II

INFS1602
Computer Information Systems 1
Staff Contact: School Office
U1 S1 or S2 L2 T2
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
U1 S1 or S2 L2 T2

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
U1 S2 L2 T2
Prerequisites: INFS1602 and 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
U1 S2 L2 T2
Prerequisites: INFS1602
Note/s: Not offered in 1995.

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
Object-Orientat Computer Programming
Staff Contact: School Office
U1 S1 L2 T2
Prerequisites: INFS1602 and INFS1603
Note/s: Restricted to programs 1400, 6810, 1000, 0600 and Course 3971.

Programming in the commercial environment; COBOL; Hardware and operating systems concepts and their impact on the commercial computing environment. Introduction to computer communications. Introduction to object-oriented programmes.

Information Systems Level II/III

INFS2691
Industrial Training 1
Staff Contact: School Office
U0 S1 HPW1
Prerequisites: INFS1602 and 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
U1 S1 L3
Prerequisites: INFS1602 and 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
U1 S2 L2 T1 Lab 1
Prerequisites: INFS1602 and 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
U1 S1 L2 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
U1 S2 L2 T2
Prerequisite: INFS2607
Note/s: Not offered in 1995.

Contents to be advised.

INFS3607
Distributed Computer Systems
Staff Contact: School Office
U1 S2 L2 T2
Prerequisite: INFS2603
Note/s: 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
U1 S1 L3 T1
Prerequisites: INFS1602 and 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
U1 S2 L2 T1
Prerequisites: 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
U1 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
U0 S2 HPW1
Prerequisites: 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
U0 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:
U10 F
Prerequisites: Completion of program 1400 including 6 Level III units.

INFS4774
Information Systems Security
Staff Contact: School Office
S1 L3 LAB1
Prerequisites: INFS1603 and 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 LAB1
Prerequisite: ACCT3708, 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
Prerequisites: 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 LAB1
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 Orientat 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 L2 T1
Prerequisites: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School of Information Systems.

Objectives: This course aims to assist students to develop their knowledge, understanding and ability to critically analyse important issues involved in the management of information systems in organisations. Management of information systems will be considered at strategic, tactical and operational levels. Particular emphasis will be given to management of enterprise-wide and inter-organisational systems and planning for their strategic use.

Topics: The following general topics will be considered:

- the use and management of strategic information systems
- management of information as a corporate resource
- managing IS service levels and technologies
- managing IS sponsored change
- assessing IS/IT performance

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 Studies

Subjects in Japanese language are offered both for students without prior knowledge of the language and for those with HSC or other Japanese language studies. Students enrolling in Japanese with no previous knowledge of the language should enrol in JAPN1000 Japanese Communication 1A and JAPN1001 Japanese Communication 1B. For students with HSC or other Japanese language studies, a multipoint entry system operates and, subject to an individual placement test, students will be allocated to the most suitable subject level.

N.B. For students admitted in their first year of studies to JAPN2000 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 2 Level II/III units in any School/area of studies under this provision.

All Japanese subjects are restricted to Programs 0600, 1400, and Course 3971 and Advanced Science students in Program 1000.

JAPN1000
Japanese Communication 1A
Staff Contact: Dr Y.Sasaki
U1 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
U1 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
U1 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
U1 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
U1 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; government-business relations.

JAPN2500
Japanese Studies
Staff Contact: A/Prof W. Purcell
U1 S1 HPW3
Prerequisite: JAPN1001 or JAPN2001

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
U1 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
U1 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
U1 S2 HPW3
Prerequisite: JAPN3000

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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 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
U1 S1 HPW5
Prerequisite: JAPN4201 or permission from Head of Unit

Provides opportunity for advanced learners of Japanese with intensive and extensive reading in the language on selected topic(s). Accumulation of *kanji*, vocabulary and idiomatic expressions is emphasised.

JAPN4301
Advanced Reading in Japanese B
Staff Contact: Dr C. Kinoshita Thomson
U1 S2 HPW5
Prerequisite: JAPN4300 or permission from Head of Unit

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
U1 S2 HPW3
Prerequisite: JAPN4000

Provides students with a framework for analysing problems in the field of Japanese Studies, including a theoretical framework and types of 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

In addition to introductory Korean, intermediate-level Korean will be on offer in 1995 and it is envisaged that an advanced-level program will be introduced in 1996.

Korean Level I

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
U1 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
U1 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.

Korean Level II

KORE2000
Korean 2A
Staff Contact: Mr S.C. Shin
U1 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
U1 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.

Law

LAWS1010
Litigation
Staff Contact: Dr Jill Hunter
U6 F HPW4
Note/s: Restricted to Course 4770.

Civil pre-trial procedure: focus on selected topics largely in the context of Supreme Court actions - parties to an action; pleadings; discovery and exchange of information. Supreme Court Rules are examined to determine the extent to which they facilitate just, accurate and speedy resolution of disputes. Problems of delay and cost are addressed with particular reference to case-flow management techniques and alternative dispute resolution.

Criminal procedure: the law and related issues associated with arrest, warrants, police searches, interrogation and the formulation of pleadings. Comparisons drawn between the civil and criminal pre-trial processes.

Evidence: a basic understanding of the legal and philosophical principles related to the presentation of evidence in court. A comprehensive examination of the rules of evidence, including those designed to protect the accused at trial; the rule against hearsay evidence; the use of expert evidence; the treatment of unreliable evidence; proof and probability theory and questioning of witnesses in court.

The effect of pre-trial procedures on the final outcome at trial highlighted.

LAWS1120
Legal System Torts
Staff Contact: Mr Angus Corbett/Ms Prue Vines
U6 F HPW4
Note/s: Restricted to Course 4770.

The legal significance of the arrival of the British in Australia; the principal institutions of the legal system, particularly the courts, the legislature, and the executive arms of government; the judiciary; the legal profession; their history, roles, interrelationships, operation and techniques; general constitutional principles and institutions; the notion and consequences of federalism; Bill of Rights proposals; precedent and statutory interpretation, practice and theory; sources of Australian law, including the past and present status of Aboriginal customary law; origins of the common law; classifications within the common law; jurisdiction of Australian courts.

A number of torts, both intentional and unintentional, relating to economic interests as well as personal injury. The primary focus of the course is a thorough and comprehensive introduction to the tort of negligence. There is a detailed discussion of specific issues such as recovery for personal injury, for nervous shock, for pure economic loss as well affirmative duties of care. In addition there is an introduction to the law relating to limitation periods, vicarious liability, defences to the tort of negligence and the law relating to the assessment of damages. The approach to teaching this material is via extensive discussion of a relatively limited number of leading cases. Students are thus able to build up an understanding of this body of law through their own analysis of case law.

A second strand of this course is to introduce students to the wide ranging debates about the appropriate role and function of tort law. This requires developing a working knowledge of a feminist and economic analysis of tort law and of the various corrective justice theories of tort. In developing this working knowledge students will be exposed to secondary materials which build upon and refer to the cases and statutes which are included in the course.

LAWS1420
Contracts
Staff Contact: Mr Denis Harley
U6 F HPW4
Note/s: Restricted to Course 4770. Taken concurrently with LAWS2140 as a composite subject

This course examines the nature of contractual obligations and how parties make and break contracts.

Topics include: how contracts are formed and the necessary elements of a validly constituted contract; express and implied terms of a contract and how such terms are imported into the contract; how courts interpret the terms of a contract; the consequences where a contract is induced by misrepresentation, mistake or unconscionability; exemption clauses; estoppel and contract; contracts which are illegal under statute or contrary to public policy; remedies for breach of contract and the damages payable for such breach.

Students are encouraged to examine the role of contract law from an historical and contemporary standpoint.

LAWS1610
Criminal Law
Staff Contact: A/Prof David Brown
U6 F HPW4
Note/s: Restricted to Course 4770.

The principles of criminal law and criminal liability. Aims to: promote and refine research and social policy analysis skills; develop a rigorous analytic and socially oriented approach to the study of criminal law; investigate the constitution of concepts like crime, criminal and criminal law; question traditional approaches which assume a unified set of general principles; suggest an approach to criminal law as a number of diverse fields of regulation; acknowledge the importance of forms of regulation outside the criminal law; examine empirical material on the actual operation of the N.S.W. criminal process such as court statistics and a court observation exercise; examine the substantive rules developed in selected criminal offence areas; stress the importance and relevance of criminal law in an understanding of law, even (and especially) for those who do not intend to practise in the area. Topics include: the phenomenon of crime, the criminal process, criminal responsibility, homicide offences, public order offences, drug offences, offences against the person, offences of dishonest acquisition, general defences, complicity, conspiracy, sentencing and penal practices.

LAWS2140
Public Law
Staff contact: Mr. Robert Shelly
C1.5 S1 HPW2
Note/s: Taken concurrently with LAWS1420 as a composite subject

This course introduces the students to the concept of "public law", its methods of reasoning,history and fundamental principles. It deals with the fundamental principles of constitutional and administrative law, with the ethical precepts underlying our constitutional system; with the essential features of our system of government, and with the increasing role of public international law. Th course also introduces students to comparative law, especially the public law assumptions of the Civil Law system. Topics include the concepts of public law; theories and history of constitutionalism; comparative methods of enforcing constitutional precepts; Australia's constitutional development; the separation of powers, responsible government and constitutional conventions; and the republicanism debate.

LAWS2150
Federal Constitutional Law
Staff Contact: Prof George Winterton/Mr. Keven Booker
U3 S1 or S2 HPW4
Note/s: Restricted to Course 4770.

Federal constitutional law, stressing the legislative and judicial powers of the Commonwealth and the judicial interpretation by the High Court of the extent of those powers, in particular: trade and commerce, external affairs, corporations, appropriation, grants and taxation powers, family law and industrial law powers, inconsistency of Commonwealth and State laws, freedom of interstate trade and commerce, excise and implied limitations on Commonwealth and State powers. Techniques and approaches adopted by the High Court in interpreting the Australian Constitution, and occasionally, federal executive power.

Further study of constitutional law may be undertaken in LAWS2100 The High Court of Australia.

LAWS2160
Administrative Law
Staff Contact: Melinda Jones
U3 S1 or S2 HPW4
Note/s: Restricted to Course 4770.

This course considers the law concerning the accountability and control of government officials. Topics covered include: the regulation of delegated legislation; the problem of corruption; the duty to give reasons for administration decisions; freedom of information, the Ombudsman, the Administrative Appeals Tribunal; and judicial review of administrative action (the principles of legality and procedural fairness).

LAWS3010
Property and Equity
Staff Contact: A/Prof Chris Rossiter
U6 F HPW4
Note/s: Restricted to Course 4770.

The basic principles of the law of property, transcending the traditional boundaries of real and personal property. For reasons of time and convenience, most topics are those usually considered in the context of 'real property'.

Enquiry into the meaning of the concepts of property and the purposes that are or ought to be fulfilled by the law of property. Some of the traditional concepts and classifications adopted by the common law in the content of the study of fixtures. Topics: possession as a proprietary interest in land and goods; some basic concepts such as seisin and title; the fragmentation of proprietary interests, including the doctrines of tenure and estates; an introduction to future interests; the development of legal and equitable interests, including a comparative treatment of their nature, extent and sphere of enforceability and an introduction to trusts; legal and equitable remedies; the statutory regulation of proprietary interests in land, including an examination of the Torrens and deeds registration systems; co-ownership; an introduction to security interests; the acquisition of proprietary interests; the alienability of interests including trusts for sale; commercial transactions involving leasehold estates in land and bailment of goods.

LAWS6210
Law, Lawyers and Society
Staff Contact: Dr Stan Ross
U3 S1 or S2 HPW4
Note/s: Restricted to Course 4770.

1. The lawyer/client relationship, including who exercises control and the lawyers' duties to accept work, to keep client confidences, to act competently and to avoid conflicts of interest; the social implications of lawyers' professional behaviour. 2. The adversary system of litigation and the lawyers' role therein, both generally and specifically as defence counsel and as prosecutor in criminal cases. 3. The structure of the profession and methods of regulation including discussion of the concept of professionalism, control of admission, discipline generally and conducting court specifically; selection and control of the judiciary. 4. Issues relating to the delivery of legal services, including specialisation in lawyers' practice, the structure and availability of legal aid, the regulation of lawyers' fees, the extent of the lawyers' monopoly and the role of non-lawyers in delivering legal services.

LAWS7410
Legal Research and Writing 1
Staff Contact: Irene Nemes
C2 S1 HPW2
Note/s: Restricted to Course 4770.

The literature, both legal and non-legal, relevant to the law in Australia. The contents of a law library, how it works and is ordered and how lawyers go about using it to find the law. Practice in handling the principal legal materials in the law library, notably law reports, collections of statutes, bibliographies, periodical, indexes, digests and material on law reform. An introduction to case analysis and statutes. Principles of legal writing, including plain English, citation practice, word processing and logical argument. An introduction to the use of computerised legal research methods. The methods and objectives of legal and empirical research.

LAWS7420
Legal Research and Writing 2
Staff Contact: Irene Nemes
C1 S2 HPW2
Note/s: Restricted to Course 4770.

A revision of legal research skills acquired in LAWS7410 Legal Research and Writing 1, particularly the use of Australian digests, law reform materials, loose-leaf services and legal encyclopedias. Practice in finding and updating the law on a topic. Foreign legal systems and International law. Further instruction on the use of computers for retrieval of legal materials.

LAWS7430
Research Component
Staff Contact: Mr Ian Cameron
Note/s: Taken after or concurrently with LAWS7420.

This subject must be taken either concurrently with or after LAWS7420 Legal Research and Writing 2, though students are advised where possible to complete Legal Research and Writing 2 first so that they have a command of the relevant research techniques. Students must select one from amongst the subjects for which they are enrolled in which a piece of assessable work (a research essay or moot) will be allocated for Research Component, and must submit a Research Component Form to the Administrative Assistant (Undergraduate) by the end of Week 4 in the Session in which they elect to undertake Research Component. This form must identify the subject in which the work for Research Component will be undertaken, and must be signed by the teacher in the subject. Students must attach to the completed research essay or moot submission a written research report, outlining the research methods adopted in preparation for the essay or moot. The piece of assessable work chosen for allocation to Research Component must be worth 30% of the total mark (in the case of a three credit point subject, or 15% of the total mark in the case of a six credit point subject). The assessment of Research Component will be made on the basis of the research report, in addition to the separate assessment of the essay or moot for the purpose of the subject selected. All subjects offered in the Law School are prima facie available to Research Component students for this purpose. Where for compelling reason no provision for a suitable essay or moot is or can be made in a program of assessment of a particular subject, the teacher of that subject may ask the student to select another subject. There is no formal teaching in LAWS7430 Research Component and no credit points are awarded for it. It is compulsory for all students except those taking one or more of the Research Thesis electives (LAWS6510, LAWS6520, LAWS6530).

LAWS8320
Legal Theory
Staff Contact: A/Prof Martin Krygier
U3 S1 or S2 HPW4
Note/s: Restricted to Course 4770.

Introduction to philosophical questions which underline the practical workings of the law. The course concentrates on questions to do with the reasoning, particularly the reasoning of judges, and of moral reasoning; and the interrelationships between law and morals and law and politics.

LAWS8820
Law and Social Theory
Staff Contact: A/Prof Martin Krygier
U3 S1 or S2 HPW4
Note/s: Restricted to Course 4770.

Examination of sociological assumptions about law, about society, and about the relationships between law, legal institutions and social ordering. Topics include: The role and functions of law within modern society, the extent to which law embodies implicit social theories and the nature of these theories, and the implications of empirical social research on our understanding of the place of law in society.

LAWS8320 and LAWS8820 form part of the compulsory core of the LLB and BJuris degree courses with respect to students who entered the Faculty in 1981 or later. Students are required to take one of these two subjects to fulfil compulsory requirements and are permitted to take the other as an elective.

Legal Studies and Taxation

Legal Studies and Taxation Level I

LEGT7711
Legal Environment of Commerce
Staff Contact: School Office
U1 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 Course 3971.

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.

Legal Studies and Taxation Level II

LEGT7721
Legal Transactions in Commerce
Staff Contact: School Office
U1 S1 or S2 L2 T1
Prerequisite: LEGT7711
Note/s: Restricted to program 1400 and Course 3971.

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
U1 S1 or S2 L2 T1
Note/s: Restricted to program 1400 and Course 3971.

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.

Legal Studies and Taxation Level III

LEGT7741
Business Entities
Staff Contact: School Office
U1 S2 L2 T1
Prerequisite: LEGT7711
Note/s: Restricted to programs 1400 and Course 3971.

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
U1 S1 L3 T1
Prerequisite: LEGT7711
Note/s: Restricted to program 1400 and Course 3971.

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
U1 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
U1 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
U10 F
Prerequisites: Completion of program 6831, 6832, 6833 or 6834 including 6 Level III units.

The Category C General Education requirements are met within the Honours program by seminars, an essay and participation in discussion groups.

Mathematics

1. Many Level II and III 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 grades higher than Distinction are only awarded in the ordinary level in exceptional circumstances. At Level I there are three levels. Grades higher than Credit are not normally awarded in the General Mathematics subjects. The ordinary and higher subjects are awarded grades on a common scale with weighting given to the higher components.

2. Students proposing to proceed to Year 4 (Honours) in a Mathematics program may be required to take some of their Mathematics subjects at 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.

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
U1 S1 HPW6
Prerequisites: HSC exam score 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.

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
U1 S2 HPW6
Prerequisite: MATH1011 or MATH1131 or MATH1141
Note/s: Excluded MATH1032, MATH1042, MATH1231, MATH1241, ECON2200, ECON2201, ECON2202.

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
U1 S1 or S2 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 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.

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
U1 S2 HPW6 or Summer Session HPW9
Prerequisite: MATH1131 or MATH1141
Note/s: Excluded MATH1021, MATH1032, MATH1042, MATH1241, ECON2200, ECON2201, ECON2202.

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
U1 S1 HPW6
Prerequisites: HSC exam score 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.

As for MATH1131 but in greater depth.

MATH1241
Higher Mathematics 1B
Staff Contact: School of Mathematics First Year Office
U1 S2 HPW6
Prerequisite: MATH1131 or MATH1141, each with a mark of at least 70.
Note/s: Excluded MATH1021, MATH1032, MATH1042, MATH1231, ECON2200, ECON2201, ECON2202.

As for MATH1231 but in greater depth.

MATH1051
Mathematics 1F
Staff Contact: School of Mathematics First Year Office
U1 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 and series of functions.

MATH1061
Introductory Applied Computing
Staff Contact: School of Mathematics First Year Office
U1 HPW6
Prerequisites: As for MATH1011
Corequisites: 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 1995.

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
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 co-ordinates 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
U1 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
U.5 S2 HPW3
Corequisite: MATH1032 or MATH1131 or MATH1042 or MATH1141
Note/s: Excluded MATH1081. Restricted 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 unit of Mathematics at Level II. It may be followed only by the Level III subject MATH3021 Mathematics 3.

MATH2009
Engineering Mathematics 2
Staff Contact: School Office
U2 F HPW4
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Restricted 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.

MATH2021
Mathematics 2
Staff Contact: School Office
U1 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 unit. If other Level II units 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
Mathematic Methods for Aviation
Staff Contact: School Office
S1 (6 weeks) HPW8
Prerequisite: MATH1079
Note/s: Excluded MATH2009. 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
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded 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
U.5 S1 HPW2.5
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70
Note/s: Excluded MATH2100.

As for MATH2100 but in greater depth.

MATH2120
Mathematical Methods for Differential Equations
Staff Contact: School Office
U.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
U.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
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
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
U.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
U.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
U.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
U.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
U1 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
U.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
U.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
U1 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
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2610.

Multiple integrals, partial differentiation. Analysis of real valued functions of one and several variables.

MATH2520
Complex Analysis
Staff Contact: School Office
U.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
U1 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
U.5 S1 HPW2.5
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70
Note/s: Excluded MATH2510.

As for MATH2510 but in greater depth.

MATH2620
Higher Complex Analysis
Staff Contact: School Office
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241, each with a mark of at least 70
Note/s: Excluded MATH2520.

As for MATH2520 but in greater depth.

Statistics Level II

The subjects MATH2819, MATH2829, MATH2839, MATH2849, 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 unit of statistics at Level II. It can be followed only by the Level III subjects MATH3870 and MATH3880.

MATH2801
Probability and Random Variables
Staff Contact: School Office
U1 S1 HPW4
Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2819, MATH2841, MATH2901, BIOS2041.

Probability, random variables, standard discrete and continuous distributions, multivariate distributions, transformations, random sampling, sampling distributions, limit theorems.

MATH2810
Statistical Computing and Simulation
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241
Corequisite: MATH2801
Note/s: Excluded MATH2910. (The syllabus below is in the process of being changed.)

Introduction to APL, random variables, univariate transformations, simulation of random variables, APL programming, integer value random variables, random walks theory and simulation, introduction to Markov chains.

MATH2819
Statistics SA
Staff Contact: School Office
U1 F HPW2
Prerequisite: MATH1021 or MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Restricted to Science students in programs 6832, 6833 and 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.

MATH2821
Basic Inference
Staff Contact: School Office
U1 S2 HPW4
Prerequisite: MATH2801
Note/s: Excluded MATH2921, MATH2841, MATH2819, BIOS2041.

Point estimation: general theory, estimation by moments, maximum likelihood, interval estimation with general theory and application, hypothesis testing using Neyman Pearson theory, linear regression and prediction, analysis of variance.

MATH2829
Statistics SU
Staff Contact: School Office
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.

MATH2830
Nonparametric Statistical Inference
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH2801
Corequisite: MATH2821
Note/s: Excluded MATH2930.

Order statistics, exact and approximate distributions, multinomial distributions, goodness of fit, contingency tables, one-sample and two-sample estimation and inference problems.

MATH2839
Statistics SM
Staff Contact: School Office
U1 F HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2841, MATH2801, MATH2821, MATH2901, MATH2921. Restricted 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.

MATH2841
Statistics SS
Staff Contact: School Office
U1 F HPW2
Prerequisites: MATH1021(CR) or MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2801, MATH2821, MATH2901, MATH2921, MATH2819, BIOS2041.

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 SE1
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Not available to Science students.

Introduction to probability theory, random variables and distribution functions; the binomial, Poisson and normal

distributions in particular. Standard sampling distributions including those of chi-square, t and F.

MATH2859
Statistics SE2
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Not available to Science students.

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
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Not available to Science students.

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

MATH2901
Higher Probability and Random Variables
Staff Contact: School Office
U1 S1 HPW4
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Note/s: Excluded MATH2801, MATH2841, MATH2819, BIOS2041.

As for MATH2801 but in greater depth.

MATH2910
Higher Statistical Computing and Simulation
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1231 or MATH1042 or MATH1241
Corequisite: MATH2901
Note/s: Excluded MATH2810.

As for MATH2810 but in greater depth.

MATH2921
Higher Basic Inference
Staff Contact: School Office
U1 S2 HPW4
Prerequisite: MATH2901
Note/s: Excluded MATH2821, MATH2841, MATH2819, BIOS2041.

As for MATH2821 but in greater depth.

MATH2930
Higher Nonparametric Statistical Inference
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH2901
Corequisite: MATH2921
Note/s: Excluded MATH2830.

As for MATH2830 but in greater depth.

Mathematics Level III

Students considering 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.

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 MATH3021 Mathematics 3 is the only Level III Mathematics subject available for Science students who have previously taken MATH2021.

MATH3021
Mathematics 3
Staff Contact: School Office
U1 F HPW2
Prerequisite: MATH2021
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.

Applied Mathematics Level III

Before attempting any Level III Applied Mathematics subject a student must have completed at least 2 units of Level II Mathematics including the prerequisites specified below.

The subject MATH3141 is not available to Science students.

Usually only one of the advanced subjects MATH3130 and MATH3170 are offered in one year.

MATH3101
Numerical Analysis
Staff Contact: School Office
U1 S1 HPW4
Note/s: Excluded MATH3141.

Analysis of some common numerical methods. Iterative methods for solving nonlinear equations; interpolation using polynomials, splines and trigonometric functions; least-squares approximation and orthogonal functions; numerical differentiation and integration; extrapolation; finite difference methods for initial value problems for ordinary differential equations; iterative techniques for large systems of linear equations.

MATH3110
Advanced Numerical Analysis
Staff Contact: School Office
U.5 HPW2
Prerequisites: A weighted average mark of at least 70 in 2 units of Level II Mathematics
Note/s: It is highly recommended that MATH3101 be taken concurrently. Not offered in 1995.

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
U1 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
U.5 S1 HPW2
Prerequisites: A weighted average mark of at least 70 in MATH2120, MATH2520 and one further unit of Level II Mathematics
Note/s: It is highly recommended that MATH3121 be taken concurrently.

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
Electrical Engineering Mathematics 3
Numerical and Mathematical Methods
Staff Contact: School Office
S2 HPW3.5
Prerequisites: MATH2501 and either MATH2100 or MATH2510
Note/s: Excluded MATH2120, MATH2130, MATH3101. Not available to Science Students.

Numerical and mathematical methods for electrical engineering. Numerical Methods: Solution of linear and nonlinear algebraic equations, interpolation and extrapolation, numerical quadrature, solution of ordinary differential equations, computational methods for matrix eigenvalues and eigenvectors. Mathematical Methods for Partial Differential Equations: Separation of variables methods, generalised Fourier series, Bessel functions, Legendre polynomials.

MATH3150
Transform Methods
Staff Contact: School Office
U.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
U1 S1 HPW4
Prerequisites: MATH2501, and either 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
U.5 S1 HPW2
Prerequisites: A weighted average mark of at least 70 in MATH2501 and one further unit of Level II Mathematics including 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, complementary problems, minimax theory, game theory, stochastic optimization, new approaches to linear programming.

MATH3181
Optimal Control
Staff Contact: School Office
U1 S2 HPW4
Prerequisite: 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
U1 S2 HPW4
Prerequisite: MATH2120 or MATH3540

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
U1 S1 HPW4
Prerequisites: 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
U.5 HPW2
Prerequisites: A weighted average mark of at least 70 in MATH2100, MATH2120 and one further unit of Level II Mathematics
Note/s: It is highly recommended that MATH3241 be taken concurrently. Not offered in 1995.

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
U1 S2 HPW4
Prerequisites: 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
U1 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 two units of Level II Mathematics including the prerequisites specified below. For higher subjects the average performance of the above two units 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.

MATH3400
Logic and Computability
Staff Contact: School Office
U.5 S1 HPW2

The propositional calculus, its completeness and consistency; Turing machines; unsolvable problems; computability and Church's thesis; Godel's incompleteness theorems.

MATH3420
Information, Codes and Ciphers
Staff Contact: School Office
U.5 S2 HPW2

Introduction to discrete information theory (including Shannon's theorems), error-correcting codes and cryptography.

MATH3430
Symbolic Computing
Staff Contact: School Office
U.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
Staff Contact: School Office
U.5 S2 HPW2
Note/s: Excluded MATH2601 (before 1992), MATH3710.

Mathematical systems, groups, determination of small groups, homomorphisms and normal subgroups.

MATH3510
Geometry
Staff Contact: School Office
U.5 S2 HPW2
Note/s: Excluded MATH3780 (from 1992), MATH3640 (before 1992).

Elementary concepts of Euclidean, affine and projective geometries.

MATH3520
Number Theory
Staff Contact: School Office
U.5 S2 HPW2
Note/s: Excluded MATH3740 (from 1992), MATH3610 (before 1992).

Introduction to algebraic structures. Euclidean domains, primes and irreducibles, factorisation. Diophantine equations, polynomial congruences, arithmetic functions, primitive roots, quadratic residues, quadratic reciprocity, sums of squares.

MATH3530
Combinatorial Topology
Staff Contact: School Office
U.5 S1 HPW2
Note/s: Excluded MATH3760 (from 1992).

Elementary combinatorial topology of surfaces.

MATH3540
Ordinary Differential Equations
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2501
Note/s: Excluded MATH3640 (from 1992).

The initial value problem: existence, uniqueness, continuation, and dependence on initial conditions and parameters. The Gronwall inequality, linear systems, variation of parameters formula, plane autonomous systems, Poincaré space, Poincaré-Bendixson theory. Stability of linear and almost linear systems, Lyapunov's second method.

MATH3550
Partial Differential Equations
Staff Contact: School Office
U.5 S2 HPW2
Prerequisites: MATH2510, MATH2520
Corequisites: MATH3540 or MATH3640
Note/s: Excluded MATH3650 (from 1992).

Partial differential equations of the first order, the Cauchy or initial value problem, Cauchy-Kovalevsky theorem, characteristics of second order equations, normal forms, boundary value and initial value problems, well-posed problems. Dirichlet and Neumann problems for Poisson's equations. Harmonic functions, maximum principles, Poisson's formula, conformal mappings. Perron's method for solving the Dirichlet problem.

MATH3560
History of Mathematics
Staff Contact: School Office
U.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
U.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
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2510
Note/s: Excluded MATH3760 (from 1992), MATH3750 (before 1992).

Curves and surfaces in space. Gaussian curvature, Gauss theorem. Gauss-Bonnet theorem.

MATH3610
Higher Real Analysis
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2610 or MATH2510(CR)
Note/s: Excluded MATH3570, MATH3601.

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
U.5 S2 HPW2
Prerequisites: MATH3610, MATH2601 or MATH2501(CR)
Note/s: Excluded MATH3601.

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
U.5 S2 HPW2
Prerequisite: MATH3610
Note/s: Excluded MATH3740 (before 1992).

Rings and algebras of sets, Lebesgue integration, dominated convergence theorem, Lp-spaces, Borel-Cantelli theorem, Riesz representation theorem, Fubini's theorem, stochastic processes, random variables, martingales.

MATH3640
Higher Ordinary Differential Equations
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2601 or MATH2501(CR)
Note/s: Excluded MATH3540.

As for MATH3540 but in greater depth.

MATH3650
Higher Partial Differential Equations
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH2610 or MATH2510(CR), MATH2620 or MATH2520(CR)
Corequisite: MATH3640
Note/s: Excluded MATH3550, MATH3660 (before 1992).

As for MATH3550, but in greater depth.

MATH3670
Higher Set Theory and Topology
Staff Contact: School Office
U.5 S1 HPW2
Corequisite: MATH3610
Note/s: Excluded MATH3730 (before 1992). 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
U.5 S1 HPW2
Prerequisite: MATH2620 or MATH2520 (CR)
Note/s: MATH3610 is recommended. Excluded MATH3630 (before 1992). 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
U.5 S1 HPW2
Prerequisite: MATH2601 or MATH2501(CR)
Note/s: Excluded MATH3500, MATH3710 and MATH3720 (both before 1992).

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
U.5 S2 HPW2
Prerequisite: MATH3710
Note/s: Excluded MATH3720 (before 1992).

Galois theory, additional group theory, representations and characters of finite groups.

MATH3730
Higher Advanced Algebra
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH3710
Note/s: Excluded MATH3710 (before 1992). 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
U.5 S2 HPW2
Note/s: Excluded MATH3520, MATH3610 (before 1992). 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
U.5 S1 HPW2
*Prerequisites:*MATH2601 or MATH2501(CR) , MATH2610 or MATH2510(CR)
Note/s: Excluded MATH3530, MATH3580, MATH3750 (before 1992).

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
U.5 S2 HPW2
Prerequisite: MATH3760
Note/s: Excluded MATH3760 (before 1992) 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
U.5 S2 HPW2
Prerequisites: MATH2601 or MATH2501(CR), MATH3710 or MATH3500(CR)
Note/s: Excluded MATH3510, MATH3640 (before 1992). This subject offered in even numbered years only.

Axiomatic geometry. Affine geometry, Desargues theorem. Projective geometry. Spherical and hyperbolic geometry.

Statistics Level III

The two half unit 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 only one unit of statistics at Level III. The Level II subjects MATH2821 and MATH2921 may also be counted as being at Level III.

MATH3801
Stochastic Processes
Staff Contact: School Office
U1 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
U1 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
U.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
U.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
U.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
U.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
U1 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
U.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
U.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
U1 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
U1 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
U.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
U.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
U.5 S2 HPW2
Prerequisite: MATH2921
Note/s: Excluded MATH3840.

As for MATH3840 but in greater depth.

MATH3950
Higher Nonparametric Methods
Staff Contact: School Office
U.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
U1 S1 HPW4
Prerequisites: MATH2501, MATH2510, MATH2901.
Note/s: Not offered in 1995

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
U.5 F HPW1
Prerequisites: MATH2901, MATH2921
Corequisites: At least four units from Level III Statistics.

Mathematics Level IV

To enter Level IV Mathematics students must 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 units specified in the program is required and some evidence of the ability to undertake independent study. In special cases other units may be substituted for the Mathematics units. 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.

MATH4003/MATH4004
Mathematics and Computer Science Honours
Staff Contact: School Office
U10 F
Prerequisites: Completion of 3 years of program 0600, 1060 or 1066 including 3 Level III Computer Science units and 3 Level III Mathematics units. 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 Category C 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)
U10 F
Prerequisites: Completion of 3 years of any Mathematics program including 6 Level III units 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, microhydrodynamics, and analytical and numerical solution of partial differential equations. May also include advanced lectures given by other Departments or Schools.

The Category C 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)
U10 F
Prerequisites: Completion of 3 years of any Mathematics program including 6 Level III units 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 Category C 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)
U10 F
Prerequisites: Completion of 3 years of any Mathematics program including 6 Level III units as specified in the program including 4 Level III Statistics units 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 Category C 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
U.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 A.K. Hellier
U.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 A.G. 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 A.K. 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 A.G. Crosky
S1 T3

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

MATS9520
Engineering Materials
Staff Contact: Dr A.G. Crosky
U.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
U.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 A.K. 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.

MATS7223 (Units 1,2,3 & 4)
Mechanical Behaviour of Materials
Note/s: Restricted to Combined degree course 3681.

Unit 1: Deformation
Staff Contact: Dr B. Gleeson
S1 L2

Atomic and molecular description of deformation. Introduction to dislocation theory and its application to mechanical properties. Chain dynamics under stress.

Unit 2: Fractographic analysis
Staff Contact: Dr A.G. Crosky
S2 L1 T1

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, creep, stress corrosion, and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy.

Unit 3: Deformation and strengthening mechanisms
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 agehardening, activation energy of strain ageing.

Unit 4: Metal forming processes
Staff Contact: Dr A.G. Crosky
S1 L1 T1

Metal forming. Introduction to metal forming operations. 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.

MATS9323
Mechanical Behaviour of Materials
Note/s: Restricted to Combined degree course 3681.

Unit 1: Deformation
Staff Contact: Dr P. Munroe
S1 L2

Atomic and molecular description of deformation. Introduction to dislocation theory and its application to mechanical properties. Chain dynamics under stress.

Unit 2: Fractographic analysis
Staff Contact: Dr A.G. Crosky
S2 L2 T1

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, creep, stress corrosion, and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy.

Unit 3: Deformation and strengthening mechanisms
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, activation energy of strain ageing.

Mechanical and Manufacturing Engineering

Mechanical and Manufacturing Engineering Level I

AVEN1300
Basic Mechanics
Staff Contact: A/Prof DW Kelly
F HPW2
Note/s: Restricted to course 3890.

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: Dr RA Willgoss
S1 HPW2
Note/s: Restricted to course 3890.

Operating Systems Vax/Vms DOS. Hardware configurations mainframe, workstation PC, Lap top. Languages: Basic, Fortran. Packages: MS Word - WP -

spreadsheet Matlab - Data analysis. Number crunching and display I/O and interaction with the real world actuators/sensors.

AVEN1900
Introduction to Aircraft Engineering
Staff Contact: Dr NA Ahmed
F HPW1
Note/s: Restricted to course 3890.

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

MANF1110
Manufacturing Technology
Staff Contact: Dr P. Mathew
U.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: A/Prof A.E. Churches
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 A. J. Barratt
S2 L1 T2
Note/s: Excluded MECH0130, MECH0160.

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 K. Zarrabi
U.5 S1 or S2 L2 T2
Prerequisites: HSC Exam Score 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, MECH0360. Restricted to combined degree course 3681. Students who wish to enrol in this subject in courses other than the full-time courses in Aerospace Engineering, Electrical Engineering, Manufacturing Management, Mechanical Engineering and Naval Architecture can make up for the lack of the prerequisite by work taken in Physics in the first half of Year 1.

Equilibrium. Friction. Systems of multiforce members, coplantar and three-dimensional. Mass centre; centroid. Fluid statics. Plane particle kinematics: rectilinear, curvilinear and relative motion. Plane particle kinetics: equations of motion; work power, energy; impulse, momentum, impact.

MECH1400
Mechanics of Solids 1
Staff Contact: Dr M. Chowdhury
U.5 S1 or S2 L2 T1
Corequisite: MECH1300 or MECH0360 or MECH0330 or MECH0440
Note/s: Excluded MECH0430. Restricted to Combined degree course 3681.

Stress and strain, internal forces. Bars under axial loading. Stresses and deformation due to bending. Strain energy. Flexibility and stiffness. Stress and deformation due to torsion. Helical springs.

MECH1500
Computing 1M
Staff Contact: A/Prof J.A. Reizes
U.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 3890.

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 3890.

Hydraulics, main power transmissions pneumatics driving wing 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
Note/s: Restricted to course 3890.

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 3890.

The overall aim of the subject to expose students to the qualitative and quantitative examinations of fluids in motion and the physical forces exerted by these forces on aircraft. The subject will start with an introduction to some of the fundamental principles and equations of aerodynamics such as dimensional analysis, flow similarity, continuity momentum and energy equations, circulation, vorticity, stream functions and will develop 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 3890.

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
Prerequisites: Basic Mechanics
Note/s: Restricted to course 3890.

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 wind loading.

MECH2300
Engineering Mechanics 2A
Staff Contact: Dr S.S. Leong
U.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; plane 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. Kinematics and kinetics of simple mechanisms.

MECH2310
Engineering Mechanics 2B
Staff Contact: Prof K.P. Byrne
U.5 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 H.L. Stark
S1 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 H. L. Stark
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 J.A. Reizes
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
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 thermodymanics. Analysis of closed and open systems. Second law of thermodynamics: definitions, Carnot cycle, Clausius inequality, entropy, irreversibility, isentropic efficiencies. Air-standard cycles. Vapour cycles. Basic heat transfer.

Mechanical and Manufacturing Engineering Level III

AVEN3200
Aviation Engineering Experimentation 2
Staff Contact: A/Prof DW Kelly
F HPW2
Note/s: Restricted to course 3890.

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 3890.

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 3890.

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 3890.

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 3890.

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
Prerequisites: Aircraft Performance
Note/s: Restricted to course 3890.

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.

Medicine

MDCN8001
Principles of Medicine for Optometry Students
Staff Contact: A/Prof L. Simons (St Vincent's Hospital)
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
U1 S1 HPW6

This introduction to microbiology is offered as a single unit 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. A brief bridging course is available for students in this category.

MICR2011
Microbiology 1
Staff Contact: Dr. P. March
U1 S2 HPW6
Prerequisites: BIOS1011, BIOS1021, MICR2201
Corequisites: BIOC2201 and BIOS2021

This unit 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 units at other institutions.

The classification and function of bacteria. Differentiation of major families and genera of bacteria. Measurement models and theory of microbial growth. Comparative aspects of microbial growth. Bacterial nutrition and biosynthetic pathways. Microbial survival. Theory and practice of sterilisation. Introduction to microbial ecology and medical microbiology, Microbiology and Immunology Level III subjects.

Microbiology and Immunology Level III

MICR3021
Microbial Genetics
Staff Contact: Dr. R. Cavicchioli
U1 S1 HPW6
Prerequisites: BIOS2021, BIOC2312 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
U1 S1 HPW6
Prerequisite: BIOC2312

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. ANAT2211 Histology 1 at Level II is strongly recommended for students doing Immunology I.

MICR3051
Immunology 2
Staff Contact: Dr A. Collins
U1 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
U1 S2 HPW6
Prerequisite: MICR2011

Major topics include virus structure, classification and replication. A number of human diseases are discussed in the contexts of disease producing mechanisms and associated virus-host interactions, the persistence, transfer and control of virus infections in the community and of laboratory diagnosis of virus diseases.

MICR3071
Environmental Microbiology
Staff Contact: Prof. S. Kjelleberg
U1 S2 HPW6
Prerequisite: MICR2011

Major topics include water quality, the complexity of natural habitats, interaction of micro-organisms with their environment with an emphasis on evolution and adaptation,biogeo-chemical cycling, environmental monitoring in aquatic and soil habitats, manipulation of microbial populations in natural habitats including problems with the release of genetically engineered micro-organisms, and environmental biotechnology.

MICR3081
Medical Bacteriology
Staff Contact: Dr S. Hazell
U1 S1 HPW6
Prerequisites: 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)
U10 F
Prerequisites: completion of program 4400 including 8 Level III units 4 of which must be Microbiology and Immunology units

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 Category C 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
Solely for students enrolled in the Food Technology BSc courses 3060 and 3070 in the Faculty of Applied Science.

MICR3228
Microbiology for Medical Students

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 I
Staff Contact: Mr G. Dick

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: Prof B. Holden

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

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

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

OPTM2106
Pathology for Optometry Students
Staff Contact: Dr P. Herse
Prerequisites: BIOS1011
Corequisites: PHPH2122

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
Prerequisites: BIOS1011
Corequisites: OPTM2106

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

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

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: BIOS1011, CHEM1809
Corequisite: PHPH2122

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, OPTM1211
Corequisites: OPTM2303

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, visual fields, refraction, colour vision tests, assessment of binocular vision and strabismus.

OPTM2303
Spectacle Lens and Optical Systems
Staff Contact: Mr G. Dick
Prerequisites: OPTM1201, OPTM1203

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

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
Prerequisites: OPTM2301

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

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
Prerequisites: OPTM2301

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

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, PSYC2116
Corequisite: OPTM4301, OPTM3410, OPTM4311, MDCN8001

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

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

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
Opotmetry and the Professional Environment
Staff Contact: Mr D. Pye

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.

OPTM9041
Clinical Optometry
Staff Contact: Mr D. Pye
Prerequisites: OPTM9031, OPTM9032, OPTM9034

Students are required to examine patients in the Optometry Clinic, to diagnose their problems and to prescribe optical aids, orthoptic treatment or other management or referral as required. They also work in special clinics, including orthoptics, colour vision, low vision, children's vision and contact lenses, and participate in patient review clinics.

OPTM9042
Optometry B
Staff Contact: A/Prof S. Dain
Prerequisites: OPTM9031, OPTM9032, OPTM9033, OPTM3034

Public health optometry: contact lens fitting; pharmacology for optometrists; paediatric optometry; colour vision; advanced physiological optics; current issues and research; legal aspects; projects.

OPTM9043
Optometry and the Professional Environment
Staff Contact: Mr D. Pye

History of optometry and optics. Optometry's role in health care. Morals and ethics. Medicare. Federal and state law. The State 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: A/Prof C. Howlett
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: A/Prof C.R. Howlett
U10 F
Prerequisites: completion of program 7000 including 6 Level III units

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 two Level I subjects:
Each of these has 1-unit 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 both, and students wishing to major in Philosophy must do so.

PHIL1006
Introductory Philosophy A
Staff Contact: Rosalyn Diprose, Convenor
U1 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
Introductory Philosophy B
Staff Contact: Stephen Hetherington, Convenor
U1 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.

Value of Upper Level Subjects in Philosophy
All Upper Level subjects are full units.

Specialisation in Philosophy
Students majoring in Philosophy must complete, in addition to PHIL1006 and PHIL1007 (Introductory Philosophy A and Introductory Philosophy B), the equivalent of six full point Upper Level (II/III) units. Of these, at least four units 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 the equivalent of two Level II/III units in Year 2, and the equivalent of four Level II/III units 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 up to one unit 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
PHIL2206	Contemporary Philosophy of Mind
PHIL2207	Issues in the Philosophy of Psychology
PHIL2216	Human Nature and Human Understanding: the Empiricist Approach
PHIL2217	Personal Identity
PHIL2218	Philosophical Foundations of Artificial Intelligence
PHIL2219	Topics in Philosophy of Language
PHIL2226	Twentieth Century Analytic Philosophy
PHIL2227	Hume, Leibniz, Kant: Themes in Metaphysics
PHIL2308	Reason and the Passions: Descartes, Spinoza and Hume
PHIL2417	Relativism: Cognitive and Moral
PHIL2518	Greek Philosophy: Issues in Ethics and Epistemology
PHIL3106	Pre Honours Seminar

The remaining two units 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 up to one unit 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 8 Philosophy units.

PHIL2106
Logic
Staff Contact: Stephen Hetherington
U1 C6 S1 HPW3
Prerequisite: Any Level 1 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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Note/s: Excluded 52.304. Might not be offered in 1995 - Consult School.

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
U1 C6 S1 HPW3
Prerequisite: Upper level status in Philosophy
Note/s: Excluded 52.233, 52.2010.

Material for this subject is drawn from everyday sources, such as newspapers, books and advertisements, and including television. Deals with the nature of argument, fallacies, reasoning and the role of reasoning. From studying the structure of arguments students will be able to improve their critical skills and the presentation of their own arguments.

PHIL2109
Metaphysics (Realisms)
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult School

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
U1 C6 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
U1 C6 S2 HPW3
Prerequisite: PHIL2106 or equivalent, or contact School

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; inter-theoretical reduction; reductionism; models and metaphors; the issues of scientific realism and anti-realisms.

PHIL2118
Philosophy and Biology
Staff Contact: Michaelis Michael
C6 S1 HPW3
Prerequisite: Upper Level Status in Philosophy or 12 credit points in History and Philosophy of Science and Technology (HPST), or BIOS1011 or BIOS1021
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
U1 C6 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
U1 C6 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
U1 C6 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
U1 C6 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
C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult school

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.

PHIL2216
The Empiricists
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.2130, 52.2170, 52.231.

Empiricism has always been a significant theme within philosophy. Historically, empiricism is the idea that whatever we know is derived from the experiences we have had, that senses are the only means by which knowledge is gained. Traditional and modern empiricists have tried to use this as a basis to solve perennial problems, for example, about mind, language, science, causation, reason, freedom, ethics and politics. Some of those attempts will be explored and assessed in this subject.

PHIL2217
Personal Identity
Staff Contact: Neil Harpley
U1 C6 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
U1 C6 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 Philosophy of Language
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult 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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult School

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.

PHIL2227
Hume, Leibniz, Kant: Themes in Metaphysics
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult School

Examines the writings of Hume, Leibniz and Kant on some central issues in metaphysics, which include: the nature of causality, the existence of the external world, what we can know about the world a priori, the nature of space and time, the self. Our concern is first, to understand their views on these topics, second, to explore how their views are historically and conceptually connected and third, to try to assess their views. Required readings are almost exclusively from primary sources.

PHIL2308
Reason and the Passions: Descartes, Spinoza and Hume
Staff Contact: Genevieve Lloyd
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.2021, 52.2024, 52.215.

Philosophical distinctions between reason and the passions, and the role that philosophers have given — or denied — reason in understanding and controlling the passions. The reason-passion distinction is discussed in relation to other distinctions between — mind and body, theoretical and practical reason, interests and passions, male and female; and also in relation to contemporary attitudes to rationality.

PHIL2309
The Heritage of Hegel: The Concept of Experience
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.221, 52.3025 in 1988. Might not be offered in 1995 - Consult School

In his book *The Phenomenology of Mind*, Helel 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
U1 C6 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
U1 C6 S1 HPW3
Prerequisite: Upper Level status is Philosophy
Note/s: Excluded 60.014, EURO2400. Might not be offered in 1995 - Consult School

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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - Consult School

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: Ros Diprose
U1 C6 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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Note/s: Might not be offered in 1995 - Consult School

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
U1 C6 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
C6 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
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.203, 52.2050, 52.240. Might not be offered in 1995 - 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.

PHIL2507
The Ethics of Plato and Aristotle
Staff Contact: Stephen Cohen
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Not offered in 1995. Excluded 52.523, 52.2220, 52.5231, 52.242.

PHIL2508
Theories in Moral Philosophy
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.523, 52.2230, 52.5232, 52.243. Might not be offered in 1995 - 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
U1 C6 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.

PHIL2516
Philosophical Foundations of Marx's Thought
U1 C6 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Not offered in 1995. Excluded 52.373, 52.219.

PHIL2517
Philosophy and Gender
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.216. Might not be offered in 1995 - Consult School

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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Excluded 52.2040, 52.2220, PHIL2507.

Covers themes in Plato and Aristotle which have had a continuing influence in Western philosophy. Discussion centres on concepts of virtue and knowledge in relation to ideals of wisdom and contemplation.

PHIL2519
Introduction to Chinese Philosophy
U1 C6 S2 HPW3
Prerequisite: Upper Level Status - students must be in Year 2 or later of university study.
Note/s: Might not be offered in 1995 - Consult School

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
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Might not be offered in 1995 - 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.

PHIL2607
Philosophy and Literature
Staff Contact: Genevieve Lloyd
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Note/s: Not offered in 1995.

PHIL2706
Seminar A
U1 C6 S1 HPW3
Note/s: Might not be offered in 1994 - Consult School

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
U1 C6 S2 HPW3
Note/s: Might not be offered in 1995 - Consult School

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
U1 C6 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 8 Philosophy units.

PHIL3106
Pre-Honours Seminar
Staff Contact: Phillip Staines/Convenor
U1 C6 S2 HPW3
Prerequisite: 30 credit points in Philosophy with overall standard of Credit or higher

A 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: Genevieve Lloyd, Coordinator
U10 F
Prerequisites: Completion of program 5200, 5262 or 5206 including 7 Level III units

The Honours Year consists of writing a research thesis under supervision and two seminar courses.

PHIL4050
Philosophy Honours (Research) P/T
Staff Contact: Genevieve Lloyd, Coordinator
U10 F
Prerequisites: Completion of program 5200, 5262 or 5206 including 7 Level III units

PHIL4500
Combined Philosophy Honours (Research) F/T
Staff Contact: Genevieve Lloyd, Coordinator
U10 F
Prerequisites: Completion of program 5200, 5262 or 5206 including 7 Level III units

PHIL4550
Combined Philosophy Honours (Research) P/T
Staff Contact: Genevieve Lloyd, Coordinator
U10 F
Prerequisites: Completion of program 5200, 5262 or 5206 including 7 Level III units

Students contemplating Honours are urged to seek advice from the School on their program early in their course.

The Category C 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 unit value of the combination of PHYS1022 and PHYS1002 is 3 units.

PHYS1002
Physics 1
Staff Contact: First Year Director
U2 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
U1 S2 HPW6
Prerequisites, corequisites and syllabus: identical to PHYS1002, S1.

PHYS1021
Physics 1 (FT2)
Staff contact: First Year Director
U1 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
U2 F HPW6
Corequisites: MATH1021 or MATH1032 or MATH1131.

Principally for students majoring in the life and health sciences disciplines. Topics at an introductory level.

The methods of physics, describing motion, the dynamics of a particle, conservation of energy, kinetic theory of gases, properties of liquids, vibrations and waves, electricity and conduction in solids, ions and ionic conduction, magnetism and electromagnetic induction, alternating current, atomic nature of matter, X-rays, the nucleus and radio-activity, geometrical optics, optical instruments, wave optics, microscopes and their uses.

PHYS1601
Computer Applications in Experimental Science 1
Staff Contact: First Year Director
U1 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
U1 HPW6
Corequisites: MATH1021 or MATH1032 or MATH1131 and PHYS1002 or PHYS1022
Note/s: Excluded programs 0600. Not offered in 1995.

PHYS1889
Physics 1 (Aviation)
Staff Contact: Dr M Box
F HPW6
Note/s: Restricted to course 3890.

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
U1 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 co-requisites, the higher levels of such subjects are acceptable and preferable. Students are also advised that other subjects may be acceptable equivalent prerequisites or co-requisites 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
U1 S1 HPW4
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Corequisite: MATH2100
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
U1 S2 HPW4
Prerequisites: PHYS1002, MATH1032 or MATH1231
Corequisites: MATH2100
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
U1 F HPW2
Prerequisites: PHYS1002, MATH1032 or MATH1231
Note/s: Excluded PHYS2989.

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
U1 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
U.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
U.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
U.5 HPW2
Prerequisites: PHYS1002, MATH1032 or MATH1231.
Corequisites: MATH2100, MATH2120, MATH2510
Note/s: Not offered in 1995.

PHYS2601
Computer Applications in Experimental Science 2
Staff Contact: Executive Assistant
U1 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
U.5 S2 HPW3
Prerequisites: 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
U.5 S1 HPW2
Prerequisites: PHYS1002 or PHYS1022, MATH1032 or MATH1231
Note/s: Excluded PHYS3180.

Introduction to the properties and problems of the atmosphere: composition and structure, thermodynamics and stability, solar and terrestrial radiation, ozone layer, equations of motion and their consequences, 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 3890.

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.

Physics Level III Subjects

Note: See notes for Physics Level II subjects.

PHYS3010
Quantum Mechanics
Staff Contact: Executive Assistant
U.5 S1 HPW2
Prerequisites: 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
U1 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
U.5 S1 HPW2
Prerequisites: PHYS2011, MATH2100, MATH2120

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

PHYS3041
Experimental Physics A
Staff Contact: Executive Assistant
U1 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
U.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
U.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
U.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
U.5 S2 HPW4
Prerequisite: PHYS2031

As for PHYS3110 Experimental Physics B1.

PHYS3160
Astrophysics
Staff Contact: Executive Assistant
U.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
U.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
U.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
U.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
U.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.

PHYS3530
Advanced Quantum Mechanics
Staff Contact: Executive Assistant
U.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
U.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.

PHYS3560
Relativistic Electrodynamics and Plasma Physics
Staff Contact: Executive Assistant
U.5 S2 HPW2
Prerequisites: PHYS2021, MATH2510
Corequisite: PHYS3030

Relativistic transformations of electric and magnetic quantities, covariant formulation of electrodynamics, fourvectors, generation of electromagnetic fields by accelerated charges. Motion of charged particles in fields, bulk motions of a plasma, magnetic confinement and the pinch effect, waves in a plasma.

PHYS3601
Computer Applications in Instrumentation
Staff Contact: Executive Assistant
U1 S2 HPW5
Prerequisite: PHYS2601

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
U.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
U.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
U.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
U.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
U.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
U.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
Prerequisites: PHYS1889
Note/s: Restricted to course 3890.

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

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

PHYS3810
Applications of Radiation
Staff Contact: Executive Assistant
U.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 3890.

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: Prof D Haneman
U10 F
Prerequisites: Completion of program 0100 including 7 Level III units, or 0161 including 6 Level III units
Note/s: For the combined Physics/Geology honours see entry under Board of Studies in Science and Mathematics.

Honours programs consist of advanced lecture units and project work. Students normally undertake two separate projects during the year, in different research areas. All students take units in quantum mechanics, statistical mechanics and solid state physics. Four additional units 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 M. Beilby
U1 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 M. Beilby
U3 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.

PHYS1909
Astronomy
Staff Contact: First Year Director

An overview of Astronomy from the solar system to the stars and galaxies. Includes: exploring our solar system, the search for other solar systems; stars, their properties, evolution to pulsars, neutron stars and black holes; galaxies, radio galaxies and quasars; the expanding universe and cosmology.

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.

PHYS1929
Physics 1 (Geomatic Engineering)
Staff Contact: First Year Director
Note/s: Not re-run in S2 and/or Summer Session

Motion of particles under influence of mechanical, electrical, magnetic and gravitational forces. Force, mass, energy, momentum, charge, potential fields. Conservation principles applied to problems involving charge, energy and momentum. Applications of Kirchoff's laws to DC and AC circuits. Uniform circular motion, Kepler's laws and rotational mechanics. Geometrical optics, optical instruments. Application of wave theory to interference, diffraction and polarisation.

PHYS1939
Physics 1 (Building and 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.

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
U1 S2 HPW6
Prerequisites, corequisites and syllabus: identical to PHYS1969, S1.

PHYS1959
Physics 1 (EE, FT2)
Staff contact: First Year Director
U1 Summer Session HPW9
Prerequisites: PHYS1949

Syllabus identical to PHYS1969, S2.

PHYS1989
Physics 1 (Civil Engineering)
Staff Contact: First Year Director
Note/s: Not re-run in S2 and/or Summer Session.

Mechanical concepts, properties of matter, atomic structure, elasticity, plasticity, fracture of solids; surface tension and viscosity of fluids, electrical and magnetic forces, DC and AC circuits, digital electronics. Simple harmonic motion. Acoustic and mechanical waves, attenuation, velocity of propagation. Elastic moduli. Non destructive testing, instrumentation.

PHYS2920
Electronics (Applied Science)
Staff Contact: Executive Assistant
U.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 J. W. Morley
U2 F HPW6
Prerequisites: BIOS1011 and BIOS1021, 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: BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201
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 J. W. Morley
U2 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

PHPH3114
Physiology 2
Staff Contact: Prof M.J. Rowe
U4 F HPW12
Prerequisites: PHPH2112, BIOC2312 or BIOC2101 and BIOC2201, BIOC2372
Note/s: Student numbers in Physiology 2 are limited and entry to the course is allocated on academic merit.

A major subject offered in Year 3, providing a more advanced study in physiology. Laboratory experiments which illustrate physiological principles and introduce research techniques. Orientated towards major research interests of the School, the subject is divided into several sections which may be available in special circumstances as separate 1 and 2 unit Level III subjects, including Membrane Biology, Neurophysiology and Organ Physiology, details of which are given below.

PHPH3121
Membrane Biology
Staff Contact: Prof P.H. Barry
U1 S1 HPW6
Prerequisites: Normally as for PHPH3114 but may be studied only with permission of the Head of School.
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 M.J. Rowe
U1 S1 HPW6
Prerequisites: Normally as for PHPH3114 but may be studied only with permission of the Head of School.
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.

PHPH3142
Organ Physiology
Staff Contact: A/Prof M. A. Perry
U2 S2 HPW12
Prerequisites: Normally as for PHPH3114 but may be studied only with permission of the Head of School.
Note/s: Student numbers in this subject are limited and entry to the course is allocated on academic merit.

An advanced coverage of aspects of cardiovascular, respiratory, renal, fetal exercise and gastrointestinal physiology. Emphasis on the function and control of each organ and system. Extensive practical component involving mammalian preparations and human subjects ie. should need "mammalian preparations (and human subjects)."

PHPH3152
Pharmacology
Staff Contact: A/Prof G. Graham
U2 F HPW6
Prerequisite: PHPH2112, BIOC2312 or BIOC2372 or BIOC2101 and BIOC2201

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.

Physiology and Pharmacology Level IV

PHPH4218/PHPH4224
Physiology 4 (Honours)
Staff Contact: Dr D. Garlick
U10 F HPW10
Prerequisites: Completion of program 7300 including 7 Level III units 4 of which must be Physiology units

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
U10 F HPW10
Prerequisites: Completion of program 7301 including 7 Level III units

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 C Desmarchelier
S1 HPW3
Note/s: Restricted to course 3890.

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: Ms C Desmarchelier
S1 HPW2
Note/s: Restricted to course 3890.

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 C Desmarchelier
S2 HPW5
Note/s: Restricted to course 3890.

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.

Professional Studies Level II

PROF0202
Crew Resource Management 2
Staff Contact: Ms C Desmarchelier
S1 HPW8
Prerequisites: Crew Resource Management 1
Note/s: Restricted to course 3890.

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
S2 HPW4
Note/s: Restricted to course 3890.

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 Desmarcelier
S2 HPW4
Note/s: Restricted to course 3890.

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.

Professional Studies Level III

PROF0301
Aviation Studies: Researching Societies
Staff Contact: Ms C Desmarchelier
S1 HPW6
Note/s: Restricted to course 3890.

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
S2 HPW2
Note/s: Restricted to course 3890.

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
S2 HPW3
Note/s: Restricted to course 3890.

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
S2 HPW2
Note/s: Restricted to course 3890.

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.

Psychiatry

Psychiatry Level II

PSCY2201
Human Behaviour
Staff Contact: Dr C. Mason
U1 F HPW3
Note/s: Restricted to Combined degree course 3820.

Staff Contact: Dr C. Mason
S1 HPW3 S2 HPW3

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
U2 F HPW5
Note/s: A high proficiency in English is necessary to pass this subject. Excluded 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 units.

PSYC2001
Research Methods 2
Staff Contact: Dr K. Llewellyn
U1 S1 HPW4
Prerequisite: PSYC1002 Advanced Pass (a mark of 55 or greater)

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
U1 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 J. Taplin
U1 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
U1 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
U2 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: Dr S. Moston
U1 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 units unless PSYC3001 Research Methods 3A has been passed.

Students may not enrol in more than eight Level III Psychology units.

Not all Level III Psychology units will necessarily be offered in each year.

PSYC3001
Research Methods 3A
Staff Contact: Dr K. Bird
U1 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 K. Bird
U1 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
U1 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: Prof E. J. Kehoe
U1 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
U1 HPW4
Prerequisite: PSYC3031
Note/s: Not offered in 1995.

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: Dr J. Cranney
U1 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
U1 HPW4
Prerequisite: PSYC3021
Note/s: Not offered in 1995.

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 S. Andrews
U1 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
U1 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
U1 S2 HPW4
Prerequisites: PSYC2001 and 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
U1 S1 HPW4
Prerequisites: PSYC2011 and 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: Dr S. Moston
U1 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: Dr M. Frank
U1 S2 HPW4
Prerequisites: PSYC2001 and 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
U1 HPW4
Prerequisites: PSYC2001 and PSYC2031
Note/s: Excluded PSYC3121. Not offered in 1995.

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 Organizations
Staff Contact: A/Prof S. Bochner
U1 S1 HPW4
Prerequisites: PSYC2001 and PSYC2031

Industrial and organizational psychology, job analysis, selection, motivation, management strategies, job design and a systems analytic approach to organizations, training, selection, work satisfaction and organizational climate.

PSYC3151
Cognition and Skill
Staff Contact: A/Prof J. Taplin
U1 S1 HPW4
Prerequisites: PSYC2001 and 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
U1 HPW4
Prerequisites: PSYC2001 and PSYC2021
Note/s: Not offered in 1995.

How language is acquired and used in reading, writing, speech comprehension and speech production. Language dysfunction and bilingualism.

PSYC3171
Recent Developments in Experimental Psychology
U1 HPW4
Prerequisites: PSYC2001 and PSYC2021
Note/s: Not offered in 1995.

An occasional elective dealing with recent developments in experimental psychology.

PSYC3181
Issues in Applied Psychology
U1 HPW4
Prerequisites: PSYC2001 and PSYC2011
Note/s: Not offered in 1995.

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: Dr H. Stanislaw
U1 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 S. Andrews
U10 F
Prerequisites: PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042, and 8 Level III Psychology units 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.

The Category C General Education requirements are met by components of a number of compulsory subjects in the course and particularly by PSYC2042.

PSYC4013
Psychology 4 (Course 3431)
Staff Contact: Dr S. Andrews
U10 F
Prerequisites: PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042, and 8 Level III Psychology units 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.

The Category C General Education requirements are met by components of a number of compulsory subjects in the course and particularly by PSYC2042.

PSYC4023
Psychology 4 (Thesis) Honours
Staff Contact: Dr S. Andrews
U10 F
Prerequisites: Completion of program 1200 or 1206 or 7312 including 8 Level III units

A supervised research thesis and course work to be determined in consultation with the Head of School.

The Category C General Education requirements are met by components of a number of compulsory subjects in the course and the 56 hour subject "History and Ethics/Professional Issues', which forms part of Year 4 program.

PSYC4033
Psychology 4 Honours
Staff Contact: Dr S. Andrews
U10 F
Prerequisites: Completion of program 1200 or 1206 or 7312 including 8 Level III units

Coursework and a supervised group research project to be determined in consultation with the Head of School.

The Category C General Education requirements are met by components of a number of compulsory subjects in the course and the 56 hour subject 'History and Ethics/Professional Issues', which forms part of Year 4 program.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

PSYC2106
Psychology (Industrial Relations)
HPW3
Note/s: Not offered in 1995.

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 organization and related theories of motivation and morale. The use of library resources. Practice in the skills and discipline required to obtain and evaluate empirical evidence in this field. Recent developments under the heading of 'participation' and democracy in industry.

For further information see the Faculty of Commerce and Economics handbook.

PSYC2116
Human Development (Optometry)
Staff Contact: Dr S. Moston
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
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 co-requisites. Entrance to most Level II/III subjects is possible without having studied Level 1 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 1 units may be counted towards course 3970

HPST1106
Myth, Megalith, and Cosmos
Staff Contact: Tony Corones
U1 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
U1 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
U1 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
U1 S1 HPW3
Note/s: Excluded 62.110.

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
U1 S2 HPW3
Prerequisite: SCTS1106 or 62.101
Note/s: Excluded 62.1031.

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
U1 S1 HPW3
Prerequisite: Completion of at least 4 Level 1 Science units
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
U1 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: Randall Albury
U1 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
U1 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
U1 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
U1 S2 HPW3
Prerequisite: As for HPST2106
Note/s: Excluded 26.564, 26.251, 62.022.

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
U1 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
U1 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Not offered in 1995.

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.

HPST3106
The Discovery of Time
Staff Contact: Guy Freeland
U1 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Not offered in 1995. 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: School Office
U1 S1 HPW3
Note/s: Not offered in 1995.

The relationship between science, technology, and the visual arts in the history of Western culture.

HPST3108
Deity and Mother Earth
Staff Contact: Guy Freeland
U1 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
U1 S1 HPW3
Prerequisite or Corequisite: HPST2106 or HPST2107, or permission of lecturer
Note/s: Excluded 62.3001, 62.301U.

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
U1 S1 or S2 HPW3
Prerequisite: As for HPST2106 or 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.

SCTS2106
Scientific Knowledge and Political Power
Staff Contact: George Bindon
U1 S1 HPW3
Prerequisite: As for HPST2106
Note/s: Not offered in 1995. 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
U1 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
U1 S1 HPW3
Prerequisite: As for SCTS1106 or completion of at least 4 Level I science units.
Note/s: Not offered in 1995.

Key issues for 'info-tech' society, including social policies and the future of work and education; mass media and telecommunications in the electronic age; commercialisation 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: Rosemary Robins
U1 S1 HPW3
Prerequisite: SCTS1106, or by permission of the Head of School
Note/s: Excluded 62.245.

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
U1 S2 HPW3
Prerequisite: Completion of at least 4 Level 1 science units 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
U1 S2 HPW3
Prerequisite: Completion of at least 4 Level 1 science units including SCTS1106; or permission of Head of School
Note/s: Not offered in 1995.

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.

SCTS3020
The Social Construction of the Environment: Botany Bay and the Sydney Region
Staff Contact: Paul Brown
U1 S2 HPW2
Prerequisite: Three subjects from the following: GEOG1051, GEOG2081, GEOG2102, GEOG3211, GEOG3062, GEOG3042, HPST3108, SCTS3106, SCTS3109, SCTS3116

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.

SCTS3106
Technology, Sustainable Development, and the Third World
Staff Contact: John Merson
U1 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
U1 S1 HPW2
Note/s: Not offered in 1995.
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
U1 S2 HPW3
Prerequisite: As for SCTS1106
Note/s: Not offered in 1995. 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
U1 S1 HPW3
Prerequisite: SCTS1106 or completion of at least 4 Level 1 science units

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.

Assessment: Essays, tests, tutorials.

SCTS3116
The Political Economy of Energy and Sustainable Development
Staff Contact: Paul Brown
U1 S2 HPW3
Prerequisite: As for SCTS3109
Note/s: Excluded 62.222U.

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
U1 S2 HPW3
Prerequisite: Completion of at least 2 SCTS units
Note/s: Not offered in 1995. 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
U1 S1 or S2 HPW3
Prerequisite: As for HPST2106, or 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.

Science and Technology Studies Level IV Honours Program

SCTS4106
Science and Technology Studies (Honours)
Staff Contact: David Oldroyd
U10 F
Prerequisites: Completion of program 6200 including 7 Level II/III units 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.

The Category C General Education requirements are met within the Honours program.

Wool and Animal Science

Wool and Animal Science Level II

WOOL3803
Genetics 1
Staff Contact: A/Prof J. James
U1 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
U1 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
U1 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 W J 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 A R Hyland
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 1995 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)
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

Graduate Diploma
GradDip

Staff Contact: School Office

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

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

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, nitrogen fixation, the pathogenesis of intestinal and gastroduodenal infection, the immunology of the intestinal tract.

School of Psychology

5330
Psychology Graduate Diploma Course
Full-time

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 co-requisite.

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

School of Psychology

Head of School: Professor K. M. McConkey
Senior Administrative Officer: Mr T. Clulow

The School offers courses leading to the award of the degrees of Master of Psychology (Applied) and Master of Psychology (Clinical).

8252
Master of Psychology (Applied) Degree Course
Full-time or Part-time

Master of Psychology (Applied)
MPsychol(App)

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 organizations. 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 organizational, 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 Organizational 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 a 22 hour core program, a thesis, a 10 hour elective program, and a professional practice component.

Subjects from other graduate degrees, including the Master of Psychology (Clinical), the master of Business Administration, the Master of Commerce (Industrial Relations and Organizational 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 Organizational Psychology 1
PSYC7101	Industrial and Organizational 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 Resources Management B
MNGT0374	Creativity
PSYC7110	Advanced Ergonomics
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 (Clin)
MPsychol(Clinical)

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, supervized clinical and community work, and a research thesis.

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: Prof J. 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 28 credits for completion, consists of a major project OCEA5115 worth 50% of the total accreditation for the program, the remaining 50 being comprised as indicated below.

1. Compulsory Subjects

OCEA5115	Experimental Project
OCEA5125	Geophysical Fluid Dynamics
OCEA5135	Instrumentation
OCEA5145	Applied Data Analysis

2. Elective Subjects

REMO9580	Image Analysis in Remote Sensing
REMO9581	Microwave Remote Sensing
CIVL9835	Coastal Engineering 1
CIVL9836	Coastal Engineering 2
CIVL9863	Estuarine Hydraulics
GEOG9150	Remote Sensing Applications
OCEA5155	Theoretical Project

Appropriate existing subjects within mathematics, physics or engineering chosen on the basis of individual background

Here 1 credit is defined as being 1 hour per week for one session 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 G. J. 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 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 G. J. 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 C.A.J. 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 organizes 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
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 D. B. 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 conditions 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 A. Dooley

The School offers graduate courses leading to the award of the degrees of Master of Mathematics (MMath) and Master of Statistics (MStats). The School also offers the pass degree of MA. For further details see the Faculty of Arts Handbook.

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 40 credits. Unless otherwise noted, all subjects listed below are 2 credits each.

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 (10 credits)
MATH5935	Statistical Consulting (4 credits)

Elective Subjects (offered every second year)

MATH5806	Applied Regression Analysis
MATH5816	Mathematics of Security Markets 2 (*Prerequisite:* MATH5965)
MATH5825	Experimental Design 2
MATH5845	Time Series
MATH5865	Multivariate Analysis 2
MATH5875	Sample Survey Design
MATH5885	Sequential Analysis
MATH5895	NonParametric Methods
MATH5915	Special Topic A*
MATH5945	Discrete Distributions
MATH5955	Statistical Quality Control
MATH5965	Mathematics of Security Markets 1
MATH5975	Economic Quality Control Models (*Prerequisite:* MATH5955)
MATH5985	Industrial Designs (*Prerequisite:* MATH5815)

Up to 10 credits 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
MANF9330	Simulation in Operations Research
MATH3161	Optimisation Methods
MATH3181	Optimal Control
MNGT0331	Business Forecasting
MNGT0332	Total Quality Management
MNGT0336	Applications of Statistics in Finance and Accounting

** To be arranged: eg biological statistics, further work on order statistics, population statistics, nonlinear programming.*

** The School is currently revising some aspects of these courses. Intending students should consult the School for details.*

School of Optometry

Head of School: Associate Professor D.J. 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 specialization 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
OPTM8003	Behavioural Optometry
OPTM8004	Advanced Contact Lens Studies
OPTM8005	Advanced Contact Lens Practice
OPTM8006	Occupational Optometry
OPTM8007	Clinical Photography
OPTM8008	Project
OPTM8009	Ocular Therapy
OPTM8010	Public Health Optometry
OPTM8011	Advanced Studies in Ocular Disease
OPTM8012	Visual Neuroscience
OPTM8014	Human Visual Development (0.5 unit subject)

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 corusework 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 organizational 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

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

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: Prof M Archer

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: Prof M Archer

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: Prof M Archer

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
U4 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 D B 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

Civil Engineering

CIVL9403
Theory of Land Use Transport Interaction
Staff Contact: Dr S.E Samuels
U3 SS
Note/s: Not offered in 1995.

Theoretical aspects of land use transport planning. Basic concepts, data collection methods, systems models and equation of state function (behavioural, optimising). Introduction to land use-transport modelling (land use, generation, distribution, modal assignment, network assignment, evaluation). Planning methodologies (short, medium, long-term; action planning, strategic planning; local, urban, regional, national).

CIVL9405
Urban Transport Planning Practice
Staff Contact: Dr S.E Samuels
U3 SS
Note/s: Not offered in 1995.

Analytical techniques for urban land use/transport planning practice. Planning methodology: traffic generation, trip distribution, modal-choice, traffic assignment, evaluation. Land use forecasting; calibration and verification of behavioural models, application of mathematical programming models, case studies, public transport problems.

CIVL9417
Transport and Traffic Flow Theory
Staff Contact: Dr M.C Dunne
U3 F
Note/s: Not offered in 1995.

Analysis of deterministic and stochastic models of the traffic stream. Topics include: definition and measurement of traffic stream parameters; space and time distribution of speed; overtaking models and the movingobserver method; fundamental diagram of traffic; carfollowing theory; headway and counting distributions; introduction to queuing theory; simulation techniques; signalised and unsignalised intersections.

CIVL9835
Coastal Engineering 1
Staff Contact: A/Prof R. Cox
U3 SS (Will be taught Wed. 1800-2100)
Note/s: Not offered in 1995.

Theory of periodic waves as applied to tides and wind generated waves in water of varying depths. Wave and tide prediction.

CIVL9836
Coastal Engineering 2
Staff Contact: A/Prof R. Cox
U3 SS
Note/s: Not offered in 1995.

Wave forces on structures, shore processes and beach erosion. Estuarine hydraulics, wave and tide models.

CIVL9862
Fluvial Hydraulics
Staff Contact: A/Prof R. Cox
U3 S2

Unsteady and varied flow in nion-uniform channels, secondary currents, sediment transport, channel morphology, scour and shoaling, river control works, modelling of fluvial processes.

CIVL9863
Estuarine Hydraulics
Staff Contact: Dr D.A. Luketina
U3 S1

Classification of estuary types and their characteristics. Tides, their origin, prediction and effect on estuarine circulation. Entrainment and mixing process in estuaries. Salinity intrusion, tidal flushing, dispersion of pollutants. Sediment transport, channel stability.

Computational Science

ANCE8001
Computational Mathematics
Staff Contact: CANCES
C3 S1 HPW3

Discretization, linear algebra, ODE and PDE solvers, appropriate for contemporary computational engineering and scientific applications.

ANCE8002
Supercomputing Techniques
Staff Contact: CANCES
C3 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
C12

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
C3 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
C3 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
C3 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
C3 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
C3 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
C3 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
C3 SS HPW3

Special topics taught by visitors or UNSW staff.

Economics

Initial contact for these units should be directly with the School of Economics Office.

ECON3204
Econometrics B
Staff Contact: Prof N Kakwani
U2 S2 L2 T1
Prerequisites: ECON3203 or MATH3811 or MATH3911

A theoretical treatment of further topics in single equation econometric modelling, including econometric specification tests, the Box-Cox transformation, dynamic models with auto-correlated errors, and nonlinear regression. Seemingly unrelated regressions. Simultaneous equation identification. Estimation and prediction. An overview of model-building, with illustrations from literature.

ECON5114
Microeconomics
Staff Contact: Dr C Freedman
S3 HPW3

Microeconomic theory and applications including consumer behaviour and the theory of demand; costs, production and the theory of the firm price determination under competition, monopolistic and oligopolistic markets; investment and technology; wages, and the distribution of income; welfare, economic efficiency and public policy.

ECON5125
Macroeconomics
Staff Contact: Dr M Monadjemi
S3 HPW3

Overview of the macroeconomy; determination of aggregate income, interest rate and employment in closed and open economies; theories of inflation; inflation and unemployment policy; monetarist and Keynesian controversies.

Geography

GEOG9150
Remote Sensing Applications
Staff Contact: Drs A Skidmore and Q Zhou, Mr A. Evans
U3 S1 L1 T2

The application of remotelysensed data and information in the description, classification and assessment of earth resources and environmental conditions. Different types of remote sensing data and imagery, their attributes, acquisition and uses. Relevance of remotesensing data and imagery to a range of applications, including assessment of conditions of terrain, soils and surface materials, multitemporal monitoring and inventory of rangelands, croplands and forests; rural and urban land use assessment; surveillance of surface water resources and sedimentation; appraisal of changes in coastal zone. Use of remote sensing in environmental management and in environmental impact assessment.

GEOG9240
Principles of Geographic Information Systems
Staff Contact: Dr Q. Zhou
C3 S1 L1 T2

Study of selected geographic information systems; problems of data capture and display, data storage and manipulation, system design and development; cartographic displays and computer mapping. INFO is used for database management, and ARCINFO and MAP for spatial data manipulation and display.

GEOG9241
Advanced Geographical Information Systems
Staff Contact: Dr A. Skidmore
C3 S2 L1 T2
Prerequisite: GEOG9240

Advanced topics and concepts in GIS research and development. Focus is primarily on vector-based systems. Topics include data models, structure and capture; vector editing and algorithms; errors and data accuracy. Practical exercises based on ARCINFO; INFO is used for database management.

GEOG9280
Application and Management of Geographical Information Systems
Staff Contact: Dr A. Skidmore
C3 S1 L2 T1

The process and issues involved in an organisation acquiring, implementing and managing a GIS will be considered using real examples. Applications using GIS in the management of natural resources (forest, park, soil, etc), utilities and cadastra at the local, national and global scale will be critically reviewed. The course will involve the practical use of project management tools and the application of GIS to solve a management problem using ARCINFO or MAP. INFO is used for database management.

GEOG9290
Image Analysis in Remote Sensing
Staff Contact: Mr A Evans or Dr A Skidmore
U3 S2 L2 T1

Techniques for extracting information from satellite imagery including image enhancement and rectification techniques, classification and feature recognition, statistical methods, and related procedures. Emphasis is on applications relating to vegetation cover and natural resource management. Practical work will be undertaken using the ERDAS image processing software.

Mathematics

MATH5105
Numerical Analysis of Differential Equations
Staff Contact: School of Mathematics Office

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

Development and analysis of numerical methods for the computational solution of mathematical problems.

MATH5115
Topics in Numerical Analysis
Staff Contact: School of Mathematics Office

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

Fundamental methods for solution of problems in applied mathematics, physics and engineering

MATH5155
Discrete Optimization
Staff Contact: School of Mathematics Office

Analysis, solution and application of optimization problems where the variables may change continuously. 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

Analysis, solution and application of optimization problems where the variables may change continuously. Topics selected from: nonlinear programming, convex optimization, nonsmooth analysis and optimization, variational inequalities and complementary problems, infinitedimensional optimization, stochastic optimization, and numerical optimization.

MATH5170
Advanced Optimization
Staff Contact: School of Mathematics Office

Development, analysis and application of methods for optimization problems.

MATH5175
Topics in Optimization and Optimal Control
Staff Contact: School of Mathematics Office

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

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

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 complexanalytic methods of proving qualitative results for equations of physical interest.

MATH5215
Topics in Dynamics
Staff Contact: School of Mathematics Office

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

Special topics in boundarylayer theory, turbulent flows, stability theory, waves, viscous flows and computational techniques.

MATH5250
Advanced Fluid Dynamics
Staff Contact: School of Mathematics Office

The mathematical modelling and theory of problems arising in the flow of fluids.

MATH5255
Waves
Staff Contact: School of Mathematics Office

Hyperbolic waves the firstorder 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

The dynamics of largescale 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, airsea exchange, climate change and the Greenhouse effect.

MATH5275
Topics in Modern Applied Mathematics B
Staff Contact: School of Mathematics Office

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

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

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

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

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

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

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

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

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

MATH5515
Topics in Analysis
Staff Contact: School of Mathematics Office

MATH5525
Topics in Geometry
Staff Contact: School of Mathematics Office

MATH5535
Topics in Number Theory
Staff Contact: School of Mathematics Office

MATH5605
Operator Theory
Staff Contact: School of Mathematics Office

Topics from: invariant subspaces, integral equations and Fredholm theory, functional calculus, decomposition theorems, Hankel and Toeplitz operators, operators on Hp spaces, Ergodic theory, semigroups.

MATH5615
Banach and Operator Algebras
Staff Contact: School of Mathematics Office

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

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 boundaryvalue problems via the Schauder approach.

MATH5635
Dynamical Systems
Staff Contact: School of Mathematics Office

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

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

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

Topics from: functors and natural transformations. Homotopy of maps, homotopy groups, covering spaces. Simplical and singular homology and cohomology. Homological algebra.

MATH5675
Set Theory and Topology
Staff Contact: School of Mathematics Office

Topics from: set theory, axiom of choice, ordinals and cardinals, topological spaces, compactness, quotient topologies.

MATH5685
Complex Analysis
Staff Contact: School of Mathematics Office

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

Topics from: Brownian motion, Itô calculus, Malliavin calculus, Girsanov's theorem, Clark's theorem, the HarrisonPliska model of option pricing.

MATH5705
Commutative Harmonic Analysis
Staff Contact: School of Mathematics Office

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

Topics from: Locally compact groups, Haar measure, homogeneous spaces. Convolution algebras, representations, irreducibility. Induced representations, Mackey theory. Compact groups, PeterWeyl theory. Nilpotent groups, Kirillov theory.

MATH5725
Lie Groups and Algebras
Staff Contact: School of Mathematics Office

Topics from: revision of manifolds and linear algebra. Topological groups, Haar measure, Lie groups, Lie algebras. Substructures. Classification of semisimple complex Lie algebras. Highest weight representations.

MATH5735
Advanced Algebra
Staff Contact: School of Mathematics Office

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

Topics from: abelian, nilpotent and solvable groups, further representation theory, Euclidean reflection groups, Chevalley groups, group homology and cohomology, group extensions.

MATH5755
Mathematical Foundatons of Quantum Mechanics
Staff Contact: School of Mathematics Office

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

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

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

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

Generalised linear models. Ridge regression. Analysis of residuals. Nonlinear regression.

MATH5815
Experimental Design 1
Staff Contact: School of Mathematics Office
U2

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory. Multiple comparisons.

MATH5816
Mathematics of Security Markets 2
Staff Contact: School of Mathematics Office
Prerequisite: MATH5965

More advanced applications of stochastic calculus to security markets.

MATH5825
Experimental Design 2
Staff Contact: School of Mathematics Office
U2

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
U2

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
U2

Spectral estimates, discrete and continuous spectra. Periodogram analysis. Probability theory, special processes. Ergodicity, harmonic analysis and linear filters. Estimation and hypothesis testing.

MATH5855
Multivariate Analysis 1
Staff Contact: School of Mathematics Office
U2

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
U2

The general linear hypothesis and analysis of dispersion. Tests based on roots, distribution theory.

MATH5875
Sample Survey Design
Staff Contact: School of Mathematics Office
U2

Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multistage sampling.

MATH5885
Sequential Analysis
Staff Contact: School of Mathematics Office
U2

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
U2

Sign test, run tests, goodness of fit tests. Order statistics and range. Rankorder statistics. Wilcoxon and signed rank tests, one and twoway 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
U2

Decision theory. General theory of estimation and hypothesis testing.

MATH5915
Medical Statistics
Staff Contact: School of Mathematics Office

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

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

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

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

Lot acceptance sampling plans. Acceptance inspection for continuous production. Process control charts. Multicharacteristic quality control. Economic designs of control plans. Quality evaluation.

MATH5965
Mathematics of Security Markets 1
Staff Contact: School of Mathematics Office

Derivative securities, forward and futures contracts, swaps. Option pricing using Black Scholes and binomial approaches. Stochastic models for asset dunamics, 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

Economic designs of acceptance sampling plans. Economic designs of process control charts. Quality evaluation. Tolerance design and tolerancing. Taguchi's on time quality control. Online process parameter design process improvement methods and preventive maintenance.

MATH5985
Industrial Designs
Staff Contact: School of Mathematics Office
Prerequisite: MATH5815

The economics of reducing variation. Analysis of variance. Orthogonal arrays. Multiple level experiements. 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
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

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 Prof J Middleton.

OCEA5115
Experimental Project in Physical Oceanography
U14

A report of an experimental project, including recording, preparation, analysis and interpretation of field or laboratory data.

OCEA5125
Geophysical Fluid Dynamics
U4

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
U1

Laboratory, moored, shipborne, airborne and space instrumentation commonly used in oceanographic experiments; their applications and limitations.

OCEA5145
Applied Time Series Analysis
U2

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
U7

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
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
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
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
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
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
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
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
HPW8

An investigation into some aspect of Optometry or Visual Science.

OPTM8009
Ocular Therapy
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
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
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
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. Organization 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
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 G J Bowden.

PHYS7611
Computational Physics
Staff Contact: School Office
C3 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

Refer to the School of Psychology for details.

PSYC7000
Research and Evaluation Methods
Staff Contact: Dr K Bird
S1 HPW2

Problems of experimental design in 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
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, neuropsychological and organicity assessment, personality assessment and its use, assessment and goal attainment scaling, and ethical, legal and professional issues.

PSYC7002
Psychological Assessment 2
Staff Contact: Dr K Bird
S2 HPW2
Prerequisite: PSYC7001

The application of the principles of experimental psychology to problems of behavioural assessment in a wide variety of situations, eg organizational behaviour; lifestyle change; the management of behavioural disorders; institutional behavioural programs. Assessment procedures studied include: psychological tests, behavioural analysis and case history taking, psychophysiological and other objective measures.

PSYC7003
Graduate Colloquium
Staff Contact: School Office

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 staffgraduate student colloquium.

PSYC7004
Professional and Ethical Issues
Staff Contact: A/Prof S Bochner
S1 HPW2

An examination of the organization 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, organizations, other professionals and the public at large. Topics dealing with contemporary issues explored in depth (e.g. marketing psychology, political influencing skills in large organizations, psychologists contribution to such areas as the environment, policing and law etc.).

PSYC7100
Industrial and Organizational Psychology 1
Staff Contact: A/Prof S Bochner
S1 HPW2

General framework for understanding organizational 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 Organizational Psychology 2
Staff Contact: A/Prof S Bochner
S2 HPW2
Prerequisite: PSYC7100

An advanced examination of some topics covered in PSYC7100 Industrial and Organizational 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: Prof E J Kehoe
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 H Stanislaw
S1 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
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. Supervized 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
F HPW1

Participation in the staff graduate student colloquium.

PSYC7108
Research Thesis (Applied)
Staff Contact: A/Prof S Bochner

Research thesis involving an investigation into some aspect of applied psychology.

PSYC7109
Principles of Ergonomics
Staff Contact: Dr A Adams
HPW3 SI

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 Perspective in Applied Psychology
Staff Contact: A/Prof S Bochner
HPW2
Note/s: Not offered in 1995

General issues in cross-cultural psychology; problems of conducting research in more than one cultural setting. Cross cultural organizational 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
Staff Contact: A/Prof S Bochner
HPW2

Individual career counselling, decisionmaking 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: Dr A Adams
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
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
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
S1 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

A research thesis involving an investigation into some aspect of clinical or community psychology.

PSYC7209
Developmental Disabilities
Staff Contact: A/Prof J Taplin
S2 HPW2

An essentially practical subject focusing on childhood disorders, such as mental retardation, infantile autism, physical and sensory handicaps, specific learning difficulties, and hyperactivity. Methods of assessment include standardized 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
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.

Behavioural Medicine
Staff Contact: Dr M Nicholas

PSYC7212
Experimental Clinical Psychology 1
Staff Contact: Dr J Clarke
S1 HPW4

An introduction to clinical practice and deals with two serious psychological problems (mood disorders and obsessive compulsive disorder). Topics covered include: interviewing, diagnosis, mental state examination, case formulation, and introduction to treatments.

Note: The use of pharmacotherapy in relation to psychological problems will be covered in each of the Experimental Clinical Psychology subjects as appropriate.

PSYC7213
Experimental Clinical Psychology 2
Staff Contact: Dr J C Clarke
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: anxiety disorders, impulse control disorders, and psychoactive substance use disorders.

PSYC7214
Experimental Clinical Psychology 3
Staff Contact: Dr J C Clarke
S1 HPW2
Prerequisite: PSYC7213

The assessment and management of schizophrenia, sexual disorders and personality disorders. Psychological rehabilitation, marital and family therapies.

PSYC7215
Experimental Clinical Psychology 4
Staff Contact: Dr J C Clarke
S2 HPWE2
Prerequisite: PSYC7214

An examination of specialised areas of clinical practice, including the management of suicide, crisis management, sexual assault, and child abuse in adult mental health problems.

PSYC 7216
Professional Practice (Clinical) 1
Staff Contact: Dr J Henry
S1
Note/s: Excluded PSYC7205

Attendance at weekly clinical meetings (1 hour) and skills training workshops (2 hours).

PSYC7217
Professional Practics (Clinical) 2
Staff Contact: Dr J Henry
S2
Prerequisite: PSYC7216
Note/s: Excluded PSYC7205

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 J Henry
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
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
HPW3 S1
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
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 1995.

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.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

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

PSYC7300
Experimental Psychology in Cognitive Science
Staff Contact: Prof E J Kehoe
S1 HPW2

Theory of experimental psychology pertinent to cognitive science. Learning, memory, decision making, problem solving, perception, and language comprehension.

PSYC7301
Behavioural Neuroscience
Staff Contact: Prof G Paxinos
S1 HPW2

The neurophysiological substrates of learning, memory, perception and cognition. Introduction to the basic structure and physiology of the nervous system.

PSYC7302
Human Information Processing
Staff Contact: Dr M Taft
S2 HPW2
Note/s: Not offered in 1995

Human information processing: advanced topics in cognitive psychology with particular reference to temporal dynamics of attention, organization, integration and retrieval processes for sensory and linguistic information.

PSYC7303
Neuroscience: Human Neuropsychology
Staff Contact: Dr J Cranney
S2 HPW2

Advanced topics in the neurophysiology of human cognitive functioning, including consideration of the influence of brain disease and brain damage.

Geomatic Engineering

REMO9581
Microwave Remote Sensing
Staff Contact: A/Prof B Forster
U3

Use of passive and active radar microwave techniques in remote sensing of earth resources. Topics include; real and synthetic aperture radar systems; passive microwave radiometry; energy surface interactions; interpretation of microwave image data: applications in agriculture, geology, oceanography and hydrology; issues in signal and image processing; characteristics of airborne and spaceborne microwave sensors.

Safety Science

SAFE9211
Introduction to Safety Engineering
Staff Contact: Dr R Rosen
U3
Assumed knowledge: SAFE9011 or PHYS1022
Note/s: Students with an engineering or physics background may take SAFE9213 which covers similar material.

The engineering improvement of potentially hazardous workplaces with reference to the following: basic safety practice; management of dangerous materials; fire and explosion; ventilation; noise control; radiation protection; electrical safety; biosafety; machine dangers and machine guarding; construction safety; transport safety; environmental safety; plant safety assessment.

SAFE9224
Principles of Ergonomics
Staff Contact: Mr Roger R Hall
C3
Assumed knowledge: Basic statistics

The subject will give an introduction to ergonomics, emphasising the principles of designing user-centred, human-machine-environment systems. Topics include: definition of and justification for ergonomics, design and human error, human capabilities and limitations, controls and displays, design of human-machine-environmnt systems, job design and work organisation, introduction to anthropometry, design of workplaces, introduction to manual handling and the physical environment, and introduction to product design and human-computer interaction.

SAFE9232
Introduction to Occupational Health and Safety Law
Staff Contact: Head of School
U3

The concept of law; the creation and interpretation of statutes; the judicial and court systems; locus standi; common law and equity; basic principles of legal liability (civil and criminal); basic principles of administrative law and the liability of the Crown; the common law of employment; statutory regulation of employment;

compulsory arbitration of industrial disputes. Outline of occupational health, safety and compensation legislation of the Australian States. Actions under the common law.

SAFE9242
Effective Behaviour In Organizations
Staff Contact: Ms Dianne Gardner
C3

Human behaviour as a major system factor in occupational safety and health. Learning and safety programs. Attitudes and attitude change. Safety compliance individual and group factors affecting compliance. Work motivation and safety practice. Accident proneness and personnel selection. Individual differences in attitudes to work. Planning and implementing organizational change.

SAFE9424
Applied Ergonomics
Staff Contact: Mr Roger Hall
C3
Prerequisite: SAFE9224 or equivalent

Decision making, vigilance, effects of workload and stress, applications to screenbased equipment. Human error in relation to human/system interaction. Work systems: the systems approach, practical evaluation and redesign of work systems. Experimental methodology, experimental design in ergonomics, critical evaluation of the literature.

SAFE9543
Management of Dangerous Materials
Staff Contact: Dr Chris Winder
C3
Assumed knowledge: 1st year chemistry

This subject covers chemicals legislation, regulatory assessment of chemicals, chemical information (labels/MSDS), workplace management of chemical safety (workplace assessment, exposure control, storage of chemicals, personal protection, monitoring), emergency preparedness, pollution, management of hazardous wastes and disposal.

SAFE9553
Radiation Protection
Staff Contact: Dr Ronald Rosen
C3
Assumed knowledge: SAFE9211 or SAFE9213

Principles and practices of radiation protection for both ionising and nonionising radiation. Radiation physics, detection and measurement; background radiation; biological effects of radiation; dose limits; technical controls for radioactive sources and irradiating apparatus. Codes of safe practice; radiological monitoring and personal dosimetry; storage, transport and disposal of sources; environmental impact; administrative controls; emergency procedures; control of non ionising radiation. Practical work and site visit.

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 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

Title	Abbreviation	Calendar/Handbook
Master of the Built Environment	MBEnv	Built Environment
Master of the Built Environment (Building Conservation)	MBEnv	Built Environment
Master of Business Administration	MBA	AGSM
Master of Business Administration (Executive)	MBA(Exec)	AGSM
Master of Business and Technology	MBT	Engineering
Master of Chemistry	MChem	Science*
Master of Clinical Education	MClinEd	Medicine
Master of Cognitive Science	MCogSc	Engineering
Master of Commerce (Honours)	MCom(Hons)	Commerce and Economics
Master of Commerce	MCom	Commerce and Economics
Master of Community Health	MCH	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 and 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

Title	Abbreviation	Calendar/Handbook
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
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 (Industrial Design)	MSc(IndDes)	Built Environment
Master of Science and Society	MScSoc	Arts and Social Sciences
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*†
	GradDipC/F Therapy	Professional Studies
	GradDipClinEd	Medicine
	GradDipEq&SocAdmin	Professional Studies
	GradDipHEd	Professional Studies
	GradDipHPEd	Medicine
	GradDipIndMgt	Engineering
	GradDipIntSocDev	Professional Studies
	GradDipPaed	Medicine
	GradDipSpMed	Medicine
	DipEd	Professional Studies
	GradDipIM-Archiv/Rec	Professional Studies
	GradDipIM-Lib	Professional Studies
	DipFDA	Science*

Graduate Certificates

	GradCertHealthAdmin	Professional Studies
	GradCertHEd	Professional Studies
	GradCertPhilT	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.

(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.

Scholarships and Prizes

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

Listed below is an outline in summary form of undergraduate scholarships available to students. Full information may be obtained from the Student Centre located on the Lower Ground Floor of the Chancellery.

Unless otherwise indicated in footnotes, applications for the following scholarships should be submitted to the Scholarships Unit (c/- Student Centre) by 31 January each year. Please note that not all of these awards are available every year.

General

ANSETT Travel Awards

V A limited number of return tickets for travel within Australia on ANSETT Australia or to an international destination serviced by ANSETT International (currently Hong Kong, Indonesia and Japan) will be provided by the award.

C Applicants must be permanent residents or Citizens of Australia. The scholarship may be awarded to a student(s) undertaking full-time study in a 4th year honours program. The scholarship will be awarded on the basis of a number of factors including academic performance and the relevance and merit of the proposed travel. Applications close 31 October with the Scholarships Unit.

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 Australian Diplomatic Posts. Conditions and entitlements vary depending on the home country. The closing date is normally early in the year before the year of study.

Sam Cracknell Memorial

V Up to $1500 pa payable in fortnightly instalments

T 1 year

C Prior completion of at least 2 years of a degree or diploma course and enrolment in a full-time course during the year of application; academic merit; participation in sport both directly and administratively; and financial need. Applications close 7 March.

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 on the basis of academic merit and financial need

University Honours Year Scholarships

V $1000

T 1 year

C 25 scholarships will be awarded on the basis of acadmeic 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 Scholarships Unit on 28 October.

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 have completed their schooling in Broken Hill or whose parents reside in Broken Hill; for a course related to the mining industry. Includes courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering and science. Applications close 30 September each year. Apply directly to PO Box 460, Broken Hill, NSW 2880.

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.

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: (02) 385 4878).

General Accident Australian Bicentennial St Andrews Scholarship

V £Stg4840

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.

Biological and Behavioural Sciences

V Up to $3000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress. A number of scholarships are available and carry the title of Faculty Scholar.

C Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Biological and Behavioural Sciences

BSSM

Esther Louise Buchwald Memorial Scholarship

V $500 pa

T 1 year

Available only to a physically disabled student enrolled in any year of a course in the Board of Studies in Science and Mathematics

Science

Faculty Scholarships

V Up to $3000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress. Five scholarships are available and carry the title of Faculty Scholar.

C Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Science

School Scholarships (Chemistry, Mathematics and Physics)

V Up to $2000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress. Up to six scholarships are available.

C Permanent residents of Australia. Available to full-time students enrolled in one of the schools

George Szekeres Award (School of Mathematics)

V $200 pa

T 1 year

C Open to students entering the final year of the honours degree course in Pure Mathematics

The UNSW Co-op Program

The University of New South Wales has industry-linked education scholarships to the value of $9800 per annum in the following areas: Accounting (and Economics or Finance; Business Information Technology; Aerospace, Bioprocess, Ceramic, Chemical, Civil, Electrical, Environmental, Materials, Mechanical, Metallurgical, Mineral, Mining and Petroleum Engineering; Food Science and Technology, Industrial Chemistry, Manufacturing Management, Textile Management, Textile Technology, and Wool and Pastoral Science.

Graduate Scholarships

Listed below is an outline in summary form of Graduate Scholarships available to students. Application forms and further information are available from the Scholarships Unit and Student Centre, located on the Ground Floor of the Chancellery, unless an alternative contact address is provided. Normally applications become available four to six weeks before the closing date.

The following publications may also be of assistance: **1.** *Awards for Postgraduate Study in Australia*, **2.** *Awards for Postgraduate Study Overseas*, **3.** *Directory of Post-graduate Study*, published by the Graduate Careers Council of Australia, PO Box 28, Parkville, Victoria 3052;* **4.** *Study Abroad*, published by UNESCO.*

Details of overseas awards and exchanges administered by the Department of Employment, Education and Training can be obtained from: Awards and Exchanges Section, Department of Employment, Education and Training, PO Box 826, Woden, ACT 2606.

Where possible, the scholarships are listed in order of faculty. Applicants should note that the awards and conditions are subject to review.

**Available for reference in the University Library.*

General

ANSETT International Travel Awards

V A limited number of tickets for travel with ANSETT International (currently services Hong Kong, Indonesia and Japan)

C The scholarship is only available to international students. Students living in Hong Kong, Indonesia or Japan and proposing to commence study at the University may apply for a single ticket at the start of their course. Students currently in Australia may apply for a return ticket. The scholarship will be awarded on the basis of a number of factors including academic performance and the relevance and merit of the proposed travel. Applications close with the Scholarships Unit on 31 October.

ANSETT Travel Awards

V A limited number of return tickets for travel within Australia on ANSETT Australia or to an international destination serviced by ANSETT International (currently Hong Kong, Indonesia and Japan) will be provided by the award.

C Applicants must be permanent residents or Citizens of Australia The scholarship may be awarded to a student(s) undertaking full-time study in a postgraduate course (Postgraduate Diploma, Masters by Coursework or Research or PhD). The scholarship will be awarded on the basis of a number of factors including academic performance and the relevance and merit of the proposed travel. Applications close with the Scholarships Unit on 31 October.

Australian Awards for Research in Asia (AARA)

T 3-12 months

C The awards are for postgraduate study or fieldwork in Cambodia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam. Applicants must be Australian citizens, or have Permanent Resident status, and have lived in Australia for the 12 months prior to the close of applications on 17 June.

Caltex National Scholarship for Women

V $50,000 over two years

T Up to 2 years

C Applicants must be Australian citizens or have resided continuously in Australia for 5 years and have completed, or will complete, in 1994 an award from an Australian institution. Applicants may be proposing to undertake study in any discipline overseas. Application to the Honorary Secretary, Caltex National Scholarship, University by 16 September.

Kobe Steel Scholarship for Postgraduate Study at St Catherine's College, Oxford University

V £14,520

T Up to 2 years

C Applicants must be Australian nationals. Students should have a past or future interest in Japan. Applications close on 31 October with Kobe Steel Australia P/L, Level 32 Gateway, 1 Macquarie Place, Sydney, 2000.

Australian Postgraduate Awards

V $11,687 to $18,679 (1993 rates). Other allowances may also be paid. Tax free.

T 1-2 years for a Masters and 3-4 years for a PhD degree

C Applicants must be honours graduates or equivalent or scholars who will graduate in current academic year, and who are domiciled in Australia. Applications to Registrar 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 in the home country. Conditions and entitlements vary depending on the home country.

Overseas Postgraduate Research Scholarships

V Tuition fees 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 Registrar by 30 September

Australian American Educational Foundation Fulbright Award

V $11,500 pa and travel expenses

T 1 year, renewable

C Applicants must be graduates who are domiciled in Australia and wish to undertake research or study for a higher degree in America. Applications close 30 September with The Secretary, DEET, AAEF Travel Grants, PO Box 826, Woden, ACT 2606. Application forms are available from the Associate Registrar, University of Sydney, NSW 2006 (tel: (02) 692 2222).

Australian Federation of University Women

V Amount varies, depending on award

T Up to 1 year

C Applicants must be female graduates who are members of the Australian Federation of University Women. Further enquiries may be directed to the Secretary of the Federation, tel: (02) 232 5629.

Commonwealth Scholarship and Fellowship Plan

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 and who are not older than 35 years of age. Tenable in Commonwealth countries other than Australia. Applications close with the Registrar in early October.

The English-Speaking Union (NSW Branch)

V $8000

T 1 year

C Applicants must be residents of NSW or ACT. Awarded to young graduates to further their studies outside Australia. Applications close mid-April with The Secretary, Ground Floor, School of Arts, 275c Pitt Street, Sydney, NSW 2000.

Frank Knox Memorial Stipend of Fellowships

V $US11,500 pa plus tuition fees

T Up to 2 years tenable at Harvard University

C Applicants must be British subjects and Australian citizens, who are graduates or near graduates of an Australian university. Applications close with the Academic Registrar mid-October.

Robert Gordon Menzies Scholarship to Harvard

V Up to $US 25,000

T 1 year

C Tenable at Harvard University. Applicants must be Australian citizens and graduates of an Australian tertiary institution. Applications close 31 December with the Registrar, A.N.U., GPO Box 4, Canberra, ACT 2601.

Gowrie Scholarship Trust Fund

V $6000 pa. Under special circumstances this may be increased.

T 2 years

C Applicants must be members of the Forces or children of members of the Forces who were on active service during the 1939-45 War. Applications close with the Academic Registrar by 31 October.

Harkness Fellowships of the Commonwealth Fund of New York

V Living and travel allowances, tuition and research expenses, health insurance, book and equipment and other allowances for travel and study in the USA

T 12-21 months

C Candidates must be Australian citizens and 1. Either members of the Commonwealth or a State Public Service or semi-government Authority. 2. Either staff or graduate students at an Australian university. 3. Individuals recommended for nomination by the Local Correspondents. The candidate will usually have an honours degree or equivalent, or an outstanding record of achievement, and be not more than 35 years of age. Applications close 30 September with the Academic Registrar. Forms available from Mr J. Larkin, Bureau of Agriculture and Resource Economics, GPO Box 1563, Canberra, ACT 2601.

The Packer, Shell and Barclays Scholarships to Cambridge University

V Living and travel allowances, tuition expenses

T 1-3 years

C Applicants must be Australian citizens who are honours graduates or equivalent, and under 26 years of age. Applications are available from The Secretary, Cambridge Commonwealth Trust, PO Box 252, Cambridge CB2 ITZ, England. The scholarship closes on 15 October.

The Rhodes Scholarship to Oxford University

V Approximately $15,000 pa and fees

T 2 years, may be extended for a third year

C Unmarried Australian citizens aged between 19 and 25 who have an honours degree or equivalent. Applications close in September each year with The Secretary, University of Sydney, NSW 2006.

Biological and Behavioural Sciences

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
The National Health and Medical Research Council

V Up to $15,440 pa

T 1 year renewable up to a maximum of 3 years

C Applications close 24 May with the Scholarships Unit, c/- Student Centre, Lower Ground Floor, Chancellery. An alternative closing date of 31 October applies to Postgraduate Science Research Scholarships to accommodate students currently in the final year leading to the award of the degree of Bachelor of Science at honours level.

Science

AAUW Educational Foundation Scholarships in Science for Women

V $US14,000

T 1 year

C Applicants should be intending to undertake full-time postgraduate study in Science (natural or physical) in the United States. Applications and complete details are available from the AAUW Educational Foundation, 1111 Sixteenth St NW, Washington DC, 20036-4873. Applications close 1 December.

Arthritis Foundation Research Scholarships

See above under Medicine

Australian Telecommunications and Electronics Research Board Postgraduate Scholarships

V $9000 (tax free) intended as a supplement to other awards

T Up to 3 years for a PhD degree

C Applicants must be first class honours graduates or equivalent or scholars who will graduate with honours in the current academic year, who are Australian citizens or permanent residents. Preference will be given to applicants who are aged under 30 years as at

1 January. Applications close 1 November with ATERB, PO Box 93, North Ryde, NSW 2113.

Australian Institute of Nuclear Science and Engineering Student Scholarships

V Basic stipend $11,103 pa plus allowances and some University expenses

T 1-3 years

C Applicants must be honours graduates in Science or Engineering. At least one quarter of the period of tenure must be spent at the Institute at Lucas Heights, NSW. Applications close 31 December.

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: (02) 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.

Lionel Murphy Australian Postgraduate Bicentennial Scholarship

See above under Law

Shell Scholarship in Science or Engineering

V $20,000 pa

T 2 years for a Masters and 3 years for a PhD

C Applicants must be Australian citizens or permanent residents. Applicants should intend to study a Masters degree or Doctorate in science, engineering, economics/commerce, computer science, or a closely related discipline.

Prizes

Undergraduate University Prizes

The following information summarizes 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 or Schools 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

V $150.00

C The best performance in CHEN3080 Chemical Engineering Laboratory 2

School of Chemistry

The Bosworth Prize in Physical Chemistry

V $200.00 and Bronze medal

C The best performance in CHEM3011 Physical Chemistry in the Bachelor of Science course

The Inglis Hudson Bequest

V $15.00

C The best performance in CHEM2021 Organic Chemistry

The Jeffery Bequest

V $100.00

C The best performance in CHEM2021 Organic Chemistry

The June Griffith Memorial Prize

V $60.00

C The best performance in CHEM1002 Chemistry 1 in the Bachelor of Science degree course

The Merck Sharp & Dohme (Aust) Pty Ltd Prize

V $52.50

C The best performance in Level 2 Chemistry subjects in the Board of Studies in Science and Mathematics

The Merck Sharp & Dohme (Aust) Pty Ltd Prize

V $52.50

C The best performance in Level 3 Chemistry subjects in the Board of Studies in Science and Mathematics

The RACI Analytical Chemistry Group Prize

V $150.00

C The best performance in CHEM3041 Analytical Chemistry and CHEM3141 Advanced Instrumental Analysis

The University of New South Wales Chemical Society Parke-Pope Prize

V $100.00

C Meritorious performance in Level 2 Chemistry subjects

The University of New South Wales Chemical Society George Wright Prize

V $100.00

C Meritorious performance in Level 3 Chemistry subjects

School of Mathematics

The Applied Mathematics Prize

V $50.00

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 $50.00

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 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

The Michael Mihailavitch Erihman Award

V $1000.00

C The best performance by a student enrolled in a Mathematics program, in examinations conducted by School of Mathematics in any one year

The Pure Mathematics Prize

V $50.00

C The best performance in Level 3 Pure Mathematics subjects by a student in a Bachelor degree or Diploma course

The Reuters Australia Pty Limited Prize

V $100.00

C Excellence in Higher Theory of Statistics 2 subjects in a Bachelor degree course

The School of Mathematics Prize

V $50.00

C The best performance in MATH1131 Mathematics 1A or MATH1141 Higher Mathematics 1A, and MATH1231 Mathematics 1B or MATH1241 Higher Mathematics 1B by a student in a Bachelor degree or Diploma course

The School of Mathematics Prize

V $50.00

C The best performance in basic Level 2 Higher Mathematics units by a student in a Bachelor degree or Diploma course

The School of Mathematics Prize

V $50.00

C Excellence in four or more Mathematics units by a student in Year 2 of 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 a student proceeding to the award of 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 Real Analysis and MATH3620 Higher Functional Analysis or in MATH3181 Optimal Control

School of Optometry

The ACBO/Learning Frontiers Prize in 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 OPTM9041 Clinical Optometry

The Bausch & Lomb Prize

V Plaque and Ray-Ban sunglasses valued at $300.00

C The best performance in the contact lens section of OPTM9041 Clinical Optometry in the Bachelor of Optometry degree course

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 G Nissell & Company Australia Pty Ltd Prize

V Trial fitting set of contact lenses

C The best performance in the Contact Lens sections of OPTM9042 Optometry B and OPTM9041 Clinical Optometry 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 Year 4 of the Bachelor of Optometry degree course

The Hydron Contact Lens Prize

V $100.00

C The best performance in OPTM9042 Optometry B in the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $200.00

C The best performance in OPTM2301 Ocular and Visual Science 2 in the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $200.00

C The best performance in OPTM9032 Diagnosis and Management of Ocular Disease in the Bachelor of Optometry degree course

The Martin Wells Pty Ltd Prize

V $200.00

C The best final year Essay in the Bachelor of Optometry degree course

The Optical Products Ltd Prize

V $100.00

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 OPTM9041 Clinical Optometry by a student in the Bachelor of Optometry degree course

School of Physics

The Australian Institute of Physics Prize

V $100.00 and one year's membership of the Institute

C The highest aggregate in any 3 units from:

- PHYS3010 Quantum Mechanics
- PHYS3050 Nuclear Physics
- PHYS3021 Statistical Mechanics & 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 course

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 Bob Dalglish Prize

V $100.00

C The best performance in a project carried out within PHYS2601 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
- PHYS3530 Advanced Quantum Physics
- PHYS3550 General Relativity
- PHYS3560 Relativistic Electrodynamics and 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 $200.00 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
- 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 Spectra Physics Prize in Experimental Physics

V $400.00 and Bronze Medal

C The best performance in PHYS3041 Experimental Physics A by a student in the Bachelor of Science 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 $100.00

C The best performance in a 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

Graduate University Prizes

The following information summarizes graduate prizes awarded by the University.

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.

Notes

The University of New South Wales • Kensington Campus

Theatres

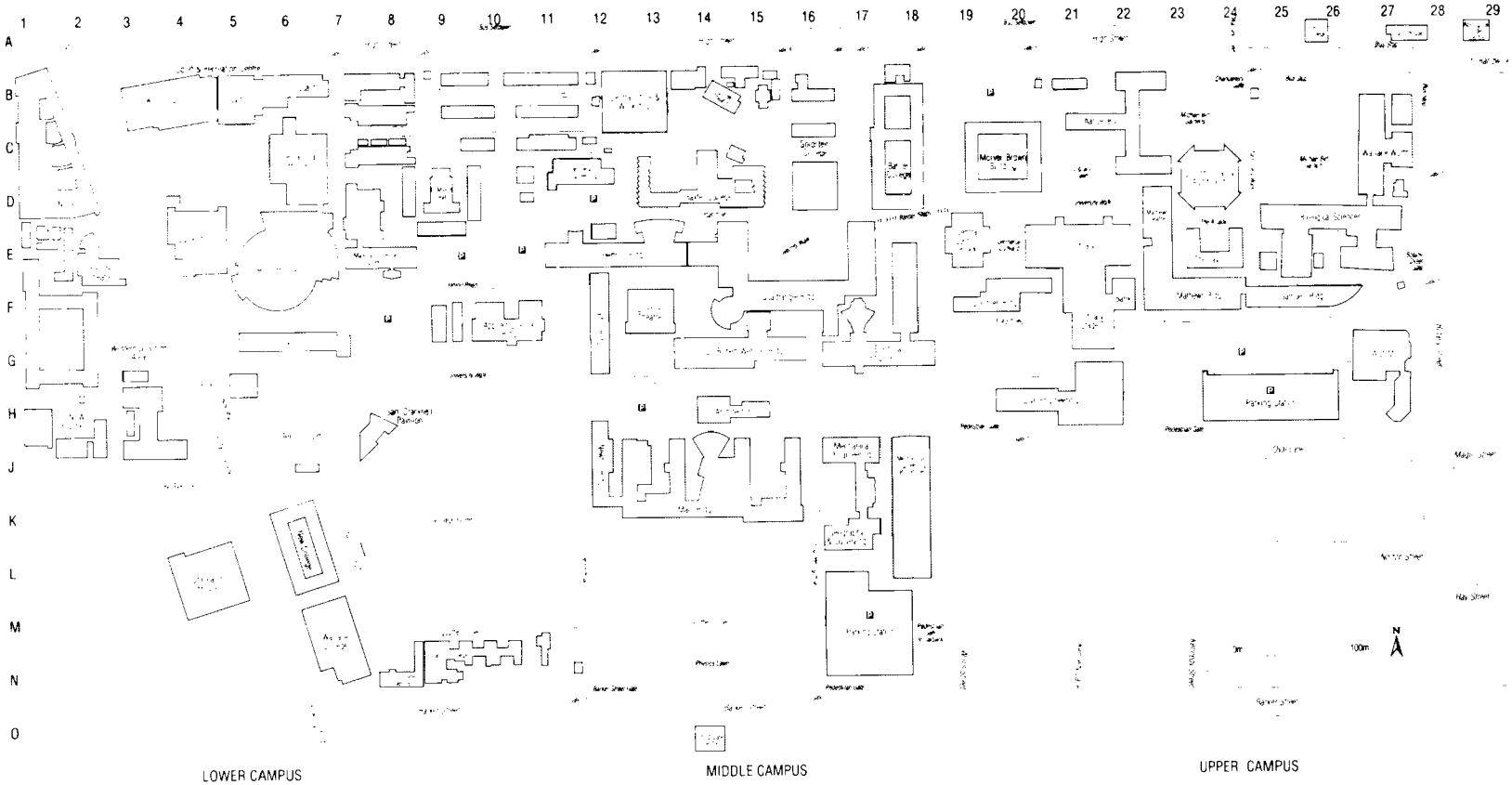
Biomedical Theatres E27
Central Lecture Block E19
Chemistry Theatres
(Dwyer, Mellor, Murphy, Nyholm, Smith) E12
Classroom Block *(Western Grounds)* H3
Fig Tree Theatre B14
Io Myers Studio D9
Keith Burrows Theatre J14
MacAuley Theatre E15
Mathews Theatres D23
Parade Theatre E3
Physics Theatre K14
Quadrangle 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 F26
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
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

This Handbook has been specifically designed as a source of detailed reference information for first year and 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, the Australian Graduate School of Management, Australian Taxation Studies Program (ATAX), College of Fine Arts, University College (ADFA) and the Centre for Liberal and General Studies.

For fuller details about the University – its organization, staff members, description of disciplines, scholarships and prizes and so on, consult the University Calendar (Summary Volume). For further information on student matters consult the University Student Guide.