UNSW

Science

1993 Handbook

THE UNIVERSITY OF NEW SOUTH WALES

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THE UNIVERSITY OF NEW SOUTH WALES

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 3 November 1992, but may be amended without notice by the University Council.

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It is University policy to promote equal opportunity in education (refer to EOE Policy Statement, The University of New South Wales Calendar (Summary Volume) and *Student Guide 1993).*

Contents

Message to New Students

Welcome to The University of New South Wales

This Handbook sets out information about the Science Courses, which are amongst 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 in more than one Faculty. They are brought together through a cross-Faculty organization, The Board of Studies in Science and Mathematics, which embraces topics from theoretical physics to anatomy, from mathematics to ecology. The Course is so organized that it can lead direct to a career in experimental science; or provide a broad program in which you have the opportunity to keep a number of options open.

All of you will have the opportunity to be taught by active scientists who are engaging in research of international significance, and all of you will acquire skills of great importance to 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. Not all new students are new to universities, of course, 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 all of you should feel that the general resources of the Board and Faculties associated with it, are very much at your disposal. And remember that essentially science is an adventure, 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. There is a recess of approximately six weeks between the two sessions and there are short recesses of one week within each of the sessions.

Session 1 commences on the Monday nearest 1 March.

All Faculties (other than Medicine)

	1993	1994
Session 1		
(14 weeks)	1 March to 8 April	28 February to 31 March
Recess:	9 April to 18 April 19 April to 11 June	1 April to 10 April 11 April to 10 June
Study Recess:	12 June to 17 June	11 June to 16 June
Examinations	18 June to 6 July	17 June to 5 July
Midyear Recess:	7 July to 25 July	6 July to 24 July
Session 2		
(14 weeks)	26 July to 24 September	25 July to 23 September
Recess:	25 September to 4 October 5 October to 5 November	24 September to 3 October 4 October to 4 November
Study Recess:	6 November to 11 November	5 November to 10 November
Examinations	12 November to 30 November	11 November to 29 November

Important Dates for 1993

January 1993

F 1 New Year's Day - Public Holiday
M 11 Term 1 begins - Medicine IV
Term 1 begins - Medicine VI
M 18 Term 1 begins - Medicine V
T 26 Australia Day - Public Holiday

February 1993

T 2 Enrolment period begins for new undergraduate students and undergraduate students repeating first year
M 8 Re-enrolment period begins for second and later year undergraduate and graduate students enrolled in formal courses. Students should consult the *Re-enrolling 1993* leaflet for their course for details.
F 26 Last day for acceptance of enrolment by new and re-enrolling students. (Late fee payable thereafter if enrolment approved.)

March 1993

M 1 Session 1 begins - all courses except Medicine IV, V, VI
Term 1 begins - Australian Graduate School of Management
Su 7 Term 1 ends - Medicine VI
M 8 Session 1 begins - University College, Australian Defence Force Academy
F 12 Last day applications are accepted from students to enrol in Session 1 or whole year subjects
Su 14 Term 1 ends - Medicine IV
M 15 Term 2 begins - Medicine IV
Term 2 begins - Medicine VI
Su 21 Term 1 begins - Medicine V
M 29 Term 2 begins - Medicine V
W 31 HECS Census Date for Session 1
Last day for students to discontinue without failure subjects which extend over Session 1 only

April 1993

F 9 Good Friday - Public Holiday
S 10 Easter Saturday - Public Holiday
Mid-session Recess begins
M 12 Easter Monday - Public Holiday
Su 18 Mid-Session Recess ends
Su 25 Term 2 ends - Medicine IV
Term 2 ends - Medicine VI
M 26 Anzac Day - Public Holiday

May 1993

M 3 Term 3 begins - Medicine IV
Term 3 begins - Medicine VI
F 7 Term 1 ends - Australian Graduate School of Management
S 8 May Recess begins - University College, Australian Defence Force Academy
T 11 Publication of Provisional Timetable for June examinations
W 19 Last day for students to advise of examination clashes
Su 23 May Recess ends - University College - Australian Defence Force Academy
Su 30 Term 2 ends - Medicine V
M 31 Term 2 begins - Australian Graduate School of Management

June 1993

T 1 Publication of Timetable for June Examinations
T 8 Term 3 begins - Medicine V
F 11 Session 1 ends
S 12 Study Recess begins
College of Fine Arts assessment week begins
Su 13 Term 3 ends - Medicine IV
Term 3 ends - Medicine VI
M 14 Queen's Birthday - Public Holiday
Term 4 begins - Medicine IV
Term 4 begins - Medicine VI
Th 17 Study Recess ends
F 18 Examinations begin
College of Fine Arts assessment week ends
F 25 Session 1 ends - University College, Australian Defence Force Academy
S 26 Mid-year Recess begins - University College, Australian Defence Force Academy
M 28 Examinations begin - University College, Australian Defence Force Academy

July 1993

T 6 Examinations end
W 7 Midyear Recess begins
S 10 Examinations end - University College, Australian Defence Force Academy
Su 11 Midyear Recess begins - University College, Australian Defence Force Academy
Su 25 Midyear Recess ends
Midyear Recess ends - University College, Australian Defence Force Academy
M 26 Session 2 begins - all courses except Medicine IV, V, and VI
Session 2 begins - University College, Australian Defence Force Academy

August 1993

F 6 Term 2 ends - Australian Graduate School of Management
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.
Su 8 Term 4 ends - Medicine IV
Term 3 ends - Medicine V
Term 4 ends - Medicine VI
M 16 Term 5 begins - Medicine IV
Term 4 begins - Medicine V
Term 5 begins - Medicine VI
M 30 Term 3 begins - Australian Graduate School of Management
T 31 HECS Census Date for Session 2
Last day for students to discontinue without failure subjects which extend over Session 2 only

September 1993

S 25 Mid-Session Recess begins
September Recess begins - University College, Australian Defence Force Academy
Su 26 Term 5 ends - Medicine IV
Term 5 ends - Medicine VI
M 27 Term 6 begins - Medicine IV
Term 6 begins - Medicine VI
Th 30 Closing date for applications to the Universities Admission Centre

October 1993

M 4 Labour Day - Public Holiday
Mid-Session Recess ends
September Recess ends - University College, Australian Defence Force Academy
T 5 Publication of provisional timetable for November examinations
W 13 Last day for students to advise of examination clashes
Su 17 Term 4 - Medicine V
T 26 Publication of Timetable for November Examinations
F 29 Session 2 ends - University College, Australian Defence Force Academy

November 1993

M 1 Examinations begin - University College, Australian Defence Force Academy
F 5 Session 2 ends
Term 3 ends - Australian Graduate School of Management
S 6 Study Recess begins
College of Fine Arts assessment week begins
Su 7 Term 6 ends - Medicine IV
Term 6 ends - Medicine VI
Th 11 Study Recess ends
F 12 Examinations begin
College of Fine Arts assessment week ends
F 19 Examinations end - University College, Australian Defence Force Academy
T 30 Examinations end

December 1993

Th 23 Last day for acceptance of applications by Admissions Section for transfer to another undergraduate course within the University
M 27 Christmas Day - Public Holiday
T 28 Boxing Day - Public Holiday

Board of Studies in Science and Mathematics

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, Metallurgy (Applied Science); Philosophy, Science and Technology Studies (Arts and Social Sciences); Accounting, Economics (Commerce and Economics); Electrical Engineering, Computer Scienceand Engineering, Mechanical and Manufacturing Engineering, Surveying (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine); Education (Professional Studies); and the Centre for Liberal and General Studies.

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Centre for Membrane and Separation Technology

(in association with the Faculty of Applied Science)

Director, Biophysics
Professor H.G.L. Coster

Director, Chemical Engineering
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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*
- Subject descriptions: *this section includes HSC requirements, prerequisites, co-requisites, exclusions and other notes*

3. Graduate Study

This contains:

- Courses and Programs: *followed by course outlines*
- Subject descriptions: *this section includes prerequisites, co-requisites, 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 organizational unit offering subjects to students follow.

Prefix	Organizational 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
MDCM	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 W. O'Sullivan who is also the Dean of the Faculty of Biological and Behavioural Science.
The Chair is Associate Professor G. Russell.
The Coordinator of Studies in Science and Mathematics is Associate Professor R. J. King.
The Administrative Officer is Mr P. Buist.

Some People Who Can Help You

If after reading this handbook you still have problems, please consult the appropriate staff.

For matters which concern the administration of the science course consult with the staff of the Board of Studies in Science and Mathematics Office (Room G27, Biological Sciences Building, map reference D25).

For 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 the Science course. All students re-enrolling in 1993 should obtain a copy of the leaflet *Re-Enrolling 1993: 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 (SM92). 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.

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

3970

Science and Mathematics Science Course

3972-3977

Advanced Science and Mathematics Course

Science and Mathematics Course Programs

The Science and Mathematics Course (3970) and the Advanced Science and Mathematics Courses (3972-3977) lead to the award of the degree of Bachelor of Science on the completion of a three year program or a Bachelor of Science degree at honours level on the completion of a four year program. The main aims of the Science and Mathematics Course may be summarized as providing opportunities for students to prepare themselves for careers in research technology, science, mathematics and education, areas of management or public policy, involving the use of science or mathematics.

UAC Codes:
NSC (science); NCS (computing); NSD (advanced science)

The Board of Studies in Science and Mathematics offers a wide choice of programs each designed to meet specific aims and objectives. Most programs are identified with a particular School or discipline but some are multi-disciplinary.

Programs in the Science and Mathematics Course have been designed 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 humans' 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.

Details of the programs follow the general information on the structure of the course.

How to structure your course

Bachelor of Science
BSc

The Bachelor of Science degree is awarded on completion of a three year program (leading to the award of the degree at pass level) or a four year program (leading to the award of the degree at honours level) chosen from specific programs approved by the Board of Studies in Science and Mathematics. The time specified is a minimum time required for completion of the degree. It may be taken over a longer period of time or as a part-time candidate, but note that it is not possible to complete studies even at Level I by evening classes alone.

Three year degree at pass level

Basic requirements

1. A total of 23 science units and 2 general education units (ie 56 hours of Category A and 56 hours of Category B). Each subject offered to science students has a unit value (usually 1 but ranging from 0.5 to 4 units) based on the number of hours taught and the type of study.

2. A student must select and be enrolled in one of the prescribed programs. Programs are designed to link subjects in such a way that a coherent pattern of study is achieved in a specified discipline. All programs consist of 23 units at Level I, II, II/III, III as specified.

Not less than eight nor more than ten units may be from Level I, and two of the Level I units must be mathematics (MATH1032 Mathematics I or MATH1042 Higher Mathematics, or both MATH1011 and MATH1021 General Mathematics B and C).

3. In order to graduate a student must pass all the subjects specified in a program.

4. Where a choice of subjects is indicated in a program care must be taken to satisfy prerequisites and corequisites. A prerequisite unit is one which must be completed prior to enrolment in the unit for which it is prescribed. A co-requisite unit is one which must either be completed successfully before or be studied concurrently with the unit for which it is prescribed. An excluded unit is one which cannot be counted towards the degree qualification together with the unit which excludes it.

5. A student may change from one program to another only with approval. A written application to make the change, together with details of any optional units selected in the new program, must be lodged at the office of the Board of Studies in Science and Mathematics, Room L-G06G (Biological Sciences Building).

6. A student may not undertake more than 8 Science units in any one year. Exceptional cases must be discussed with and have approval from the Coordinator of the Board of Studies in Science and Mathematics.

7. Some subjects and programs have quotas.

When such restrictions apply, entry to these subjects or programs is based solely on academic achievement.

8. General education electives in the three year (pass) degree are those in Categories A and B as indicated here. General Education is an integral part of the degree. Among its objectives, the General Education program provides the opportunity to address some of the key questions you will face as individuals, citizens and professionals.

General Education Electives

Category A. The External Context; an introduction in non-specialist terms to an understanding of the environments in which humans function.
Course Requirement: 56 hours

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 techno-scientific 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: an introduction to, and a critical reflection upon, the cultural bases of knowledge, belief, language, identity and purpose. *Course Requirement: 56 hours*

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?

Four year degree at honours level

Basic requirements

1. All requirements of a three year program, including both the Science and the General Education electives specified.

2. (1) An approved honours program offered by one or more schools; or (2) at least 10 units at Level IV as specified in an individual program.

3. the general education elective in the honours degree is from Category C.

General Education Elective

Category C. 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 Category C is satisfied depends on the honours program in each discipline.

For entry to Year 4 students are required:
1. to have completed Years 1, 2 and 3 of the specific program and to have satisfied prerequisite requirements as specified in that program. The general education electives *must* be completed;

2. to 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;

3. to have completed relevant subjects normally with better than passing grades;

4. to have the approval of the appropriate Head of School.

Satisfactory Progress and Workloads

The expected maximum workload for students is four science units per session. This can be exceeded only in exceptional circumstances by students with a good 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. External commitments are not to be taken into consideration in relation to such matters as extensions of time for written work or failure to attend examinations, which may, for some subjects, be scheduled on Saturday mornings. Students whose performance is unsatisfactory will be asked to show cause why they should remain in their course of study.

Failure to show cause can result in exclusion from a subject or the course.

A show cause will be issued to any student who fails a subject twice, or is deemed to be making unsatisfactory progress.

Unsatisfactory progress can be evidenced by failure of more than 50% of subjects attempted in a particular year, failing to pass the equivalent of four science units in one year, or failing to complete the requirements of first year in the first two years of study.

Rules governing admission to the Science and Mathematics Course with advanced standing

Any person who makes application to enrol in the Science and Mathematics Course (3970), the Advanced Science Courses (3972-3977), or in a combined degree course which includes the Science degree course administered by the Board of Studies in Science and Mathematics, may be admitted to the course of study leading to such degree with such standing on the basis of previous attainment as may be determined by the Board of Studies in Science and Mathematics provided that:

1. where students transfer from another tertiary institution, they shall not in general be granted standing in the course which is superior to that which they have enjoyed at the institution from which they transferred.

2. the standing granted by the Board of Studies in Science and Mathematics in the case of any application based upon any degrees or other award held by applicants, should not be such as will permit the applicants to qualify for the award of the science degree, without completing the course of instruction and passing examinations in at least those subjects comprising the latter half of the four year Science and Mathematics course, so that where such a program of study would involve the applicants in repeating courses of instruction in which the Board of Studies in Science and Mathematics deems the applicants to have already qualified, the Board may prescribe an alternative program of studies in lieu thereof.

3. the standing granted by the Board of Studies in Science and Mathematics in the case of applications based on partial completion of the requirement for any degree or other award of another institution shall not be such that it will permit the applicants to qualify for the award of the science degree by satisfactory completion of the program of study deemed by the Board to be less than that required for students in full time attendance in the final year of the Science and Mathematics Course.

4. the standing granted by the Board of Studies in Science and Mathematics in the case of applications based upon the partial completion of the requirements for any degree or award of the University may be such as to give full credit in the Science and Mathematics Course for work done in the course from which the students transfer.

Program Outlines

Each program has a four-digit identifying number. Most programs are set out as Years 1, 2, 3 and 4 for the four year program and in these cases Years 1, 2 and 3 comprise a three year program. A few programs are set out as Years 1, 2 and 3 and lead to the award of the pass degree only.

Students wishing to take units additional to the minimum 23 required for the pass degree should be aware that these units will attract an additional fee as voluntary subjects.

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. All programs follow in alphabetical order.

BIOCHEMISTRY see program 4100
BIOLOGICAL SCIENCE see program 1700
BIOTECHNOLOGY see program 4200
BOTANY see program 1743
BUSINESS INFORMATION TECHNOLOGY see course 3971
CHEMISTRY see program 0200
COMMUNITY MEDICINE subjects available in some programs
COMPUTER SCIENCE see program 0600 (separate UAC entry code NCS)
EARTH AND ENVIRONMENTAL SCIENCE see program 2527
ECOLOGY see programs 6851, 6852, 6853
GENETICS see program 6840 and MOLECULAR GENETICS 4110
GEOGRAPHY see program 2700
GEOLOGY see programs 2500, 2503
GEOPHYSICS see program 2503 under GEOLOGY
INFORMATION SYSTEMS see program 1400 (separate UAC entry code NIT)
MARINE SCIENCE see programs 6831, 6832, 6833, 6834
MATHEMATICS see programs 1000, 1006, 1061
MOLECULAR GENETICS see program 4110
MICROBIOLOGY AND IMMUNOLOGY see program 4400
PHARMACOLOGY see program 7301
PHILOSOPHY see program 5200, 5262
PHYSICS see programs 0100, 0161, and GEOLOGY and GEOPHYSICS 2503
PHYSIOLOGY see program 7300
PSYCHOLOGY see program 1200, also course 3431
SCIENCE AND TECHNOLOGY STUDIES see program 6200, and PHILOSOPHY 5262
STATISTICS see MATHEMATICS programs 1006, 1061
ZOOLOGY see program 1745

All of these programs are available to Advanced Science students. The following additional programs are available only to Advanced Science students (transfer to these programs is possible for course **3970** students but only on the basis of academic performance):

ANATOMY see program 7000 (Course **3972**)
BIOMEDICAL SCIENCE see program 7370 (Course **3972**)
CHEMISTRY, PURE AND APPLIED see program 0205 (Course **3972**)
ENVIRONMENTAL SCIENCES see programs 6861 - 6868 (Course **3976**)
MATHEMATICS WITH COMPUTING see program 1060 (Course **3972**)

MATHEMATICS OF MANAGEMENT see program 6810 (Course **3972**)

MEDICAL PHYSICS see program 0141 (Course **3973**)

NEUROSCIENCE see programs 7312 and 1273 (Course **3972**)

PHILOSOPHY WITH COMPUTING see program 5206 (Course **3972**)

PHYSICS AND ASTRONOMY see program 0121 (Course **3972**)

PSYCHOLOGY WITH COMPUTING see program 1206 (Course **3972**)

In addition to Courses **3970 - 3977** programs are also included for Courses **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).

Details of Programs

ANATOMY

Entry to Anatomy programs is normally limited to students who enter the program through Advanced Science. Entry at Level II is possible 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 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 (Advanced Science only)

Year 1
BIOS1011, BIOS1021
MATH1032 or MATH1042
or both MATH1011 and MATH1021
4 elective Level I units

Year 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

Year 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 Year 4 (Honours) must complete 6 Level III units

Year 4 (Honours)
ANAT4508

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 biological 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.

See also program 4110 Molecular Genetics.

4100
Biochemistry

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

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units (*Recommended:* Physics, Computing)

Year 2
BIOC2312
BIOS2011, BIOS2021
CHEM2021 or CHEM2041

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

Year 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 School of Biotechnology, Immunology units offered by the School of Microbiology and Immunology or by BIOS3141)
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 Year 4 (Honours) must complete 8 Level III units

Year 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. Specializations 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 specialize, are advised to enrol in this program and then transfer to the appropriate program in Level II.

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units

1700
Biological Science

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level 1 units

Year 2
BIOC2312
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and 2 units from BIOS2031, BIOS2061 or MICR2011
One 56 hour or two 28 hour Category A General Education subjects

Year 3
5 units from BIOS3011, BIOS3021, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3101, BIOS3111, BIOS3121, BIOS3131, BIOS3141, MICR3031
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 Year 4 (Honours) must complete 7 Level III units

Year 4 (Honours)
BIOS4013 (F/T), BIOS4019 (P/T)

BIOMEDICAL SCIENCE

7370
Biomedical Science (Advanced Science only)

Year 1
BIOS1011,BIOS1021
CHEM1002
MATH1032, MATH1042 or both MATH1011 and MATH1021
One of the following subjects:
PHYS1002 or PHYS1022 or COMP1811 and COMP1821 or PSYC1002

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

Year 2
Students must take 7 or 8 units, with at least 5 units from:
ANAT2111, ANAT2211, BIOC2312, 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 Year 4).

Year 3
After consultation with appropriate Schools about the proposed Honours Year 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

Year 4
Subject to satisfactory progress through the course students may proceed to the honours year. Before commencement of Level II students should consult an appropriate school (see the lists under Year 3) about the subjects required for a particular honours program.

*From 1994 Student numbers in PHPH2112 will be limited. Entry to this subject 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 biopharma-ceuticals, including hormones, vaccines, anti-hypertensive and anti-inflammatory agents, are being developed which have the potential to revolutionize medicine. Microorganisms and viruses are being modified for use in controlling plant and animal diseases and pests. Diagnostic kits are being developed for use in forensic science and in product identification and quality control. In addition, genetic improvements in agriculture, plants and animals are becoming a reality, as is the control of inborn genetic disorders in humans.

Some aspects of biotechnology are traditional, having been used for centuries. The first makers of bread, cheese and fermented beverages over six thousand years ago were applying biotechnological principles in processing these goods. Without understanding the processes they were operating, they were in fact making use of catalysis mediated by microbial cells. Such processes are still in use today and scientific advances now allow for much greater control of the processes with resultant improvements in quality and economics of production. The number of such biological processes has also expanded and enzymes and/or microorganisms are used in the production of a wide range of fermented foods (such as cheeese, 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 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. The BSc Course is three years for a Pass degree during which the student can study aspects of biotechnology in combination with another major in a relevant discipline, preferably biochemistry, microbiology or chemistry. The fourth Honours Year of 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 years full-time and has been designed to meet the requirements for membership of the Institution of Engineers, Australia. Details of the BE Degree Course in Bioprocess Engineering are given in the Faculty of Applied Science Handbook.

4200
Biotechnology

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 *and* MATH1021
2 elective Level I units

Year 2
BIOC2312
BIOS2011, BIOS2021
MICR2011
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

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

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

Year 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

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units

Year 2
BIOC2312
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

Year 3
4 units from BIOS3041, BIOS3061, BIOS3091, BIOS3101, BIOS3121, BIOS3141, MICR3031
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 Year 4 (Honours) must complete 7 Level III units

Year 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 specialization 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 hi-tech materials.

Year 1
CHEM1002
MATH1032 or MATH1042 or both MATH1011 and MATH1021
PHYS1002 or PHYS1022
2 elective Level I units

Year 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

Year 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 Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
CHEM4003

** Students wishing to specialize 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.

Year 1
CHEM1002
MATH1032 or MATH1042 or both MATH1011 and MATH1021
PHYS1002
2 elective Level I units

Year 2
CHEM2011, CHEM2021, CHEM2031, CHEM2041
3 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

Year 3
CHEM3011, CHEM3021, CHEM3031, CHEM3041
4 Level III Chemistry units
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 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 years 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 non-computing 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. See specific programs available: Computer Science/Physics (0161 Physics/Computer Science); Computer Science/Mathematics/Statistics (1061 Mathematics or Statistics/Computer Science and 1060 Mathematics with Computing); Computer Science/Psychology (1206 (UAC entry code NCS)); Computer Science/Philosophy (5206 (UAC entry code NCS)); Information Systems (1400 UAC entry code NIT)).

0600
Computer Science

Year 1
COMP1011, COMP1021
MATH1032 or MATH1042, MATH1081
3 elective Level I units*

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

Year 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 Year 4 (Honours) must complete 6 Level III Units

Year 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. (6 BA degree credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit).*

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 guide-lines in the selection of subjects within the program.

2527
Earth and Environmental Science

Year 1
CHEM1002 or both CHEM1101 and CHEM1201 or CHEM1302 or CHEM1401 and CHEM1501
GEOG1031, GEOG1051
GEOL1101, GEOL1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021

Year 2
BIOS1011, BIOS1021
GEOG2021, GEOG2032, GEOG3051
GEOL2011, GEOL2031, GEOL7221
One 56 hour or two 28 hour Category A General Education subjects

Year 3
GEOG3011, GEOG3021
GEOL3031, GEOL6231,
and at least 2.5 units selected from BIOS2031, BIOS2051,
BIOS2061, BIOS3061, BIOS3101, GEOG3032, GEOG3062, GEOG3071, GEOG3122, GEOL2042, GEOL3011, GEOL2072, GEOL3072, GEOL3092, GEOL6321

Year 4 (Honours)
GEOL4313 or GEOG4050/GEOG4100

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

Year 1
BIOS1011, BIOS1021
GEOG1031, GEOG1051
MATH1032 or MATH1042 or both MATH1011 and MATH1021
Choose 1 of the strands:
1. CHEM1002 or both CHEM1101 and CHEM1201
2. GEOL1101, GEOL1201
3. 2 Level I units

Year 2
BIOS2011, BIOS2051 and BIOS2031 or BIOS2061
BIOS2041 or GEOG2013
GEOG2021, GEOG3051
At least 1 unit from:
BIOS2021, BIOS2031, BIOS2061, GEOG3032, GEOG3042, GEOL2121, GEOL6231, MICR2201, MICR2011
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3101, BIOS3111
GEOG3021, GEOG3062, GEOG3211
At least 1 unit from:
BIOS3011, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3081, BIOS3121, BIOS3131, GEOG2032, GEOG3011, GEOG3032, GEOG3042, 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 Year 4 (Honours) must complete at least 6 Level III units

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

6852
Mathematical Ecology

Year 1
BIOS1011, BIOS1021
COMP1811
MATH1081, MATH1032 or MATH1042
Choose 1 of the strands:
1. CHEM1002 or both CHEM1101 and CHEM1201
2. GEOG1031, GEOG1051
3. PHYS1002 or PHYS1022

Year 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, GEOG3051, 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

Year 3
BIOS3101, BIOS3111 and BIOS3061 or GEOG3021
At least 3 units from subjects related to the strand chosen in Year 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, BIOS3041, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3121, BIOS3131, BIOS3141, GEOG2013, GEOG3011, GEOG3021, GEOG2032, 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 Year 4 (Honours) must complete at least 6 Level III units

Year 4 (Honours)
BSSM4023 (F/T), BSSM4029 (P/T)
Category C General Education requirement

6853
Biological Ecology

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
GEOG1031, GEOG1051

MATH1032 or MATH1042 or both MATH1011 and MATH1021

Year 2
BIOC2312
BIOS2011, BIOS2021, BIOS2041, BIOS2051 and BIOS2031 or BIOS2061
1 unit from: BIOS2031, BIOS2061, GEOG2021, GEOG3051, GEOG3042, MICR2011, MICR2201
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3101, BIOS3111
GEOG3021
2 further Level III units from: BIOS3011, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3081, BIOS3121, BIOS3131, GEOG2032, GEOG3021, GEOG3032, GEOG3042, GEOG3051, GEOG3211, 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 Year 4 (Honours) must complete at least 6 Level III units

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

ENVIRONMENTAL SCIENCE

Electives in these programs may be restricted to those in table ENVS immediately below. Environmental Science programs allow specialization in a number of aspects: Biological Environments (Terrestrial, Marine and Microbial), Environmental Chemistry, Earth Environments, Environmental Mathematics (Fluid Dynamics, Statistics and Population Dynamics).

All programs have the requirements for subjects to be selected from the following table.

TABLE ENVS

Level I Units
BIOS1011, PHYS1002

Level II Units
BIOS2011, BIOS2031, BIOS2041, BIOS2051, BIOS2061, CHEM2011, CHEM2021, CHEM2031, CHEM2041, GEOG2013, GEOG3051, GEOL2011, GEOL2041, GEOL2042, GEOL2072, GEOL2092, MATH2100, MATH2120, MATH2200, MATH2220, MATH2301, MATH2501, MATH2510, MATH2520, MATH2801, MATH2810, MATH2821, MATH2830, MATH2841, MICR2201, MICR2011, MSCI2001

Level III Units
BIOS3011, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3081, BIOS3091, BIOS3101, BIOS3111, BIOS3121, BIOS3131, CHEM3311, GEOG2032, GEOG3011, GEOG3032, GEOG3021, GEOG3051, GEOG3122, GEOG3192, GEOG3202, GEOG3211, GEOL3011, GEOL6231, GEOL7221, GEOL8220, MATH3121, MATH3201, MATH3301, MATH3241, MATH3261, MATH3550, MATH3811, MATH3820, MATH3830, MATH3540, MICR3011, MICR3071

6861
Biological Environments (Terrestrial) (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1011 and MATH1021

Year 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
At least two units from BIOS2031, BIOS2051, BIOS2061, MSCI2001, MICR2201
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3101, BIOS3111, BIOS3131
GEOG2021, GEOG3021
At least one unit for major sequence from Table ENVS
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG3042, GEOG3062
BIOS4004 (Thesis Project 4 units) or
BIOS4002 (Thesis Project 2 units) plus 2 further units from Table ENVS
Category C General Education requirement

6862
Biological Environments (Marine) (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1011 and MATH1021

Year 2
BIOS2011, BIOS2041
ECON1107

ENVS2010, ENVS2020
GEOL1101
LAWS8000
MSCI2001
At least 2 units from: BIOS2031, BIOS2051, BIOS2061, MICR2201
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3081, BIOS3091, BIOS3111
GEOG2021, GEOL6321
MSCI3001
One 56 hour or two 28 hour Category B General Education subjects

Year 4
BIOS3101
ENVS3011
GEOG3042, GEOG3062
GEOL6231
MSCI4002 (Thesis Project 2 units)
Category C General Education requirement

6863
Biological Environments (Microbial) (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1011 and MATH1021

Year 2
BIOS2011, BIOS2041
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
MICR2011 (plus 1 unit of Biochemistry)
1 unit from: BIOS2031, BIOS2051, BIOS2061, MSCI2001
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3041
GEOG2021, GEOG3021
MICR3011, MICR3071
1 further Level III unit for your major sequence from Table ENVS
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG3042, GEOG3062
MICR4004 (Thesis Project 4 units) or
MICR4002 (Thesis Project 2 units)
plus 2 further units from Table ENVS
Category C General Education requirement

6864
Environmental Chemistry (Advanced Science only)

Year 1
BIOS1021
CHEM1002
ENVS1011, ENVS1021
GEOL1101
MATH1032 or MATH 1011 and MATH 1021

Year 2
CHEM2011, CHEM 2021, CHEM2031, CHEM2041
ECON1107
ENVS2010,ENVS2020
LAWS8000
1 statistics unit from: BIOS2041, GEOG2013, or MATH2841
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071
CHEM3311, CHEMXXXX*, CHEMXXXX*
PHYS1002
2 optional units from Table ENVS
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG2021, GEOG3042, GEOG3062
CHEM4005 (Environmental Chemistry/Science project 3 units)
Category C General Education requirement

** Please note subjects ending in XXXX are yet to be finalised; students should consult subsequent handbooks.*

6865
Earth Environments (Advanced Science only)

Year 1
BIOS1021
CHEM1002
ENVS1011, ENVS1021
GEOL1101
MATH1032 or MATH1011 and MATH1021

Year 2
ECON1107
ENVS2010, ENVS2020
GEOG2021
GEOL2011, GEOL7221, GEOG2032
LAWS8000
1 unit from: GEOL6231, GEOL2041, GEOG2081, GEOG2102, MSCI2001
Other options may be available subject to approval from course coordinator
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071
GEOG3011, GEOL2072, GEOL2092
4 units from: GEOG2013, GEOG3021, GEOG3032, GEOG3051, GEOG3122, GEOG3192, GEOG3202, GEOG3211, GEOL6231, GEOL2042, GEOL3011
One 56 hour or two 28 hour Category B General Education subjects

Other options may be available subject to approval from course coordinator

Year 4
ENVS3011
GEOG3042, GEOG3062
GEOL8220, GEOL6321
APSE4002 (Thesis Project 2 units)
Category C General Education requirement

6866
Environmental Mathematics (Fluid Dynamics) (Advanced Science only)

Year 1
BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1042
PHYS1002

Year 2
ECON1107
ENVS2010, ENVS2020
LAWS8000
MATH2100, MATH2120, MATH2200, MATH2220, MATH2301, MATH2510, MATH2520
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071,
GEOG2021, GEOL1101
MATH3121, MATH3301, MATH3241, MATH3261
PHYSXXXX*
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG3042, GEOG3062
MATH4103
MATHXXXX* (2 units) Major Project involving analysis and interpretation of existing data, or modelling of a simple process

An additional unit is taken in a topic associated with environmental fluid dynamics, numerical modelling or data analysis, chosen after consultation

Category C General Education requirement

** Please note subjects ending in XXXX are yet to be finalised; students should consult subsequent handbooks.*

6867
Environmental Mathematics (Statistics) (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1042

Year 2
BIOS2011
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
MATH2501, MATH2510, MATH2520, MATH2801, MATH2821
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3071, BIOS3101, BIOS3111
GEOG2021
MATH2810, MATH2830, MATH3811, MATH3820, MATH3830
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG3042, GEOG3062
MATHXXXX* (Thesis Project 2 units)
Category C General Education requirement

** Please note subjects ending in XXXX are yet to be finalised; students should consult subsequent handbooks.*

6868
Environmental Mathematics (Population Dynamics) (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
ENVS1011, ENVS1021
MATH1032 or MATH1042

Year 2
BIOS2011
ECON1107
ENVS2010, ENVS2020
GEOL1101
LAWS8000
MATH2200, MATH2220, MATH2501, MATH2510, MATH2520, MATH2841
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3061, BIOS3071, BIOS3111
GEOG2021, GEOG3062

MATH3201, MATH3540, MATH3550
One 56 hour or two 28 hour Category B General Education subjects

Year 4
ENVS3011
GEOG3042
MATH3161, MATH3181, MATHXXXX* (Thesis Project 2 units)
Category C General Education requirement

** Please note subjects ending in XXXX are yet to be finalised; students should consult subsequent handbooks.*

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. Year 4 (Honours) programs in Genetics are available in any of these schools and also in the School of Community Medicine.

6840
Genetics

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units

Year 2
BIOC2312
BIOS2011, BIOS2021
MATH2841 or BIOS2041
2 or 3 elective units, (*Recommended:* BIOS2031, BIOS2051, BIOS2061, CHEM2021, COMP1011, MICR2011, WOOL3803 or BSSM2101)
One 56 hour or two 28 hour Category A General Education subjects

Year 3
At least 4 units from: BIOC3121, BIOC3131, BIOC3281, 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, COMP1021, MICR3011, MICR3041, WOOL3901
One 56 hour or two 28 hour Category B General Education subjects

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

Year 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 organization 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 air-photo 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

Year 1
GEOG1062 and at least one of GEOG1031 and GEOG1051
MATH1032 or MATH1042 or both MATH1011 and MATH1021
Elective Level I units to make a total of 8

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

Year 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 Year 4 (Honours) must complete 8 Level III units and must have completed GEOG2013 or GEOG3221

Year 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 year course. Students wishing to enter the geology profession through Science should take program 2500 with a double specialization in Applied Geology and then take a Year 4 honours program. Year 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 Year 4 is devoted to a specialised research project.

Single Specialization 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 specialization 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

Year 1
CHEM1002 or both CHEM1101 and CHEM1201 or CHEM1302 or CHEM1401 and CHEM1501
GEOL1101, GEOL1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
and either
BIOS1011 and BIOS1021*
or GEOG1031 GEOG1051, GEOG1062
or PHYS1002 or PHYS1022

Year 2
GEOL2011, GEOL2022, GEOL2031
At least 4.5* elective units: GEOL2041, GEOL2042, GEOL2051, GEOL2062, GEOL2072, GEOL2092
One 56 hour or two 28 hour Category A General Education subjects

Year 3
GEOL3011, GEOL3031
At least 2 Applied Geology units from: GEOL3021, GEOL3052, GEOL3072, GEOL3082, GEOL3092, GEOL3101, GEOL3102
Further elective units to a total of 23
One 56 hour or two 28 hour Category B General Education subjects

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

Year 4 (Honours)
GEOL4303

** 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, BIOL3121 (For 1992 students should consult the Department of Applied Geology for deails.)*

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.

Year 1
CHEM1002 or both CHEM1101 and CHEM1201
GEOL1101, GEOL1201
MATH1032 or MATH1042
PHYS1002

Year 2
GEOL2041, GEOL2042, GEOL2051, GEOL2062, GEOL8220
MATH2100, MATH2120
PHYS2001, PHYS2011, PHYS2021, PHYS2031
One 56 hour or two 28 hour Category A and One 56 hour or two 28 hour Category B General Education subjects

Year 3
GEOL3052, GEOL3072, GEOL3082, GEOL8320, GEOL8330, GEOL8340, GEOL8350, GEOL8360
Plus 3 units from Level III Physics and/or Mathematics

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

Year 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 years 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 organizations. 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 organizations – 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 year, students study systems design, database, communications and commercial programming in parallel with computer science, mathematics and management accounting units. In the honours year, well qualified students may specialise in advanced information systems and data management topics.

See also Course **3971**

1400
Information Systems

Year 1
ACCT1501, ACCT1511
COMP1811
ECON1101, ECON1102
INFS1602
MATH1032 or MATH1042

Year 2
COMP1821
INFS2603, INFS2609
MATH2841 or MATH2801
4 elective units
One 56 hour or two 28 hour Category A General Education subjects

Year 2 (Direct Year 2 Entrants)*
COMP1821
ACCT1501, ACCT1511, INFS1602, INFS2603,INFS2609
MATH2801 or MATH2841
1 elective unit
One 56 hour or two 28 hour Category A General Education subjects

Year 3
ACCT2522, INFS3605, INFS3607, INFS3608
3 elective units including at least one at Level III
One 56 hour or two 28 hour Category B General Education subjects

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

Year 4 (Honours)
INFS4794
The Category C General Education requirement is covered by components of compulsory subjects in the course.

** Students admitted at Level II must enrol in another science program for Year 1. Transfer is based on academic performance at Level I. Students in this category are not required to complete ECON1101 and ECON1102.*

MARINE SCIENCE

Marine Science programs allow specializations 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)

Year 1
MATH1032 or MATH1042
PHYS1002, PHYS1611 or PHYS1601
2 units from 1 of the strands:
1. BIOS1011, BIOS1021 or
2. CHEM1002 or both CHEM1101 and CHEM1201 or
3. GEOL1101, GEOL1201
MATH1081 or 1 further unit from the above strands

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

Year 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 Year 4 (Honours) must complete 6 Level III units

Year 4 (Honours)
MSCI4003 F/T, MSCI4009 P/T
Units in waves, turbulence and geophysical fluid mechanics are offered

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6832
Marine Science (Biological Oceanography)

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1101 and MATH1021
2 units from 1 of the strands:
1. GEOL1101, GEOL1201
2. PHYS1002 or PHYS1022

Year 2
BIOS2031, BIOS2051 ·
CHEM2011 or CHEM2041
MICR2201
MSCI2001
1 unit from the subjects related to the strand chosen in Year 1:
1. GEOL6231
2. MATH2021 or MATH2801 or MATH2841
Additional units from: BIOS2011, BIOS2021, BIOS2041, BIOS2051, BIOS2061, BIOC2312 to give a total of 8 for the year
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOS3081, BIOS3091
MICR3071
2 Level III units which may include the subjects corresponding to the strand chosen in Years 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 Year 4 (Honours) must complete at least 6 Level III units

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

6833
Marine Science (Earth Science Oceanography)

Year 1
GEOL1101, GEOL1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
4 units from 2 of the strands:
1. BIOS1011, BIOS1021
2. CHEM1002 or both CHEM1101 and CHEM1201
3. PHYS1002 or PHYS1022

Year 2
MSCI2001
GEOL6201, GEOL6221, GEOL6231
Continue both of the strands chosen in Year 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

Year 3
GEOL6310, GEOL6330, GEOL6311, GEOL6321
3 Level III units which may include the subjects corresponding to the strands chosen in Years 1 and 2:
1. BIOS3081, BIOS3091
2. CHEM3311
3. MSCI3001, MATH3021
1 elective unit
One 56 hour or two 28 hour Category B General Education subjects

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

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

6834
Marine Science (Environmental Chemistry)

Year 1
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042
4 units from 2 of the strands:
1. BIOS1011, BIOS1021
2. GEOL1101, GEOL1201
3. PHYS1002

Year 2
CHEM2011, CHEM2041
MSCI2001
Continue both of the strands chosen in Year 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

Year 3
CHEM3041, CHEM3311
2 Level III units which may include the subjects corresponding to the strands chosen in Years 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 Year 4 (Honours) must complete 6 Level III units

Year 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 specialization in any of these areas. Students wishing to major or undertake Honours in Statistics should consult program 1006. Students wishing to proceed to Year 4 (Honours) should select higher mathematics subjects. There is also a specified interdisciplinary program, Mathematics of Management. Mathematics is also available through the Marine Science (Physical Oceanography) (6831).

Pure Mathematics is concerned with the whole structure of mathematics. Research focuses on the creation of new mathematical systems and the finer analysis of partially understood fields. Problems of mathematics come from many sources of science and industry but the pure mathematician is concerned with the problems themselves rather than with their sources. Courses provide the necessary equipment for those using mathematics in any way, to give basic familiarity with the fundamental language of modern science and technology and to develop appreciation for, and insight into, one of our major cultural achievements.

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 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 major
A 1000 program is considered as a degree in Pure Mathematics if it includes four units of Pure Mathematics Level III. MATH1081 in Year 1 is highly recommended.

Furthermore:

1. Pure Mathematics subjects relevant to the mathematical aspects of Computer Science are MATH2400 and MATH2410 in Year 2, and MATH3400, MATH3420 and MATH3430 in Year 3.

2. Pure Mathematics subjects relevant to mathematics teaching are MATH3500, MATH3510, MATH3520, MATH3530, MATH3560 and MATH3570 in Year 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 Year 3.

Applied Mathematics major
A 1000 program is considered 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, MATH2301.

Level III: At least three of: MATH3101, MATH3121, MATH3161, MATH3181, MATH3201, MATH3241, MATH3261, MATH3301.

In addition, the following are recommended in Year 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; CHEM1002 or both CHEM1101 and CHEM1201.

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

Statistics major
See program 1006 (Statistics).

1000
Mathematics

Year 1
MATH1032 or MATH1042
6 elective Level I units*

Year 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

Year 3
4 Level III Mathematics units
3 elective units*
One 56 hour or two 28 hour Category B General Education subjects

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

Year 4 (Honours)
MATH4003 or 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 schools: Chinese, Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104 (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit). Japanese is also available for students in Advanced Science.*

1006
Statistics

Year 1
MATH1032 or MATH1042
6 elective Level I units*

Year 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

Year 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

Students proposing to proceed to Year 4 (Honours) must complete 4 Higher Level III Statistics units including MATH3980

Year 4 (Honours)
MATH4903

** Up to 8 units may be from subjects that are restricted to this program or Arts subjects from the following schools: Chinese, Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104 (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit). Japanese is also available for students in Advanced Science.*

1060
Mathematics with Computing (Advanced Science only)

Year 1
COMP1811, COMP1821
MATH1042, MATH1081
3 elective Level 1 units*

Year 2
COMP2011, COMP2031
MATH2501, MATH2301, MATH2510** or MATH2100, MATH2400,
MATH2801** or MATH2841
2 elective Level II units*
(*Recommended alternative strands*: **Applied Mathematics:** Level II MATH2120. Level III MATH3101 *and at least one of* MATH3161, MATH3181, MATH3201. **Pure Mathematics:** Level II MATH2410. Level III MATH3420, MATH3430, MATH3520. **Statistics:** Level II MATH2810, MATH2821. Level III: MATH3811, MATH3861)
One 56 hour or two 28 hour Category A General Education subjects

Year 3
2 Computer Science Level III units from: COMP3111, COMP3121, COMP3311, COMP3411
MATH3301, MATH3400
3.5 elective units*
(*Recommended alternative strands:* as listed in **Year 2** above)
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Year 4 (Honours) must complete at least 6 Level III units. Consult the head of the appropriate department at the commencement of Year 3.

Year 4 (Honours)
MATH4003 or 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 schools: Chinese, Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Japanese is also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104 (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit).*

*** In the Statistics strand, MATH2510 Real Analysis and MATH2801 Probability and Random Variables must be taken.*

1061
Mathematics or Statistics/Computer Science

Year 1
COMP1811
MATH1032 or MATH1042, MATH1081
4 elective Level I units*

Year 2
COMP1821
MATH2120, MATH2501, MATH2510, MATH2520
One of the strands:
1. MATH2100, MATH2301, MATH2841
and at least 1 unit from: MATH2160, MATH2200, MATH2400, MATH2410
or
2. MATH2801, MATH2810, MATH2821, MATH2830.
Further units from Mathematics and/or Computer Science to make a total of 8
One 56 hour or two 28 hour Category A General Education subjects

Year 3
Continue the strand chosen in Year 2:
1. COMP2011, MATH3301 and 3 Level III Mathematics units
or
2. MATH3861 and 4 Level III Statistics units
Further units from Mathematics and or Computer Science to make a total of 7
One 56 hour or two 28 hour Category B General Education subjects

Year 4 (Honours)
MATH4003 or 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 schools: Chinese, Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104 (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit). Japanese is 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. 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.

Year 1
ACCT1501, ACCT1511
ECON1101, ECON1102
MATH1032 or MATH1042
2 elective Level I units*

Year 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

Year 3
2 units from: MATH2821, MATH3101, MATH3121, MATH3161, MATH3181, MATH3801, MATH3870, MATH3880.
2 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

**Up to 3 units may be from subjects that are restricted to this program or Arts subjects from the following schools: Chinese, Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Japanese is also available. Upper Level Economics subjects are restricted to those in Economic History plus ECON2103, ECON2104 (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit).*

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 will be awarded on the basis of suitable weighted performance over the last three years of this four years advanced science degree.

0141
Medical Physics (Advanced Science only)

Year 1
BIOS1011,BIOS1021
CHEM1002
MATH1032
PHYS1002 (or PHYS1022 at distinction level)

Year 2
BIOC2312
MATH2510, MATH2100
PHYS2410, PHYS2001, PHYS2021, PHYS2011, PHYS2031
.5 elective units
One 56 hour or two 28 hour Category A General Education subjects

Year 3
ANAT2111
MATH2120
PHPH2112
PHYS3410,PHYS3041,PHYS3060,PHYS1601
Plus at least 1 elective unit chosen from:
MATH2520,MATH2160,MATH2841,MATH3121
PATH3201
PHYS3630,PHYS3620,PHYS3710/20,PHYS2601, PHYS3010*,PHYS3050*
One 56 hour or two 28 hour Category B General Education subjects

Year 4
4 units of Medical Physics (for information contact Dr J. R. Smith, School of Physics)
PHYS3021,PHYS3030
1 General Education (Category C) subject

Plus at least 2 elective units from the subjects listed for year 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. Micro-organisms 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. Not all micro-organisms are harmful. We depend on micro-organisms 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-cell co-operation and the triggering of proliferation and differentiation by cell surface receptors.

4400
Microbiology and Immunology

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units

Year 2
BIOC2312
BIOS2011, BIOS2021
MICR2201, MICR2011
1 or 2 elective units*
One 56 hour or two 28 hour Category A General Education subjects

Year 3
MICR3011, MICR3021
At least 2 units from BIOS3041, MICR3031, 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 Year 4 (Honours) must complete 8 Level III units

Year 4 (Honours)
MICR4013, MICR4023

**Students wishing to take MICR3041 Immunology 1 are strongly advised to take ANAT2211 Histology I at Level II. BIOS2041 Biometry is recommended, particularly for students interested in MICR3071 Environmental Microbiology or in research.*

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

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units

Year 2
BIOC2312
BIOS2011, BIOS2021
CHEM2021 or CHEM2041
MICR2011
1 or 2 elective units
One 56 hour or two 28 hour Category A General Education subjects

Year 3
BIOC3121, BIOC3281
At least 1 unit from:
BIOC3131, BIOT3031 or MICR3021
1 or 2 units from:
BIOC3111, BIOT3011, CMED8303, MICR3011, 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 Year 4 (Honours) must complete 8 Level 3 units

Year 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

7312
Neuroscience A (Advanced Science only)

Year 1
BIOS1011, BIOS1021
CHEM1002
MATH1011 and MATH1021 or MATH1032 or MATH1042
PSYC1002

Year 2
ANAT2111
BIOC2312
PHPH2112*
PSYC2001, PSYC2021
One 56 hour or two 28 hour Category A General Education subjects

Year 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

Year 4
Subject to satisfactory progress throughout the course, students may proceed to the Honours year. Before the commencement of Year 2 students should consult with the appropriate Schools and the Neuroscience program co-ordinating committee consisting of representatives from the Schools of Anatomy, Physiology and Pharmacology, and Psychology, about the subjects required for a particular Honours program.

**From 1994 student numbers in PHPH2112 will be limited. Entry to this subject 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.*

1273
Neuroscience B (Advanced Science only)

Year 1
BIOS1011, BIOS1021
MATH1032 or both MATH1011 and MATH1021 and PHYS1002 or PHYS1022 or
COMP1811 and COMP1821 or COMP1811 and 1 other Level I unit

Year 2
ANAT2111
BIOC2312
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
1 General Education elective

** Although this is normally a Year 2 subject, it may be taken with COMP1821 in the first year of the Neurosceince B program.*

Year 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 chose 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
1 General Education elective.

Year 4
Subject to satisfactory progress throughout their course, students would normally be able to proceed to the Honours year. However, early in their course, and certainly before commencing Year 3, students should consult with the appropriate Schools and the Neuroscience program co-ordinating committee consisting of representatives from the Schools of Anatomy, Physiology and Pharmacology, and Psychology, about the subjects required for a particular Honours program.

**From 1994, student numbers in PHPH2112 will be limited. Entry to this subject 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.

Specialization in Philosophy
Students specializing 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 Levell II/III units in Year 2, and the equivalent of four Levell II/III units in Year 3.

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	Realism: 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 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 Years 1 – 3 of Programs 5200 or 5262 with an average of at least 70% in their Philosophy subjects, including at least one Distinction result; plus PHIL3106 Pre-Honours Seminar. Students contemplating Honours are urged to seek advice from the School early in their course.

5200
Philosophy

Year 1
MATH1032 or MATH1042 or both MATH1011 and MATH1021
PHIL1006, PHIL1007
4 elective Level I Units

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

Year 3
4 Philosophy units*
3 elective units
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Year 4 (Honours) must complete 7 Level III units including PHIL3106.

Year 4 (Honours)
PHIL4000

**A combination of 3 half unit Philosophy subjects count as the equivalent of 2 Science units. Refer to List A above for compulsory subjects.*

5206
Philosophy and Computing (Advanced Science only)

Year 1
COMP1011, COMP1021
MATH1032, MATH1081
PHIL1006, PHIL1007
1 elective level I unit

Year 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

Year 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

Year 4
The fourth year honours program allows specialization in either computer Science or Philosophy or in the combined program. The specialization 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 Year 3.

5262
Philosophy of Science

Year 1
MATH1032 or MATH1042 or both MATH1011 and MATH1021
1 unit from: HPST1106, HPST1108, HPST1107 or PHIL1006 PHIL1007
5 elective Level I units

Year 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

Year 3
PHIL2107
3 units from: PHIL2207, PHIL2116, HPST2109, HPST3106, HPST3117
3 elective units
One 56 hour or two 28 hour Category B General Education subjects

Year 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.

Year 1
MATH1032 or MATH1042*
PHYS1002
4 elective Level I units** ***

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

Year 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 Year 4 Honours must complete 7 Level III units.

Year 4 (Honours)
Choose one of PHYS4103, BSSM4013 (A Catagory C General Education subject is incorporated)

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

***Seek advice from the School of Physics regarding subject choice. Incorrect choices could exclude later study of certain areas or prevent the combination of Physics with other disciplines. Appropriate Level I electives include: COMP1811, PHYS1601, CHEM1002.*

****Students interested in Biophysics may replace PHYS3050 (or PHYS3060) with PHYS3410 provided CHEM1002, BIOS1011 and BIOS1021 are completed in Year 1 and BIOC2312 is taken in Year 2.*

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

0121
Physics and Astronomy (Advanced Science only)

This program provides the basic physics essential for a career in astronomy. It will not prevent specialization in some other field of physics if students' interests change during their studies.

There is astronomy content in each year 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 year.

Year 1
MATH1032 or MATH1042*
PHYS1002
4 elective Level I units**

Year 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.

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

Year 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: CHEM1002, PHYS1601, COMP1811*

0161
Physics/Computer Science

Program 0161, (Physics/Computer Science) includes basic Physics, Mathematics and Computer Science subjects necessary to meet the specific aims of the program.

Year 1
COMP1811*
MATH1032 or MATH1042
PHYS1002, PHYS1601
2 elective Level I units**

Year 2
COMP1821
MATH2100, MATH2120, MATH2510, MATH2520
PHYS2011, PHYS2021, PHYS2031
1 Level II Computer Science unit
1 unit from PHYS2601, MATH2501, MATH2301
or a Level II Computer Science unit*
One 56 hour or two 28 hour Category A General Education subjects

Year 3
PHYS2001, PHYS3010, PHYS3021, PHYS3030
2 further Level III Physics units
1 Level III Computer Science unit*
1 unit from:
1. PHYS2601, PHYS3601, MATH3101, MATH3121, MATH2301, MATH3301
2. Level III Physics
3. Computer Science*
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Year 4 Honours must complete 6 Level III units

Year 4 (Honours)
PHYS4103 (A Category C General Education subject is incoprorated)

**Quota restrictions apply to most Level III Computer Science subjects and students wishing to take these subjects should in Year 1 apply for entry to the Computer Science quota.*

***Consult the School of Physics for advice about appropriate subjects.*

PHYSIOLOGY AND PHARMACOLOGY

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

Students majoring in Physiology (Program 7300) should note the prerequisites for Physiology 2, normally: satisfactory completion of PHPH2112 Physiology 1 and BIOC2312 Principles of Biochemistry and Molecular Biology. Physiology 2 provides the 4 units at Year 3 level required for a degree with a single specialization 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 specialization. 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 BIOC2312 Principles of Biochemistry and Molecular Biology. Pharmacology is a 2 unit subject at the Year 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 specialization. Note should also be taken of the prequisites and corequisites for the subjects taken with Pharmacology and the restrictions on the entry to Anatomy and Physiology and Pharmacology subjects.

7300
Physiology

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I Units

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

Year 3
PHPH3114**
Further units to give a total of 23
One 56 hour or two 28 hour Category B General Education subjects

Students taking Year 4 (Honours) must complete 7 Level III units

Year 4 (Honours)
PHPH4218
The Category C General Education requirements are met within the Honours Program through seminars, an essay and participation in discussion groups.

**From 1994, student numbers in PHPH2112 will be limited and entry based on academic merit.*

***From 1995, student numbers in PHPH3114 and PHPH3152 will be limited and entry based on academic merit.*

7301
Pharmacology

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and MATH1021
2 elective Level I units.

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

Year 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 Year 4 (Honours) must complete 7 Level III units.

Year 4 (Honours)
PHPH4258

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

PSYCHOLOGY

Psychology is both a basic discipline and a field of professional practice. As a science, psychology is concerned with the study of both the more complex forms of behaviour, and associated mental processes. It seeks to understand the basic psychological processes such as learning, memory, perception and motivation; the biological basis of behaviour; the development and decline of behavioural capacities from infancy to old age; individual differences in behaviour; social influences on behaviour; and the collective behaviour of social groups. In addition, disorders of behaviour form an important part of the subject matter of psychology.

Students who wish to obtain qualifications that will allow them to practise psychology need to complete a four year honours program. The present minimum qualifications for registration in New South Wales as a psychologist and for membership of the Australian Psychological Society (the professional body of Australian psychologists) are a degree (with a major in psychology) and a fourth year of study of psychology, followed either by further graduate study or two years of supervised experience in some practical field of psychology. A professional qualification in psychology may lead to careers in research, teaching and applied fields such as personnel selection and management, vocational guidance, advertising and clinical practice.

There is also a four year full-time professional science degree course (**3431**) described later in this handbook.

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

1200
Psychology

Note: From 1994 the prerequisite for entry into PSYC2001, PSYC2021, PSYC2031 will be an Advanced Pass (a mark of 55 or greater) in PSYC1002.

Year 1
MATH1032 or MATH1042 or both MATH1011 and MATH1021
PSYC1002
4 elective Level I units*

Year 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

Year 3**
4 Level III Psychology units
3 elective units*
One 56 hour or two 28 hour Category B General Education subjects

Year 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 Year 2), and 8 Level III Psychology units including PSYC3001 PSYC3021 and PSYC3031 if they wish to take PSYC4033 at Level IV. Students intending to take PSYC4023 at Level IV must in addition also include PSYC3011. Entrance to either of the Level IV honours programs requires students to have completed Psychology units with an average of at least 68% and is at the discretion of the Head of School.*

1206
Computer Science/Psychology (Advanced Science only)

Note: From 1994 the prerequisite for entry into PSYC2001, PSYC2021, PSYC2031 will be an Advanced Pass (a mark of 55 or greater) in PSYC1002.

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.

Year 1
COMP1011 and COMP1021
MATH1032 or MATH1042, MATH1081
PSYC1002
1 elective Level I unit

Year 2
COMP2011 and COMP2031
PSYC2001, PSYC2011 and PSYC2021
3 elective units, including
2 from the list below*
One 56 hour or two 28 hour Category A General Education subjects

Year 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

Year 4 (Honours)
COMP4913 or PSYC4023 or PSYC4043

Students proposing to proceed to the honours year in Psychology must take 4 Level II and 4 Level III Psychology units, including PSYC2031, PSYC3021 and PSYC3031, in Years 2 and 3

Students proposing to proceed to the honours year in Computer Science must take 4 Level III Computer Science units

***Elective List**

COMP2021, Level III Computer Science 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 and political dimensions of scientific and technological change, especially in the twentieth century.

6200
Science and Technology Studies

Year 1
MATH1032 or MATH1042 or both MATH1011 and MATH1021
Any Level I HPST or SCTS unit
5 elective Level I units

Year 2
HPST2106
SCTS 2107
1 additional HPST or SCTS unit
5 elective units
One 56 hour or two 28 hour Category A General Education subjects

Year 3
4 HPST or SCTS units
3 elective units
One 56 hour or two 28 hour Category B General Education subjects

Students proposing to proceed to Year 4 (Honours) must complete 7 Level II/III units

Year 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

Year 1
BIOS1011, BIOS1021
CHEM1002 or both CHEM1101 and CHEM1201
MATH1032 or MATH1042 or both MATH1011 and

MATH1021
2 elective Level I units

Year 2
BIOC2312
BIOS2011, BIOS2021, BIOS2031, BIOS2041, BIOS2061
1 elective unit
One 56 hour or two 28 hour Category A General Education subjects

Year 3
4 units from BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3071, BIOS3081, BIOS3091, BIOS3111, BIOS3131, BIOS3141
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 Year 4 (Honours) must complete 7 Level III units

Year 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** (UAC-NPS), Business Information Technology Course **3971** (UAC-NIT), Optometry Course **3950** (UAC-NOP), 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

3431
Psychology Degree Course
Full-time

Bachelor of Science (Psychology)
BSc(Psychol)

The four year full-time course in Psychology, which leads to the award of the degree of Bachelor of Science (Psychology), is designed to meet the requirements of students who intend to become professional psychologists, as either practitioners or research workers.

The course requirements have been so designed that they allow for:

1. a solid core of psychology to equip the psychologist-in-training with psychological theory, skill in experimentation and psychological techniques;

2. supporting studies in mathematics and or biology (a minimum of one year is compulsory);

3. supporting studies in the Arts and Social Sciences (a minimum of one year is compulsory); and

4. the special needs, interests and academic or vocational background of individual students.

Degree Program

Year 1
PSYC1002
BIOS1011 and BIOS1021 or
MATH1032 or MATH1042, or both MATH1011 and 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

Year 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 recognized sequence of two years (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 Year 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 Year 2 take the other non-psychology subject and the Category B General Education (56 hours) requirement.

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

Year 4
PSYC4003 or PSYC4013

Examples of recognized sequences:

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

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

Biochemistry
Year 1
BIOS1011, BIOS1021
CHEM1002

Year 2
BIOC2312

Genetics
Year 1
BIOS1011, BIOS1021
CHEM1002 (for BIOS2021 *only*)

Year 2
Choose 2 units from BIOS2021 and BIOC2312, BIOS2011, BIOS3071, BSSM2101

Mathematics or Statistics
Year 1
MATH1032 or MATH1042

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

Physiology
Year 1
BIOS1011, BIOS1021
CHEM1002

Year 2
PHPH2112

For students in Course **3431** the additional prerequisite of MATH1032 or MATH1042 or both MATH1011 and MATH1021 for PHPH2112 has been waived by the School of Physiology and Pharmacology.

Zoology
Year 1
BIOS1011, BIOS1021

Year 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 taken over the four years. 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 co-ordinated industrial experience in the sponsoring organizations. A scholarship is payable from a fund donated by the sponsoring organizations. 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 year entry into the 1400 program. If scholarships become available at the end of Year 1, students undertaking the 1400 program may be offered transfer to the **3971** course

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

Objectives of the Course

This four year 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 Years 2 and 4, and July of Year 3 of the program.

Degree Program

Year 1
ACCT1501 ACCT1511
COMP1811,

ECON1101, ECON1102
INFS1602
MATH1032 or MATH1042

Year 2
COMP1821
INFS2603, INFS2609, INFS2691
2 elective units
One 56 hour or two 28 hour Category A General Education subjects

Year 3
ACCT2522,
INFS3605, INFS3608, INFS3616, INFS3692
MATH2841
1 elective unit

Honours students additionally take INFS3607 and a further elective unit

Year 4 (Pass Degree)
INFS3607, INFS3611, INFS4693
2 units including at least one at Level III
One 56 hour or two 28 hour Category B General Education subjects

Year 4 (Honours Degree)
INFS3611, INFS4886, INFS4887, INFS4693, INFS4893, INFS4794, 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 Year 3).

3950
Optometry Degree Course
Full-time

Bachelor of Optometry
BOptom

The School provides a four year 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 Year 3 has been implemented from 1993. Professional training including clinical optometry will be interwoven with basic studies of visual and ocular science over the four years of the course. As distinct from past practice the only entry point into Optometry will be at the Year 1 level.

Degree Program

Year 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
OPTM1205 Measurement of Light and Colour
PHYS1999 Physics (Optometry)

Year 2
Full Year
MATH2819 Statistics SA
OPTM2106 Pathology for Optometry Students
OPTM2107 Microbology for Optometry Students
OPTM2208 Diagnosis of Ocular Disease
OPTM2301 Ocular and Visual Science II
OPTM2302 Clinical Optometry II
OPTM2303 Spectacle Lens and Optical Systems
PHPH2122 Principles of Physiology
PSYC2116 Human Development (Optometry)

Year 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

Year 4
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)

Year 4 (Commencing 1994)
MDCN8001Principles of Medicine for Optometry Students
OPTM4301Visual Science IV
OPTM4302Clinical Optometry IV
OPTM4310Research Project
OPTM4311Current Issues in Optometry and Visual Science
OPTM4312Optometry and the Professional Environment

3951
Combined Science/ Optometry Course

BSc BOptom

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

1. Undergraduates* of The University of New South Wales who have satisfied the examiners in at least the first two years 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 has 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 year 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 year 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. 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, 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 year 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 year 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. 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.

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 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.

Accounting

Accounting Level I

ACCT1501
Accounting Management 1A
Staff Contact: School Office
U1 S1 or S2 L2 T2
Notes: 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 aspects of the practice of financial reporting, and reviewing the analytical and investigative tools and processes used within the discipline of accounting. The basic accounting process, whereby financial data from source documents are recorded, processed, summarized and adjusted (in terms of a given set of accounting concepts) culminating in the preparation of financial reports. Design of accounting systems and incorporation of internal controls. Accounting for cash debtors, inventories and properly, plant and equipment. Uses and limitations of traditional financial reports.

ACCT1511
Accounting and Financial Management 1B
Staff Contact: School Office
U1 S1 or S2 L2 T2
Prerequisite: ACCT1501
Notes: Restricted to programs 0600, 1000, 1400, 6810 and Course **3971**.

The second unit in a sequence of financial accounting subjects including the definition and recognition of assets, liabilities, revenues and expenses, partnerships, joint ventures and corporations. Financing decisions and financial management. Financial statement analysis. Aspects of the contemporary institutional and regulatory environment of external financial reporting. Alternative accounting systems incorporating different measurement unit. Capital maintenance and valuation concepts. Overview of accounting for investments. Preparation of simple funds statement.

Accounting Level II

ACCT2522
Accounting and Financial Management 2A
Staff Contact: School Office
U1 S1 L2 T2
Prerequisite: ACCT1511
Notes: Excluded ACCT2532. Restricted to programs 0600, 1000, 1400, 6810 and Course **3971**.

The design and operation of management accounting systems, including product costing systems and budgeting planning and control systems. In particular, attention is focused on the theoretical and practical implications of management accounting system design on organizational functioning, with emphasis on both manufacturing and service organizations. Involves the use of spread sheet modelling and the use of personal computers.

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

Content includes that of ACCT2522 Accounting and Financial Management 2A plus additional and more advanced work in management accounting.

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

The third financial reporting unit after ACCT1501 and ACCT1511 with a consideration of more complicated transactions and events as well as the accounting problems in certain specific industries. The contracting cost and other frameworks for the analysis of financial reporting. More advanced aspects of accounting for shareholders' equity, liabilities and assets including interperiod company tax allocation and lease accounting. Accounts of a company. Profit and Loss account, balance sheet, and summary of sources and applications of funds. Application of computer technology to financial accounting problems.

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

Content includes that of ACCT2542 Accounting and Financial Management 2B plus 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
Notes: Excluded ACCT3573.

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

The practices and problems associated with reporting on the affairs of complex organizations and structures including the technique of consolidation accounting; reporting on relationships with subsidiaries, associated companies, joint ventures, trusts, etc; segment reporting; reporting where the affairs of subsidiaries or associates are stated in foreign currencies, and other foreign currency translation issues. Accounting for new generation financial instruments, share buy-backs and corporate insolvency. Overall view of developments in financial reporting: major themes in the professional and research literatures in financial accounting and perspectives on the process whereby regulations governing the practice of external reporting are produced and compliance with those rules is monitored.

ACCT3573
Accounting and Financial Management 3A (Honours)
Staff Contact: School Office
U1 S1 L2 T2.5
Prerequisite: ACCT2552
Notes: Excluded ACCT2563. Restricted to program 6810.

Includes ACCT3563 Accounting and Financial Management 3A plus 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
Notes: Excluded ACCT3593. Restricted to programs 1400, 6810 and Course **3971**

Management Accounting for decision making: development of skills in financial analysis, and analytical skills and techniques for modelling and solving a variety of typical managerial decision problems with regard to organizational content. Use of the mainframe computer financial modelling package IFPS.

ACCT3593
Accounting and Financial Management 3B (Honours)
Staff Contact: School Office
U1 S2 L2 T2.5
Prerequisite: ACCT2532
Notes: Excluded ACCT3583. Restricted to program 6810. Includes ACCT3583 Accounting and Financial Management 3B, plus 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 F HPW6
Prerequisites: BIOS1011, BIOS1021
Notes: 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 P. Waite
U1 F HPW3
Prerequisites: BIOS1011, BIOS1021
Corequisite: ANAT2111
Notes: 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
Notes: 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
Notes: 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
Notes: 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, X-rays 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
Notes: 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 BIOC2312, BIOS2061 or ANAT2211
Notes: 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
Notes: Restricted to program 7000 or in the Anatomy Quota.

History of embryology and its development as a science. The mammalian reproductive system. Gametogenesis. Fertilization 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
Notes: 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: Dr P. Waite
U1 S2 HPW3
Prerequisite: ANAT3411
Notes: 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, organization 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 organized 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 program 7000 including 6 Level III units, 4 of which must be Anatomy units.

An honours program consisting of the preparation of 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.

Banking and Finance

Banking and Finance Level II

FINS2613
Business Finance 2A
Staff Contact: School Office
U1 S1 or S2 L2 T1
Prerequisites: ACCT1511, ECON1102 and ECON1203
Notes: Restricted to programs 1400, 6810.

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; 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
Prerequisites: ACCT1511, ECON1102 and ECON1203 or completion of Stage 1 for students from other faculties.
Notes: Restricted to program 1400.

Analysis of the 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
Notes: Excluded FINS2714 and FINS3615. Restricted to program 6810.

An introduction to investment theory and practice. Primary asset pricing models, including CAPM and APT models, relevant empirical tests, and the models to the problem of measuring portfolio performance. Investment management in the social, ethical and economic context. 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: FINS3615 or FINS2624
Notes: Excluded FINS3715 and FINS2614. Restricted to programs 1400, 6810.

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. Discussion of ethical issues.

Biochemistry and Molecular Genetics

Biochemistry Level II

BIOC2312
Principles of Biochemistry and Molecular Biology
Staff Contact: Dr A. Bagnara
U2 F HPW6
Prerequisites: BIOS1011 and BIOS1021, CHEM1101 and CHEM1201 or CHEM1002
Notes: Excluded CHEM2929.

The chemical properties of amino acids, peptides and proteins, carbohydrates, nucleic acids and lipids and the biological roles of these compounds. The nature and function of enzymes. The intermediary metabolism of carbohydrates, lipids and nitrogenous compounds. The relationship between structure and function of enzymes, other proteins, hormones and biological membranes. Metabolic networks and control mechanisms. The molecular mechanism of gene expression and protein synthesis. Regulation of gene expression. Recombinant DNA technology and protein engineering. Introduction to biotechnology. Photosynthesis. Practical work to complement the lectures.

Biochemistry Level III

BIOC3111
Molecular Biology of Proteins
Staff Contact: Dr G. Zalitis
U1 S1 HPW6
Prerequisites: BIOC2312, CHEM2021 or CHEM2041
Notes: Excluded 41.102, 41.102A.

Modern aspects of the structure-function relationships of proteins including discussion of the latest techniques of protein characterization. Topics include: separation and analytical procedures; determination of amino acid sequence data; the nature of protein-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, CHEM2021 or CHEM2041
Notes: 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 hybridization 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. Mc Farlane
U1 S1 HPW6
Prerequisite: BIOC2312

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: A/Prof P. Schofield
U1 S2 HPW6
Prerequisite: BIOC2312

Aspects of metabolism that are of particular relevance to the human: nutrition, exercise, neurochemistry, xenobiotics and genetic diseases.

The role of triglyceride, cholesterol and lipoprotein metabolism in human health, and other selected areas of human nutrition. Exercise, the metabolic fuels utilized and the use of in vivo NMR to monitor changes in energy metabolism. Specialized 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. Practical work amplifies the lectures.

BIOC3271
Cellular Biochemistry and Control
Staff Contact: Prof. B. V. Milborrow
U1 S2 HPW6
Prerequisite: BIOC2312

Cell biology from a molecular viewpoint. Biochemical aspects of cellular organization 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: Dr T. Stewart
U1 S2 HPW6
Prerequisite: BIOC3121
Notes: Excluded 41.132, 41.102E.

The organization 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 characterization of eukaryotic genomes in terms of the organization 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 specialized 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 hybridization and DNA sequencing.

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 specialized 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 Level I

BIOS1011
Biology A
Staff Contact: Dr R. Vickery
U1 S1 HPW6
Prerequisites: HSC Exam Score Required: 2 unit Science (Physics) 53-100, or 2 unit Science (Chemistry) 53-100, or 2 unit Science (Geology) 53-100, or 2 unit Science (Biology) 53-100, or 3 unit Science 90-150, or 4 unit Science 1-50
Notes: 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 microscopes; 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 R. Vickery
U1 S2 HPW6
Prerequisites: BIOS1011

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

Introduction to functional relationships between living organisms and environments in which they live. Illustration of structural, physiological, ecological and behavioural characteristics as examples of adaptations or neutral traits, and the evaluation of these attributes as the outcome of ecological and evolutionary selection. 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: BIOC2312

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

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.

BIOS2041
Biometry
Staff Contact: Mr A. Woods
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS1021
Notes: 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 C. J. Quinn
U1 S2 HPW6
Prerequisites: BIOS1011 and BIOS1021

Basic plant biology including cell structure, plant morphology and anatomy, water and sugar transport, seed structure and physiology, plant growth and development aborescence, 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
Notes: Excluded 45.301, 17.732. a compulsory 3-day field trip will be held during the week before the start of session

1. Field trip and practical class allocations must be obtained during re-enrolment week from room 501E, Biological Science Building.

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. Participations in field excursions is compulsory.

Biological Science Level III

BIOS3011
Animal Behaviour
Staff Contact: Dr D. Croft
U1 S2 HPW6
Prerequisites: BIOS2041, and BIOS2031 or BIOS2061.

Introduction to ethology, the biological study of behaviour. Neurophysiological, ecological, developmental and evolutionary aspects of behaviour as important elements in the analysis of behaviour, particularly social behaviour. Includes both field and laboratory work.

BIOS3021
Comparative Animal Physiology
Staff Contact: Dr 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
U1 S2 HPW6
Prerequisite: BIOS2031 or BIOS2061

Physiological adaptation to habitat in animals. The problems imposed by the basic physiological characteristics of major animal groups under different environmental conditions are examined, especially osmotic and ionic regulation, oxygen availability, metabolism, temperature regulation and acclimation. Particular attention is given to Australian fauna and conditions. A compulsory field trip to Western NSW is part of the course.

BIOS3041
Plant-Microbe Interactions
Staff Contact: A/Prof A. Ashford
U1 S2 HPW6
Prerequisites: BIOS2011 and BIOS2051 or MICR2210
Note: Not offered in 1993.

The relationship between microbes and plant surfaces particularly in the soil environment, rhizosphere organisms, role of micro-organisms in mineral acquisition by plants, mutualistic symbioses between roots and micro-organisms, dynamics of infection and host invasion, plant pathogen interactions. Fungi in culture and basic fungal taxonomy. Inoculation of plant material to produce symbioses and examination of infection processes, histochemistry and light microscopy.

BIOS3051
Entomology
Staff Contact: Dr A. Richards
U1 S1 HPW6
Prerequisites: BIOS2031

Classification, external morphology and internal anatomy of insects, studies on environmental sensory physiology and behaviour, especially reproductive behaviour, social organization and pheromones. Ecology; chemical, biological and physical control of insect pests which attack people, crops or livestock; and side effects of pest control methods. Practical work to illustrate the lectures.

BIOS3061
Plant Ecosystem Processes
Staff Contact: Dr R. Vickery
U1 S1 HPW6
Prerequisites: BIOS1011 and BIOS102 and any 2 Level II Science subjects

Soil and atmospheric environments in which plants live and their interaction with the environment. Interactions at scales ranging from the microenvironment to the ecosystem; energy and mass transfer over these scales is investigated and modelled. Impacts of global change on vegetation. Exchange of greenhouse gases between atmosphere and biosphere.

BIOS3071
Conservation Biology and Biodiversity
Staff Contact: Dr W. Sherwin
U1 S2 HPW6
Prerequisites: BIOS1011 and BIOS1021

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 P. Dixon
U1 S1 HPW6
Prerequisite: MSCI2001 or 2 Level II units in Biological Science
Notes: Students intending to enrol in this unit should register with the School of Biological Science for the February field trip by 13 January.

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.

Complements BIOS3091 Marine Biology.

BIOS3091
Marine Biology
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.

BIOS3101
Australian Ecosystems and Community Analysis
Staff Contact: A/Prof P. Adam
U1 S2 HPW6
Prerequisites: BIOS2051 or GEOG1012 and GEOG1031 or BIOS2011
Notes: Not available in 1993.

Methods for detection and analysis of spatial pattern in the distribution of organisms and communities. Geological history of the Australian environment and biota. Selected habitat types are examined in detail with issues related to their distribution, species composition and functioning. Participation in fieldwork is essential.

BIOS3111
Population and Community Ecology
Staff Contact: A/Prof B. Fox
U1 S1 HPW6
Prerequisites: BIOS1021 and MATH1032 or MATH1042 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
Evolution and Phylogenetics
Staff Contact: A/Prof C. Quinn
U1 S1 HPW6
Prerequisite: BIOS2051 or BIOS2061 or BIOS2031

Evolutionary and ecological genetics: variation between individuals, populations and species. Assessing relationships and reconstructing phylogenies; evolution and biogeography of Australian groups of vertebrates and land 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.

BIOS3141
Ultrastructure and Function of Cells
Staff Contact: A/Prof A. Ashford
U1 S1 HPW6
Prerequisite: BIOS2051 or BIOS2031 or BIOS2061 or BIOC2312 or MICR2201

Concepts and techniques in ultrastructure and cell biology including secretion of macromolecules, cell recognition, membrane structure and function, transport, communication and nerve function. Practical work includes histochemistry, electrophysiology, specimen preparation, and use of transmission and scanning electron microscopes.

Biological Science Level IV

Staff Contact: A/Prof C. Quinn

BIOS4013/BIOS4019
Biological Science 4 (Honours)
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: 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 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 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
U1 S1 L2 T4
Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2011
Notes: 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
Modern Techniques in Biotechnology
Staff Contact: Dr S Mahler
U1 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.

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)
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 Lab.4
Prerequisites: CHEM2011, CHEM2021, MATH2021, MATH2819
Co or prerequisites: INDC3090
Notes: Restricted to Combined degree course **3681.**

Polymerization chemistry and processes. Step and radical chain polymerization. Ionic (including stereoregular) polymerization. Methods including bulk, suspension, emulsion, solution and gas phase polymerization. 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

CHEM1002
Chemistry 1
Staff Contact: Dr P. Chia
U2 F HPW6
Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 55-100, 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 1-50, or 2 unit Physics 53-100
Notes: CHEM1002 is the normal prerequisite for Level II Chemistry.

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. Molecular geometry, hybridization of orbits. Periodicity of physical and chemical properties of elements and compounds. Organic chemistry including stereoisomerism.

CHEM1101
Chemistry 1A
Staff Contact: Dr P. Chia
U1 S1 HPW6
Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 55-100, 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 1-50, 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 HPW6
Prerequisite: CHEM1101
Notes: The two subjects CHEM1101 and CHEM1201, taken sequentially, are equivalent to CHEM1002.

Molecular geometry, hybridization of orbitals. Periodicity of physical and chemical properties of elements and compounds. Organic chemistry, including stereoisomerism.

CHEM1302
Introductory Chemistry
Staff Contact: Dr P. Chia
U2 F HPW6
Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 55-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100
Notes: Students who perform very well in CHEM1302 are permitted to continue on to Level II chemistry with the permission of the Head of School of Chemistry.

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. Atomic and Molecular structure, equilibrium constants, acid-base and solubility. Periodicity of physical and chemical properties of elements and compounds. Organic chemistry, including stereoisomerism.

CHEM1401
Introductory Chemistry A
Staff Contact: Dr P. Chia
U1 S1 HPW6
Prerequisites: HSC Exam Score Range Required: 2 unit Mathematics 55-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100

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 55-100, 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 1-50, or 2 unit Physics 53-100
Notes: The two subjects CHEM1401 and CHEM1501, taken sequentially, are equivalent to CHEM1302.

Atomic and molecular structure. Equilibrium constants, acid-base and solubility. Periodicity of physical and chemical properties of elements and compounds. Organic chemistry including stereoisomerism.

Chemistry Level II

CHEM2011
Physical Chemistry
Staff Contact: Dr D. Smith
U1 S1 or S2 HPW6
Prerequisites: CHEM1002, MATH1032 or MATH1042 or MATH1011 and 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. Surface and colloid chemistry.

CHEM2021
Organic Chemistry
Staff Contact: Prof P. Clezy
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 D. Phillips
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 MATH1042 or MATH1011 and 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: Prof R. Howe
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. Stabilization of oxidation states. Aspects of the chemistry of p-block elements including the inert pair effect.

CHEM3041
Analytical Chemistry
Staff Contact: A/Prof P. Alexander
U1 S1 or S2* HPW6
Prerequisite: CHEM2041
Note: * 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. Characterization of surfaces and adsorbed molecules. Liquid - gas, liquid - solid and solid - solid interfaces. Principles of heterogeneous catalysis; elementary steps in catalytic reactions. Examples of catalytic processes. Applications of surface chemistry.

CHEM3121
Synthetic Organic Chemistry
Staff Contact: Dr R. Read
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. Heave 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 P. Alexander
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 optimization of instrumental parameters; theory of separation strategies for identification and quantitative determinations. Networking of computer-controlled workstations for laboratory automation and management.

CHEM3211
Physical Chemistry of Large Molecules
Staff Contact: Dr D. Smith
U1 S2 HPW6
Prerequisite: CHEM2011

Classification of macromolecules; naturally occurring and synthetic polymers. Techniques for the characterization 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

Origin and properties of nuclear radiations, their interaction with matter and their detection and measurement. Effect of radiation on living cells, contamination and radiation hazards, factors affecting radiotoxicity. Applications of isotopes as tracers and radiation sources.

CHEM3311
Environmental Chemistry
Staff Contact: Dr W. Johnson
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
Prerequisites: CHEM3021

Polymerization processes and synthetic polymers; initiators, chain transfer agents, retarders. Pigments and dyestuffs; Basis of colour in organic compounds. Oxidation and reduction processes; theory and industrial importance.

CHEM3510
Quantum Chemistry and Symmetry
Staff Contact: A/Prof A. Rae
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 S. Colbran
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. Roberts
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 stabilization and activation; novel effects of ligand bulk and geometry. Catalytic applications of organometallic compounds.

CHEM3640
Computers in Chemistry
Staff Contact: A/Prof P. Alexander
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.

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 67-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100 and 2 unit Science (Physics) 53-100, or 2 unit Science (Chemistry) 53-150, or 4 unit Science 1-50, or 3 unit Science 90-150
Notes: Restricted to Courses **3640** and **3725**

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electro-chemistry 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
Notes: excluded CHEM1101, CHEM1201, CHEM1002 Restricted to Course **3681**

Stoichiometry. Atomic and molecular structure. Chemistry of materials. Thermochemistry. Kinetics. Equilibrium. Oxidation and reduction, electrochemistry 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
Notes: Excluded CHEM1101, CHEM1201, CHEM1002 Restricted to course **3730**

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electro-chemistry 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 55-100, 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 1-50, or 2 unit Physics 53-100
Notes: Restricted to course **3950**

Stoichiometry and solution stoichiometry. Atomic and molecular structure. Gases, liquids and solutions. Thermodynamics. Kinetics. Equilibrium constants, acid-base and solubility. Oxidation and reduction. Organic chemistry including stereoisomerism. Amino acids, proteins, carbohydrates, nucleic acids and lipids. Enzymology. Bioenergetics. Carbohydrate metabolism, oxidative phosphorylation. Metabolism and hormone function.

CHEM2828
Organic and Inorganic Chemistry for Chemical Engineers
Staff Contact: Prof P. Clezy
Discussion of selected types of organic reactions to provide a broad cover of the chemistry of aliphatic and aromatic compounds. Survey of the structures, energetics, bonding, reactions and physical properties, and applications, of selected compounds of main group elements and of lanthanide and *d*-block transition elements.

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.

CHEM2838
Inorganic Chemistry and Structure for Materials Science
Staff Contact: Dr N. Roberts
U1 S1 or S2 HPW5
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 or co-ordination chemistry. Occurrence, preparation, properties and reactions of selected compounds of transition and main group elements.

CHEM3829
Organic Chemistry
Staff Contact: Prof D. Black
The spectroscopic identification of organic compounds, free radical chemistry and electro-organic 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
Biochemical Genetics of Man
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 characterization. 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 analyzing 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 localization, 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 8 Level III units

Computer Science and Engineering

Computer Science and Engineering Level I

COMP1011
Computing 1A
Staff Contact: Mr N. Cerpa
U1 S1 or S2 L3 T3
Prerequisites: As for MATH1032
Corequisites: MATH1032 or MATH1042
Notes: Excluded COMP1811. Restricted to programs 0600, 1206, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

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. Introduction to computing applications: document processing, spreadsheets, data bases, graphics and communications.

COMP1021
Computing 1B
Staff Contact: Dr G. Whale
U1 S1 or S2 L3 T3
Prerequisite: COMP1011
Notes: Excluded COMP1821, 6.620, 6.621, 6,021D.

Introduction to procedural programming style and comparison with functional programming. 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.

COMP1811
Computing 1 (Procedural)
Staff Contact: Mr P. Compton
U1 S1 or S2 L3 T3
Prerequisites: As for MATH1032
Notes: 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. Introduction to computing systems: hardware (CPU, memory, peripherals), software (operating systems, networks, languages) and users. Computing applications: document processing, spreadsheets, data bases, graphics and communications.

Computer Science and Engineering Level II

COMP1821
Computing 2
Staff Contact: Dr T. Gedeon
U1 S1 or S2 L3 T3
Prerequisite: COMP1811
Notes: 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.

COMP2011
Data Organization
Staff Contact: Dr A. Sowmya
U1 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821
Notes: Excluded 6.641.

Data types and data structures: abstractions and implementations. Data representation: logical and physical. Files: access methods, implementation, external data structures. Primary and secondary memory: performance, management policies. Data encapsulation and information hiding; introduction to object orientation.

COMP2021
Digital System Structures
Staff Contact: Dr G. Heiser
U1 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821
Notes: 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.

COMP2031
Concurrent Computing
Staff Contact: Dr J. Olszewski
U1 S1 or S2 L3 T2
Prerequisite: COMP1021 or COMP1821

The process model – sequential versus parallel computation. Interprocess communication and synchronization 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.

Computer Science and Engineering Level III

COMP3111
Software Engineering
Staff Contact: Mr K. Robinson
U1 S1 L3 T2
Prerequisites: COMP2011
Notes: Excluded 6.642, 6.660G. Restricted to program 0600, 1060, 1206, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

Informal specification: Data flow diagram methodology, analysis, design, testing, management and documentation of software. Formal specification: set theory, logic, schema calculus, case studies. The Z specification notation. Managing the project lifecycle. CASE tools. A major group project is undertaken.

COMP3121
Algorithms and Programming Techniques
Staff Contact: School Office
U1 S2 L3 T2
Prerequisite: COMP2011
Notes: Excluded 6.642, 6.660G, COMP9101. Restricted to program 0600, 1206, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

Computability theory. Deterministic and non-deterministic algorithms. Stochastic algorithms. Computational

complexity: time and space bounds. Algorithms for parallel computation and their hardware implementation. Game playing. Branch and bound. Discrete event simulation. Linear programming. Dynamic programming.

COMP3131
Parsing and Translation

Staff Contact: Mr K. Robinson
U1 S2 L3 T2
Prerequisites: COMP2011
Notes: Excluded 6.643, 6.664G. Restricted to program 0600, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

Syntax-directed parsing and translation of well-structured objects encountered in computing. Grammars: terminal symbols, non-terminal symbols, productions, phrase structure grammars, Chomsky classification, context-free grammars, finite state grammars, logic grammars. Parsing: LL(k) grammars, top-down parsing; LR(k) grammars, bottom-up parsing; parser generators. Translation: action symbols, translation grammars, attributed-grammars, abstract syntax, unparsing. Lexical analysis: finite-state grammars, finite-state machines, regular expressions, lexical analyzer generators.

COMP3211
Computer Organization and Design

Staff Contact: Prof G. Hellestrand
U1 S1 L3 T2
Prerequisites: COMP2021 or ELEC2021
Notes: Excluded 6.654, COMP9211. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

Combinational and sequential circuit design; synchronization, communication and arbitration; register transfer specification (modal). *Arithmetic design strategies. Memory organization:* physical and virtual address space; operating system and compiler support; memory mapping and caching. *Communications organization*: shared memory, memory mapping; network systems. *Processor design*: the instruction pipeline; hardwired and micro-programmed control; instruction sets; RISC and object-based processor organization. Error detection/correction and fault tolerance: coding theory.

COMP3221
Microprocessors and Interfacing

Staff Contact: Dr S. Matheson
U1 S2 L3 T2
Prerequisite: COMP2021
Notes: Excluded 6.0318, 6.060G, 6.613, 6.732E, COMP9221, ELEC3020. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

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.

COMP3231
Operating Systems

Staff Contact: Mr S. Russell
U1 S1 L3 T2
Prerequisite: COMP2011, COMP2031 or ELEC3020
Notes: Excluded 6.632, 6.672, COMP9201. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

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.

COMP3311
Database Systems

Staff Contact: Dr A. Ngu
U1 S2 L3 T2
Prerequisite: COMP2011
Notes: Excluded 6.663, 6.005G, 6.659G, 19.608, COMP9311. Restricted to program 0600, 1060, 1206, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

The relational database model, object data bases, 4GL query languages, database design and implementation, deductive databases. Concurrency, optimization, distribution. A major project involving both design and realization is included.

COMP3321
Business Systems Organization

Staff Contact: School Office
U1 S2 L3 T2
Prerequisite: COMP2011
Notes: Excluded 6.647, 6.661G. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.** Not offered in 1993.

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

COMP3331
Computer Networks and Applications

Staff Contact: Dr K. Burston
U1 S2 L3 T2
Prerequisites: COMP2011
Notes: Excluded 6.633, 6.659G, COMP9331. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770**

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 W. Wilson
U1 S1 L2 T3
Prerequisite: COMP2011
Notes: Excluded 6.666G, COMP9414. Restricted to program 0600, 1060, 1206, 5206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

Machine intelligence. *Principles*: knowledge representation, automated reasoning, machine learning. *Tools*: AI programming languages, control methods, search strategies, pattern matching. *Applications*: computer vision, speech recognition, natural language processing, expert systems, game playing, computer-aided learning. Philosophical and psychological issues.

COMP3421
Computer Graphics
Staff Contact: Dr T. Lambert
U1 S1 L3 T2
Prerequisite: COMP2011
Notes: Excluded 6.668G, COMP9415. Restricted to program 0600 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

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.

COMP3511
Human-Computer Interaction
Staff Contact: Dr C. Quinn
U1 S1 L3 T2
Prerequisite: COMP2011
Notes: Excluded 6.006G, COMP9611. Restricted to program 0600, 1206 and Combined degree courses **3611, 3661, 3681, 3701, 3725, 3730, 4770.**

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.

Computer Science and Engineering Level IV

COMP4914/COMP4913
Computer Science 4
Staff Contact: Dr T. Lambert
U10 F
Prerequisites: Completion of program 0600 including 7 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: A/Prof R. Conlon
U1 S1 or S2 L2 T1.5
Prerequisites: HSC minimum mark required: Contemporary English 60, 2 unit English (General) 60, or 2 unit English 53, or 3 unit English 1
Notes: 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 P. Kriesler
U1 S1 or S2 L2 T1.5
Prerequisite: ECON1101
Notes: 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 D. Meredith
U1 S1 L2 T1
Prerequisites: HSC minimum mark required: Contemporary English 60, 2 unit English (General) 60, or 2 unit English 53, or 3 unit English 1
Notes: Restricted to program 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 inter-war 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

ECON2101
Microeconomics 2
Staff Contact: Dr J. Frisch
U1 S1 L2 T1.5
Prerequisites: ECON1102, ECON1203
Notes: Excluded ECON2103, ECON2121. Restricted to program 0600.

Choice theory, including intertemporal choice, labour supply. Extensions of price theory. Theory of production, costs and supply. Market structures including oligopoly models. Introduction to general equilibrium and welfare analysis. Externalities.

ECON2102
Macroeconomics 2
Staff Contact: Dr G. Otto
U1 S2 L2 T1.5
Prerequisites: ECON1102, ECON1203
Notes: Excluded ECON2104, ECON2122. Restricted to program 0600.

Models of aggregate income determination in open economies. Theories of aggregate economic behaviour with respect to consumption and investment expenditures and financial transactions. Balance of payments and exchange rate analysis. Theories of inflation and unemployment. Introduction to dynamic analysis. Theories of growth and cycles.

ECON2103
Applied Microeconomics
Staff Contact: Dr G. Fishburn
U1 S2 L2 T1.5
Prerequisite: ECON1102
Notes: Excluded ECON2101, ECON2121. Restricted to program 6810.

Structural change in the Australian economy. The effect of different market structures on firms and consumer welfare. Consequences of market failure and the effects of government regulation. Investment decisions in the public and private sectors, including the estimation of future benefits, revenues and costs, the measurement of consumer and producer surplus. Economics of non-renewable and other resources. Australia's international trade and investment and the effects of restrictions on international trade and investment.

ECON2104
Applied Macroeconomics
Staff Contact: Dr P. Kriesler
U1 S1 L2 T1.5
Prerequisite: ECON1102
Notes: Excluded ECON2102, ECON2122. Restricted to program 6810.

Economic growth and fluctuations in Australia. Inflation, unemployment and balance of payments issues. Fiscal, monetary, exchange rate and incomes policies. Changes in the structure of the Australian financial system and its links with the international monetary system. Effects of restrictions on capital markets.

Electrical Engineering

Electrical Engineering Level I

ELEC1011
Electrical Engineering 1
Staff Contact: Dr E.H. Fooks
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. Power in DC and AC circuits. Circuit models of diodes and transistors. Transistor switching. Combinational logic principles and circuits. Diode and transistor logic implementations.

Electrical Engineering Level II

ELEC2010
Circuit Theory
Staff Contact: Prof I.F. Morrison
S1 L2 T.5
Prerequisites: ELEC1011, MATH1032
Corequisite: MATH2620 or MATH2520
Notes: Excluded 6.021H. 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.

ELEC2020
Analog Electronics
Staff Contact: Dr S.R. Wenham
S2 L2 T.5
Prerequisites: ELEC2010, PHYS2989 or PHYS2859
Notes: Excluded 6.021C. Restricted to Program 0600

Operating principles and terminal characteristics of PN diodes, solar cells, bipolar and field effect transistors. Small signal models of devices, including h-parameter model. Analysis and design of low-frequency Class-A amplifiers, including choice of biasing method.

Environmental Science

Environmental Science Level I

ENVS1011
Environmental Science 1A
Staff Contact: A/Prof B. Fox
U1 S1 HPW6
Notes: Restricted to the Environmental Science Programs.

A mix of lecture, tutorial and laboratory classes outline the global environmental processes which underline major global-scale environmental problems. These problems are placed in perspective with regional case studies to highlight specific issues using seminars, workshops, field excursions and group projects. Processes examined include linkage between the lithosphere and biosphere, atmospheric circulation energy and radiation balance and ecosystem function. Desertification, deforestation, climate change, ozone depletion, energy conversion and pollution are considered together with the political aspects and values inherent in environmental issues

ENVS1021
Environmental Science 1B
Staff Contact: A/Prof B. Fox
U1 S2 HPW6
Prerequisite: ENVS1011

A mix of lecture, tutorial and laboratory classes outline the linkages between components of the physical environment, particularly the movement of energy and matter. Topics include the Earth's energy balance, nutrient cycles in vegetation and soil, imbalances leading to land degradation and instability. The hydrological cycle is used as a specific example linking inland water sources and marine resources. Regional case studies are used to highlight specific issues using seminars, workshops, field excursions and group projects.

Environmental Science Level II

ENVS2010
Population Analysis and Environment
Staff Contact: A/Prof B. Fox
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
U.5 S2 HPW3
Prerequisites: BIOS1021, CHEM1002, ENVS1011, ENVS1021

Consideration of the special impacts which urbanization 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: Drs M. Fox and M. Melville, Mr A. Evans
U1 S2 L2 T2
Notes: Excluded GENS4240.

Essential and continuing links between components of the physical environment. Movement of energy and matter in the physical environment, including consideration of Earth's energy balance, the hydrological cycle, nutrient cycles in vegetation and soil, imbalances leading to land degradation and instability, and to movement of materials.

GEOG1051
Global Environmental Problems and Processes
Staff Contact: Dr I. Prosser
U1 S1 L2 T1

The subject outlines the principles and processes necessary to appreciate the physical background behind major global-scale environmental problems. Principles and processes include the linkages between the lithosphere, hydrosphere and biosphere, atmospheric circulation, energy and radiation balance and ecosystem function. Problems covered are the issues of desertification, deforestation, 'greenhouse', ozone depletion, energy conservation and pollution.

GEOG1062
Australia and Global Development
Staff Contact: A/Prof I. Burnley, Drs M. Sant, P. Simons
U1 S2 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 core-periphery 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.

Geography Level II

GEOG2013
Geographical Data Analysis
Staff Contact: Dr B. Parolin
U1 S1 L1 T3
Prerequisite: Both GEOG1051 and either GEOG1031 or

GEOG1062
Notes: Excluded GEOG2093.
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 & Dr P. Simons
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.

GEOG2093
Geographic Methods
Staff Contact: Dr S. Walker
U1 S2 L2 T2
Prerequisites: Both GEOG1051 and either GEOG1031 or GEOG1062
Notes: Excluded GEOG2013.

Statistical procedures and field methods used in both human and physical geography. Includes: measures of dispersion; measures of spatial distribution; samples and estimates; correlation and regression; tests for distribution in space; data collection and analysis; field observations. Three days field work is a compulsory part of the subject and students will incur some personal expenses with this.

GEOG2102
Environmental Issues in Australia
Staff Contact: A/Prof J. Dodson
U1 S2 L2 T1
Prerequisite: GEOG1051 or GEOG1062
Notes: Not offered in 1993.

Selected issues in Australia demonstrating the impacts of economic growth and development on the natural environment including a consideration of the ways in which economic forces and political factors affect the exploitation and carrying capacity of natural systems. Case studies taken from tourist developments, forestry, agriculture and land degradation, suburbanization, water quality and use, and power generation. Emphasis is placed on the philosophical and factual arguments for environmentally sound planning and resource management practices.

Geography Level III

GEOG3000
Field Project 3
Staff Contact: Dr M. Melville (Physical), A/Prof I. Burnley (Economic)
U0 F T1.5
Prerequisite: One of GEOG3011, GEOG3021, GEOG2032. This prerequisite does not apply to students registered in course 3010
Notes: 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: Dr M. Melville
U1 S2 L2 T2
Prerequisites: GEOG1031 or GEOG1051 and one of CHEM1101 or CHEM1401 or both GEOL1101 and GEOL1201 or both BIOS1011 or BIOS1021

Methodology of pedogenic studies and the application of these studies to the understanding of soil-landform relationships. Soil physical and chemical properties and their interrelationships, emphasizing 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 & Dr M. Fox
U1 S1 L2 T2
Prerequisites: GEOG1031 or GEOG1051 or 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 SURV8711

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: Drs W. Erskine, S. Walker
U1 S2 L2 T2
Prerequisites: GEOG1031 or GEOG1051 or by permission from Head of School

Rationale and basic objectives; history and legislative framework: standardized 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 GEOG1051

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 S2 L2 T2
Prerequisite: Successful completion of a Year 2 Programme 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
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 computer-based systems for resource evaluation. Case study evaluation, application of the MAP and other GIS software.

GEOG3142
Geographic Information Systems Applications
Staff Contact: Dr Q. Zhou
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.

GEOG3152
Social Welfare and Urban Development
Staff Contact: Dr S. Walker
U1 S1 L2 T2
Prerequisite: GEOG2092 or GEOG3202. This prerequisite does not apply to students enrolled in course **3010**

A consideration of welfare aspects of urban development, including social policies and urban structure; social costs and benefits of urban renewal especially in the inner city; growth centres and new towns; distributional aspects of social services; and spatial disparities in social well-being.

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
Notes: Not offered in 1993.

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 S1 L2 T2
Prerequisite: GEOG3202

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: GEOG3202

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: Drs M. Fox and I. Prosser
U1 S2 L2 T2
Prerequisite: GEOG1051 or GEOG1031

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

GEOG3221
Advanced Geographic Methods
Staff contact: Dr S. Walker
U1 S1 L2 T2
Prerequisite: GEOG2093
Notes: Excluded GEOG2013.

Additional quantitative research techniques normally taken by Honours students in their third year. Research organisation; computer analysis; collection and organisation of data; statistical description; hypothesis testing and sampling; simple and multiple association analysis; nonparametric methods.

GEOG3333
Special Topic
Staff Contact: School Office
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: Dr A. Skidmore
U10 F
Prerequisites: Completion of program 2700, 2527 or 6851 including GEOG2013, GEOG3221 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 P.G. Lennox
U1 S1 L3 T3
Prerequisites: HSC Exam Score Range Required - 2 unit Mathematics or 55-100, 3 unit Mathematics or 1-50 4 unit Mathematics 1-100, and 2 unit Science (Physics) or 53-100, 2 unit Science (Chemistry) or 53-100, 2 unit Science (Geology) or 53-100, 2 unit Science (Biology) or 53-100, 4 unit Science 1-50, 3 unit Science 90-150
Notes: Up to 2 days of fieldwork is an essential part of this

subject. Students will incur personal costs in connection with the fieldwork component. Details will be provided at enrolment.

Stream 1
Constitution of the Earth: The Solar System. Minerals and rocks. The origins of igneous metamorphic and sedimentary rocks; plutonism and volcanism. The geological cycle, geological time. Structural geology, origins of faults and folds. Plate tectonics. Continental drift. Field tutorials are compulsory.

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 P.G. Lennox
U1 S2 L3 T3
Prerequisites: GEOL1101
Notes: Up to 4 days of fieldwork is an essential part of this subject. Students will incur personal costs in connection with the fieldwork component. Details will be provided at enrolment.

Palaeontology, evolution of life. Principles of stratigraphy. Economic geology. The evolution of ocean basins; sea-floor spreading and sea-level changes. Climates of the past. Gravity, isostasy, seismology and earthquake prediction. Quaternary geology, energy resources. Field tutorials are compulsory.

Applied Geology Level II

GEOL2011
Mineralogy & Igneous Petrology
Staff Contact: Dr P.C. Rickwood/ A/Prof B.J. Hensen
U1.5 S1 L2 T3 Field 1
Prerequisite: GEOL1201
Notes: Fieldwork of up to 5 days is a compulsory part of this subject. Students will incur personal costs.

Mineralogy. Principles of optical crystallography and the use of the polarizing microscope. Chemical and physical properties of rock forming minerals. Mineral identification. Igneous Petrology. Occurrence, classification and origin of igneous rocks. Fractional crystallization and differentiation. Partial melting. Simple binary melting diagrams. Igneous petrology relating to plate tectonics. Practical. Macroscopic and microscopic examination of rock forming and ore minerals and igneous rocks in the field and the laboratory.

GEOL2022
Petrology & Structural Geology
Staff Contact: A/Prof C.R. Ward/ A/Prof B.J. Hensen/Dr P.G. Lennox
U1 S2 L3 T2 Field 1
Prerequisite: GEOL2011
Notes: 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 non-classic 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/Prof J. Roberts
U1.5 S1 L3 T2 Field 1
Prerequisite: GEOL1201
Notes: 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, Brachiopoda, Mollusca, Coelenterata, Arthropoda, Protochordata and Echinodermata. Introductory paleobotany, biogeography, ichnology (trace fossils) and biostratigraphy.

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

Operating systems and hardware. Fortran programming; text editing; control for VAX and PC's; examples of computing applied to geological problems.

GEOL2042
Geological Statistics
Staff Contact: Dr D.R. Cohen
U.5 S2 L2 T1
Prerequisite: GEOL2041

Application of the mathematical techniques listed below to geological data processing and analysis. Analysis of variance. Introduction to matrix algebra. Directional data. Regression analysis, trend surface analysis; time series analysis; Markov chain analysis. Introduction to nonparametric statistics. Introduction to multivariate statistics. Practical work based on the use of SPSSX, Minitab and other library programs.

GEOL2051
Introductory Geophysics
Staff Contact: Mr D. Palmer
U.5 S1 L2 T1
Prerequisite: GEOL1101

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 Surveying
Staff Contact: A/Prof A.D. Albani
U.5 S2 L2 T1
Prerequisite: GEOL1101

Photogeology. The use of air photos for geological mapping and geomorphological evaluation of land. Techniques and principles of photo-interpretation and multi-band photography. Photo-interpretation of folds, faults, joints, bedding, limestone, intrusive igneous volcanic rocks, alluvial fans, terraces, slopes, landslides, coastal and tropical landforms. Relationships between geology, drainage, soil and vegetation, orebody expression gossans, colouration halos. An introduction to remote sensing. Geological Surveying. Levels, tachometers and theodolites. Field techniques. Precision of angular measurements. Stadia surveying. Levelling. Field computations. Closed and open traverses. Coordinates and their computation.

GEOL2072
Environmental Geology
Staff Contact: A/Prof A.D. Albani/ Prof G. Hocking
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 lay 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
U.5 S2 L2 T1
Prerequisite: GEOL1201

Geochemistry. Accuracy, precision and quality of geochemical data. Graphical display of analyses. Norms. The distribution of elements in terrestrial rocks. 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 growth of minerals from solution and the development of mineral textures. Particular aqueous geochemical systems.

GEOL6201
Marine Geology 1
Staff Contact: A/Prof A.D. Albani
U1 F L1 T2
Prerequisites: GEOL1101 and GEOL1201

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. Global Geophysics. Principles of gravity, geo-magnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution, dynamic processes and major tectonic features of the earth. Mineralogy and Petrology. Igneous and sedimentary rock types of the ocean floor and their significance.

Field work of five days is a compulsory part of the subject.

GEOL6221
Introductory Geophysics
Staff Contact: Mr D. Palmer
U.5 S1 HPW3
Notes: Excluded GEOL2051

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.

GEOL7221
Surficial Materials and Processes
Staff Contact: A/Prof C.R. Ward
U1 S2 L3 T2
Prerequisite: GEOL2111

Clay Mineralogy. The structure and properties of the clay minerals groups including the kaolinities, illites, smecites, cholorites, mixed layered and fibrous clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. Industrial uses of clays and bauxite. Sedimentary Petrology. The influence and transportation, deposition and diagenisis on the composition, texture and structure of detrital sedimentary rocks. The non-clastic sedimentary rocks including phosphates, evaporites, ferruginous and silceous deposits. Hydrology. The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater development and monitoring of groundwater reserves. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area.

GEOL8220
Sedimentology
Staff Contact: A/Prof C.R. Ward
U.4 S1 L1 T1
Prerequisite: GEOL1201
Notes: Excluded GEOL2031

As for Sedimentology in GEOL2031 Sedimentology and Paleontology.

Applied Geology Level II/III

GEOL6231
Coastal Monitoring Techniques
Staff Contact: A/Prof A.D. Albani
U1 F L1 T2

General principles of surveying. Optical and electronic methods of distance and elevation measuring. Coastal

position fixing. Co-ordinates 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 bathymetric 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 Field 1
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 characterization.

GEOL3021
Igneous and Metamorphic Processes
Staff Contact: A/Prof B.J. Hensen
U1 S1 L2 T1.5 Field 0.5
Prerequisite: GEOL2011
Notes: Fieldwork of up to 7 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. Fabric Relationships of deformation and recrystallization*. Metamorphic petrology of Australia. Practical macroscopic and microscopic study of metamorphic suites from different tectonic regimes.

* *Pressure, temperature, timepaths and Tectonic setting of metamorphism in the earth's crust.*

GEOL3031
Stratigraphy & Basin Analysis
Staff Contact: Prof J. Roberts
U1 S1 L2 T2 Field 2
Prerequisite: GEOL2031

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 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.

GEOL3052
Exploration Geophysics
Staff Contact: Mr D. Palmer
U1 S2 L2 T1 Field 1
Prerequisite: GEOL1201

Introduction to seismic, electrical and electromagnetic and methods of geophysical exploration. Data interpretation and application of these methods for mineral petroleum, coal and groundwater exploration and engineering projects.

GEOL3072
Engineering Geology
Staff Contact: Prof G. Hocking
U.5 S2 L2 T1
Notes: Fieldwork of up to 3 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

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
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: A/Prof G.R. Taylor/ Dr A.C. Dunlop
U1 S1 L3 T2 Field 1
Corequisite: GEOL2022 or GEOL3011

Metallic Resources: Classification and origin of the ore deposits, geochemical processes, research methods. Orthomagmatic, hydrothermal, porphyry, volcanic-sedimentary, Mississippi Valley type, chromium, iron, manganese ores, residual and mechnical ores. Introduction to mineral exploration. Laboratory study of hand specimens, thin sections and polished sections of various ore types; study of selected mining areas representing various types; study of selected mining areas representing various genetic types of ore. Economic Mineralogy. Nature of reflected light. Ore textures and their interpretation. Phase relations and paragenesis of ore minerals. Practical work in optical properties of ore minerals, hardness and reflectivity measurements: study of selected ores and ore minerals under the microscope including textural studies.

GEOL3102
Fossil Fuels & Non-metallic Resources
Staff Contact: A/Prof C.R. Ward
U1 S2 L3T2 Field 1
Prerequisites: GEOL2011 and GEOL2031
Notes: Fieldwork of up to 4 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, asbestos and construction materials. 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 F L1 T2
Prerequisite: GEOL6201

Clay Mineralogy. 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. Sedimentary Basin Analysis: Techniques of analysis and data presentation using information from outcrops, boreholes (including wireline logs) and seismic sections. Construction and interpretation of structural, isopachous and lithofacies maps. Seismic stratigraphy. Styles of sedimentation within the structuring of basins in tensional, compressive and strik-slip tectonic regimes. Basin evolution. Stratigraphy. Ocean basin stratigraphy and the environmental and chronological utility of the principal groups of index fossils. Stratigraphical history and correlation of sedimentary rocks in the deep ocean basins and on continental shelves. Changes of sea level. The Quaternary history of the oceans. Reefs and carbonate sedimentation. Deep sea consolidated sediments. Field work not exceeding two days is a compulsory part of the subject.

GEOL6321
Coastal Environmental Assessment
Staff Contact: A/Prof A.D. Albani
U1 F L1 T2

The physical nature of the various coastal environments: their morphology and the relationship between water masses and the sedimentary and benthic characteristics of the bottom. 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
U.5 S2 L2 T1
Notes: Excluded GEOL3052
Geophysics of ocean basins and off-shore areas and the techniques of their study. Seismic refraction, reflection and computational methods, instrumentation of seismic and acoustic sources, recording systems and signal processing. Geological and physical interpretation of results. Practical work on instrumentation, recording and interpretation of field data.

GEOL6331
Geochemistry
Staff Contact: Dr P.C. Rickwood
Notes: Excluded programs 2500, 2503, GEOL2092.

As for GEOL2092

GEOL8310
Stratigraphy
Staff Contact: Prof J. Roberts
U.5 S1 L2
Prerequisite: GEOL8220
Notes: Excluded GEOL3031.

As for Stratigraphy, in GEOL3031 Stratigraphy and Basin Analysis

GEOL8320
Gravity and Magnetic Methods
Staff Contact: Applied Geology Office
U.5 S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background to geology

Fundamental principles. Field procedures and instruments. Reduction of field data. Regionals and residuals. Effects of sources of simple geometrical shapes and generalized two and three-dimensional distributions. Applications. Field work of one day is a compulsory part of the subject.

GEOL8330
Seismic Methods
Staff Contact: Applied Geology Office
U.5 S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background in geology

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. Field work of one day is a compulsory part of the subject.

GEOL8340
Electrical Methods
Staff Contact: Applied Geology Office
U.5 S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background in geology

Introductory theory and field practice of resistivity, self-potential, induced polarization and airborne and ground electromagnetic methods. Geological interpretation

of field data. Geophysical logging. Field work of one day is a compulsory part of the subject.

GEOL8350
Geological Applications
Staff Contact: Applied Geology Office
U.5 S1 L1 T1
Prerequisite: GEOL1201

A subject of ten weeks' duration. Structural Geology: Elements of structural geology, sterographic 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. Field work of one day is a compulsory part of the subject.

GEOL8360
Geophysical and Geological Applications
Staff Contact: Applied Geology Office
U.5 S2 L1 T2
Prerequisite: GEOL1201
Notes: Excluded GEOL6330.

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. Available only in program 2503.

Applied Geology Level IV

GEOL4303
Geology Honours
Staff Contact: Applied Geology Office
U10 F
Prerequisites: Completion of programs 2500, 2503, including 8 Level III units.

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: Applied Geology Office
U10 F
Prerequisites: Completion of program 2527 including 8 Level III units

For combined Geology/Physics honours see entry under Board of Studies in Science and Mathematics.

Information Systems

Information Systems Level II

INFS1602
Computer Information Systems 1
Staff Contact: School Office
U1 S1 or S2 L2 T1
Notes: 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 organizational level, typical commercial applications, the systems lifecycle, design concepts, data analysis and models and an introduction to data communications.

INFS2603
Computer Information Systems 2
Staff Contact: School Office
U1 S2 HPW3
Prerequisite: INFS1602
Notes: 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.

INFS2609
Computer Information Systems Technology
Staff Contact: School Office
U1 S1 L2 T1
Prerequisite: INFS1602 or approved studies in computer science
Notes: 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.

INFS3616
Commercial Programming Principles
Staff Contact: School Office
U1 S2 L2 T1
Prerequisite: INFS3605.
Corequisite: INFS3692
Notes: Available only to BIT students. Restricted to Course **3971**.

An advanced treatment of the practice of implementing commercial systems. Topics include: the use of library code, program design for performance, project control and reporting practice, programming standards, human-machine interface, software testing, CASE tools, documentation, security and control, maintenance.

Information Systems Level II/III

INFS2691
Industrial Training 1
Staff Contact: School Office
U0 S1 HPW1
Prerequisite: INFS1602
Notes: 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

INFS3605
Computer Systems Implementation
Staff Contact: School Office
U1 S1 L2 T2
Prerequisite: INFS2609
Notes: Restricted to programs 0600, 1400, 6810 and Course **3971**.

Supervised implemantation of an information systems project in a commercial programming language. Advanced program design and structurd 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.

INFS3607
Distributed Computer Systems
Staff Contact: School Office
U1 S2 L2 T1
Prerequisite: INFS2603
Notes: 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
Database Systems
Staff Contact: School Office
U1 S1 L2 T1
Prerequisite: INFS2603
Notes: 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
Information Systems Development
Staff Contact: School Office
U1 S2 L2 T1
Prerequisites: INFS2603 and approval from Head of School
Notes: 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.

INFS3692
Industrial Training 2
Staff Contact: School Office
U0 S1 HPW1
Prerequisites: INFS3605 or INFS2609.
Corequisite: INFS3616
Notes: 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
Notes: 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
Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School.

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 exercises using the University's computing facilities and laboratories to provide them with a better understanding

INFS4794
Thesis (Information Systems)
Staff Contact: School Office
Available only to Year 4 (Honours) students.

INFS4805
Information Systems Auditing
S1 L3 LAB1
Prerequisite: ACCT5908 and INFS5989 or with the approval of the Head of the School of Information Systems
Notes: 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.

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.

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
Managing Software Development
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.

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 Orientated Information Systems
Staff Contact: School Office
S2 L2 T1
Prerequisite: ACCT3708, INFS1602. Admission to BCom course at honours level majoring in Information Systems and approval of Head of School.

System 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: INFS3605. Admission to BCom course at honours level majoring in Information Systems and approval of Head of School.

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
Advanced 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.

Information systems and the organization, strategic planning for information systems, information needs for decision support purposes, organization of the data processing and information systems functions, the role of senior management in information systems administration. Project management techniques, project estimation, project control, EDP audit, security, implications of privacy legislation, socio-technical issues. Data as a corporate resource, the implications of centralised and decentralised data management policies. Selection of computing equipment and associated software, turnkey systems, contract negotiation.

INFS4857
Information and Decision Technologies
Staff Contact: School Office
S1 L3
Prerequisite: Admission to BCom course at honours level majoring in Information Systems and approval of Head of School.

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.

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 organization.

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.

A specially assigned project, program or set of readings relating to information systems research.

INFS4898
Project Seminar
Staff Contact: Ms A. Katalanos

Japanese

Japanese Level I

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

JAPN1000
Japanese 1A (Core)
Staff Contact: Mr W. Armour
U1 S1 L1 T4
Notes: Excluded JAPN1100, JAPN1200.

Introduction to modern Japanese speaking, listening, reading and writing using communicative methods. Hiragana, katakana and 100 kanji are introduced and developed through progressive practice.

JAPN1001
Japanese 1B (Core)
Staff Contact: Mr W. Armour
U1 S2 L1 T4
Prerequisite: JAPN1000 or equivalent
Notes: Excluded JAPN1101, JAPN1201.

Further acquisition of communication skills in basic Japanese, regarding everyday non-technical topics. A further 100 kanji are introduced and developed through progressive practice.

JAPN1100
Japanese 1A (Intermediate)
Staff Contact: Ms T. Yalichev
U1 S1 L1 T4
Prerequisite: 70-100 percentile range in 2-unit NSW HSC Japanese or 80-100 percentile range in 2-unit Z NSW HSC Japanese, or equivalent (subject to placement test)
Notes: Excluded JAPN1000, JAPN1200.

Develops students' fundamental knowledge of spoken/written Japanese and introduces them to authentic Japanese through tapes and readings in order to refine communication skills. 150 kanji are progressively introduced.

JAPN1101
Japanese 1B (Intermediate)
Staff Contact: Ms T. Yalichev
U1 S2 L1 T4
Prerequisite: JAPN1100 or equivalent
Notes: Excluded JAPN1001, JAPN1201.

Further develops students' communication skills in modern Japanese and use of Japanese in a wider context, thereby increasing vocabulary and grammatical structures. A further 150 kanji are progressively introduced.

JAPN1200
Japanese 1A (Advanced)
Staff Contact: Ms K. Okomoto
U1 S1 L1 T4
Prerequisite: 35-50 percentile range in 3-unit NSW HSC Japanese or equivalent competence in Japanese (subject to placement test)
Notes: Excluded JAPN1000, JAPN1100.

Builds upon students' knowledge of Japanese language. Skills are improved through communicative (both written and spoken) activities. 150 kanji are introduced progressively.

JAPN1201
Japanese 1B (Advanced)
Staff Contact: Ms K. Okomoto
U1 S2 L1 T4
Prerequisite: JAPN1200 or equivalent (subject to placement test)
Notes: Excluded JAPN1001, JAPN1101.

Looks at Japanese usage, both written and spoken, for those who have acquired a high level of competency in Japanese. A further 200 kanji are introduced.

JAPN2000
Japanese 2A (Core)
Staff Contact: Ms Y. Hashimoto
U1 S1 L1 T4
Prerequisite: JAPN1001 or equivalent
Notes: Excluded JAPN2100, JAPN2200.

Core language subject designed for students who have acquired a sound knowledge of basic Japanese. Consolidates oral/aural skills and builds and develops reading/writing skills.

JAPN2001
Japanese 2B (Core)
Staff Contact: Ms Y. Hashimoto
U1 S2 L1 T4
Prerequisite: JAPN2000 or equivalent
Notes: Excluded JAPN2101, JAPN2201.

Core language subject designed for students who have acquired a sound knowledge of basic Japanese. Consolidates oral/aural skills and builds and develops reading/writing skills.

JAPN2100
Japanese 2A (Intermediate)
Staff Contact: Ms S. Iida
U1 S1 L1 T4
Prerequisite: JAPN1101 or equivalent
Notes: Excluded JAPN2000, JAPN2200.

Students' basic knowledge of Japanese is extended by the use of more advanced conversational structures and useful vocabulary. Students are also introduced to composing meaningful pieces in Japanese, e.g., letter writing. 150 new kanji are introduced.

JAPN2101
Japanese 2B (Intermediate)
Staff Contact: Ms S. Iida
U1 S2 L1 T4
Prerequisite: JAPN2100 or equivalent
Notes: Excluded JAPN2001, JAPN2201.

Conversational Japanese is taught as well as honorifics so students are able to communicate appropriately in almost any situation. The writing skill concentrates on more formal types of Japanese, e.g., writing a formal request or invitation. 150 new Kanji are introduced.

JAPN2200
Japanese 2A (Advanced)
Staff Contact: Ms H. Masumi-So
U1 S1 L1 T4
Prerequisite: JAPN1201 or equivalent
Notes: Excluded JAPN2000, JAPN2100.

Requires a high level of language ability. Concentrates on the reading and writing skills but offers ample opportunity for speaking and listening exercises. 150 new kanji are introduced.

JAPN2201
Japanese 2B (Advanced)
Staff Contact: Ms H. Masumi-So
U1 S2 L1 T4
Prerequisite: JAPN2200 or equivalent
Notes: Excluded JAPN2001, JAPN2101.

For students who have already achieved a high level of Japanese language ability; this subject concentrates on reading and writing skills. Students learn the composition skill through writing formal letters and academic-oriented pieces. 150 new kanji are introduced.

Law

LAWS1010
Litigation
Staff Contact: Dr Jill Hunter
U6 F HPW4

An introduction to issues and problems in three areas:

Civil procedure: focus on selected topics - parties to an action; pleadings and the 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.

Criminal procedure: the law and related issues associated with arrest, the use of 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. In particular, examination of the rules designed to protect the accused at trial; the rule against hearsay evidence; the use of expert evidence; the treatment of unreliable evidence and some analysis of the philosophy of proof and probability theory.

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

LAWS1120
Legal System Torts
Staff Contact: Ms Prue Vines/Mr Angus Corbett
U6 F HPW4
Notes: 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; the development of compensation law, with particular reference to workers' compensation and occupational health and safety; modern statutory compensation schemes; the rules and concepts of the law of torts, their origins, growth, operation and limitations; tort law protection from assault, injury and death; negligence; interests in another's life and services; false and misleading statements affecting economic interests; loss distribution; employers' liability; occupiers' liability; causation; remoteness of damage; product liability; interference with interests in land; interference with personal liberty. Some of these topics are dealt with in outline only.

LAWS1410
Contracts
Staff Contact: Mr Denis Harley
U6 F HPW4
Notes: Restricted to Course **4770**.

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
Notes: 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.

LAWS2160
Administrative Law
Staff Contact: Prof Garth Nettheim
U3 S1 or S2 HPW4
Notes: Restricted to Course **4770**.

Principles and procedures for review of administrative action. Topics: relations between different agencies of government (legislative, administrative, judicial); delegated legislation; judicial power; the Ombudsman: the Administrative Appeals Tribunal; principles of judicial review (denial of natural justice, going beyond power, error of law); procedures for judicial review; the Administrative Decisions (Judicial Review) Act, 1977 (Cth.).

LAWS3010
Property and Equity
Staff Contact: Dr Chris Rossiter
U6 F HPW4
Notes: 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
Notes: 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 specialization 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: Me Joe Ury
U2 S1 HPW2
Notes: 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, digests and material on law reform. An introduction to case analysis and statutory interpretation. An introduction to the use of computerized legal research methods. The methods and objectives of legal and empirical research.

LAWS7420
Legal Research and Writing 2

Staff Contact: Mr Joe Ury
U1 S2 HPW2

A revision of legal research skills acquired in LAWS741 Legal Research and Writing 1, particularly the use of Australian digests, law reform materials and indexes to legal periodicals. Practice in ascertaining delegated legislation, in using English, Commonwealth and US digests and in tracing recent amendments to case-law, statutes and regulations. Further instruction on the use of computers for retrieval of legal materials.

LAWS7430
Reasearch Component

Staff Contact: A/Prof Adrian Brooks
Notes: 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

Introduction to theoretical - particularly 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

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
Notes: Restricted to programs 1400, 6810 and Course **3971**.

The Australian legal system and areas of substantive law relevant to commerce including contract, business organization, 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
Notes: Restricted to program 1400 and Course **3971**.

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

LEGT7731
Legal Regulation of Marketing and Distribution
Staff Contact: School Office
U1 S1 or S2 L2 T1
Notes: 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 anti-competitive practices (including collusive activity, exclusive dealing, price discrimination, resale price maintenance, mergers and monopolization) 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
Legal Organization of Commerce
Staff Contact: School Office
U1 S2 L2 T1
Prerequisite: LEGT7721 or LEGT7731
Notes: 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: LEGT7721 or LEGT7731
Notes: 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

Marine Science Level II

MSCI2001
Introductory Marine Science
Staff Contact: Dr P. Dixon
U1 S1 or S2 HPW4
Notes: Fieldwork in Midyear Recess.

Ocean basins, sediments, properties of seawater, ocean circulation, coasts and coastal processes. Marine biology and ecology, primary and secondary productivity.

Marine Science level III

MSCI3001
Physical Oceanography
Staff Contact: Dr P. Dixon
U1 S2 HPW4
Prerequisite: MATH1032 or MATH1042
Notes: 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 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.

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.

Higher level Mathematics subjects are normally classified as being offered by one of the three Departments of the School: Applied Mathematics, Pure Mathematics and Statistics.

Mathematics Level I

Students whose course or program require them to take Mathematics subjects in later years must take the standard

first year subject MATH1032 Mathematics 1 or its higher equivalent MATH1042 Higher Mathematics 1. The higher version covers all of the material in MATH1032, often at greater depth, and is 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 pair of subjects MATH1011 General Mathematics 1B and MATH1021 General Mathematics 1C. However, students who select this subject should weigh seriously the implications of their choice because no further mathematical subjects are normally available. 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 a prerequisite for MATH1032.

The subject MATH1081 Discrete Mathematics is an additional Level 1 subject designed for students in Computer Science or Mathematics programs. There is also the optional subject MATH1061 for students who want an introduction to the use of computers but who do not intend any further computing studies.

The subjects MATH1051 Mathematics 1F and MATH1090 Discrete Mathematics for Electrical Engineers are restricted to students in the Optometry 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). (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. These numbers may vary from year to year.)
Notes: Excluded MATH1032, MATH1042, 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
Notes: Excluded MATH1032, MATH1042, 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

Staff Contact: School of Mathematics First Year Office
U2 F HPW6
Prerequisites: HSC exam score range required: 2 unit Mathematics (67-100)(from 1994 this will be 90-100) or 2 and 3 unit Mathematics (100-150) or 3 and 4 unit Mathematics (100-200) or MATH1011 (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. These numbers may vary from year to year.)
Notes: Excluded MATH1011, MATH1021, MATH1042, ECON2200, ECON2201, ECON2202.

Calculus, analysis, analytic geometry, linear algebra, an introduction to abstract algebra, elementary computing.

MATH1042
Higher Mathematics 1

Staff Contact: School of Mathematics First Year Office
U2 F HPW6
Prerequisites: HSC exam score range required: 3 unit Mathematics (145-150) or 4 unit Mathematics (186-200) (these numbers may vary from year to year.)
Notes: Excluded MATH1011, MATH1021, MATH1032, ECON2200, ECON2201, ECON2202.

As for MATH1032 Mathematics 1, but in greater depth.

MATH1051
Mathematics 1F

Staff Contact: School Office
U1 S1 HPW6
Prerequisite: 3 unit HSC Mathematics
Notes: Excluded MATH1011, MATH1021, MATH1032, MATH1042. 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 S2 HPW6
Prerequisites: As for MATH1011.
Corequisites: MATH1021 or MATH1032 or MATH1042
Notes: Excluded any subject offered by the School of Computer Science and Engineering. Not offered in 1993.

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.

MATH1081
Discrete Mathematics
Staff Contact: School of Mathematics First Year Office
U1 S1 or S2 HPW6
Prerequisites: As for MATH1032.
Corequisites: MATH1032 or MATH1042
Notes: Excluded MATH1090.

Role of proof in mathematics, logical reasoning and implication, different types of proofs. Sets, algebras 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
S1 HPW3
Corequisite: MATH1032 or MATH1042
Notes: Excluded MATH1081.

The role of proff 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 who wish to take only one unit of mathematics at Level II. It may be followed by the Level III subject Mathematics 3.

MATH2009
Engineering Mathematics 2
Staff Contact: School Office
F HPW4
Prerequisite: MATH1032
Notes: 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: MATH1022 (Cr) or MATH1032
Notes: 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.

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.

Applied Mathematics Level II

MATH2100
Vector Calculus
Staff Contact: School Office
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1032 or MATH1042
Notes: Excluded MATH2110.

Properties of vectors and vector fields; divergence, gradient, curl of a vector; line, surface, and volume integrals. Gauss and Stokes' theorems. Curvilinear co-ordinates.

MATH2110
Higher Vector Analysis
Staff Contact: School Office
U.5 S1 HPW2.5
Prerequisites: MATH1032 or MATH1042 with a mark of at least 70
Notes: 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 MATH1042.
Notes: 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 doefficients, 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 equations, 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
Prerequisites: MATH1032 or MATH1042 with a mark of at least 70
Notes: Excluded MATH2120.

As for MATH2120 but in greater depth.

MATH2160
Linear Programming
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1042
Corequisite: MATH2501 or MATH2601.

A first course in mathematical modelling and solution techniques for 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 MATH1042
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 MATH1042.

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.

MATH2301
Mathematical Computing A
Staff Contact: School Office
U1 S1 HPW4
Prerequisite: MATH1032 or MATH1042.

Structured programming in FORTRAN, errors in representing real numbers and their effect on calculations, and mathematical algorithms based on polynomial approximations.

Pure Mathematics Level II

MATH2400
Finite Mathematics
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH1032 or MATH1042
Notes: MATH1081 Discrete Mathematics is advised.

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 MATH1042
Notes: MATH1081 Discrete Mathematics is advised.

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 MATH1042
Notes: Excluded MATH2601.

Vector spaces, linear transformations, change of basis, inner products, orthogonalization, reflections and QR factorizations, Eigenvalues and eigenvectors, diagonalization. Jordan forms and fuctions of matrices. Applications to linear systems of differential equations, quadratics, rotations. Laplace transforms.

MATH2510
Real Analysis
Staff Contact: School Office
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1032 or MATH1042
Notes: 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 MATH1042
Notes: 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: MATH1042 or MATH1032 with a mark of at least 70
Notes: Excluded MATH2501.

As for MATH2510, 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: MATH1042 or MATH1032 with a mark of at least 70
Notes: Excluded MATH2510.

As for MATH2510 Pure Mathematics 2 Real Analysis but in greater depth.

MATH2620
Higher Complex Analysis
Staff Contact: School Office
U.5 S1 or S2 HPW2.5
Prerequisite: MATH1042 or MATH1032 with a mark of at least 70
Notes: Excluded MATH2520.

As for MATH2520 Pure Mathematics 2 Complex Analysis, but in greater depth.

Statistics Level II

The subjects MATH2819, MATH2829, MATH2839, MATH2849, MATH2859 and MATH2969 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 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 MATH1042
Notes: 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
Prerequisites: MATH1021(Cr) or MATH1032 or MATH1042
Corequisite: MATH2801
Notes: Excluded MATH2910.

Introduction to APL, random variables, univariate transformation, 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: MATH1032 or MATH1021
Notes: 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
Notes: 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 MATH1042
Notes: Not available to Science students.

Introduction to probability theory, random variables and distribution functions, sampling distributions, including those of t, chi^2 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
Notes: 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
Notes: 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: t, χ^2 and F. Estimation of parameters: the methods of moments and maximum likelihood and confidence interval estimation. The standard test 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: MATH1042, MATH1032 or MATH1021(CR)
Notes: 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 χ^2, 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
S2 HPW2
Prerequisite: MATH1032 or MATH1042
Notes: 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 χ^2 and t.

MATH2859
Statistics SE2
Staff Contact: School Office
S1 HPW2
Prerequisite: MATH1032 or MATH1042
Notes: 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, auto-regression. 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
S1 HPW2
Prerequisite: MATH1032 or MATH1042
Notes: 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 MATH1042
Notes: 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 MATH1042.
Corequisites: MATH2901
Notes: Excluded MATH2810.

As for MATH2810 but in greater depth.

MATH2921
Higher Basic Inference
Staff Contact: School Office
U1 S2 HPW4
Prerequisite: MATH2901
Notes: 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
Notes: 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 unit, 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
Notes: Excluded any other Level III in Pure Mathematics or Applied Mathematics except for MATH3261.

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 two of the advanced subjects MATH3110, MATH3130, MATH3170 and MATH250 are offered in one year.

MATH3101
Numerical Analysis
Staff Contact: School Office
U1 S1 HPW4
Notes: 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 S2 HPW2
Prerequisites: a weighted average mark of at least 70 in 2 units at Level II Mathematics
Notes: It is highly recommended that MATH3101 be taken concurrently.

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 singlular 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
Notes: 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, generalized 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
Notes: 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: MATH2100, MATH2501, MATH2510
Notes: Excluded MATH2120, MATH21390, MATH3101. Not available to Science Students.

Numerical and mathematical methods for electrical engineering. *Numerical Methods*: Solution of linear and non-linear 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, generalized Fourier series, Bessel functions, Legendre polynomials.

MATH3150
Transform Methods
Staff Contact: School Office
U.5 S2 HPW2
Prerequisites: MATH2100, MATH2520, MATH3121

The mathematics of signals and linear systems. General Fourier series. Fourier, Laplace and related transforms. Delta-distributions and others 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, 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
Notes: 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, Hamilitonian 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 S2 HPW2
Prerequisites: a weighted average mark of at least 70 in MATH2100, MATH2120 and one further unit of Level II Mathematics
Notes: It is highly recommended that MAH3241 be taken concurrently.

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
Oceanography

Staff Contact: School Office
U1 S2 HPW4
Prerequisites: MATH2021 or both MATH2100 and MATH2120.

Review of basic physical features and mathematical description of oceans. Physical properties of sea water. Elementary hydrodynamics. An elementary discussion of turbulence. Geostrophy, dynamic heights and the inference of heights from hydrographic measurement. Ekman layers. Wind-driven ocean circulation, western boundary currents. Surface and internal waves, tides. Thermohaline process: mixing, entrainment, double-diffusive phenomena, mixed layers and gravity currents.

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

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
U5 S2 HPW2
Notes: 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
Notes: Excluded MATH3780 (from 1992), MATH3640 (before 1992).

Elementary concepts of Euclidean, affine and projective geometries.

MATH3520
Number Theory
Staff Contact: School Office
U.5 S1 or S2 HPW2
Notes: Excluded MATH3740 (from 1992), MATH3610 (before 1992).
Introduction to algebraic structures. Euclidean domains, primes and irreducibles, factorization. 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
Notes: Excluded MATH3760 (from 1992).
Elementary combinatorial topology of surfaces.

MATH3540
Ordinary Differential Equations
Staff Contact: School Office
U.5 S1 or S2 HPW2
Prerequisite: MATH2501,
Notes: 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
Notes: 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
Notes: 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 SS HPW2
Prerequisite: MATH2510
Notes: 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)
Notes: 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: MATH2501 (Cr) or MATH3610, MATH2601
Notes: 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
Notes: Excluded MATH3740 (before 1992).
Rings and algebras of sets, Lebesgue integration, dominated convergence theorem, L^P-spaces, Borel-Cantelli theorem, Riesz representation theorem, Fubini's theorem, stochastic processes, random variables, martingales.

MATH3640
Higher Ordinary Differential Equations
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2601 or MATH2501 (Cr)
Notes: Excluded MATH3540.
As for MATH3540, but in greater depth.

MATH3650
Higher Partial Differential Equations
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2610 or MATH2510 (Cr) MATH2620 or MATH2520 (CR)
Corequisite: MATH3640
Notes: 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
Notes: Excluded MATH3730 (before 1992). This subject is offered in even 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)
Corequisite MATH3610 is recommended
Notes: 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; asympatotic methods; integral formulae; harmonic functions; Riemann surfaces.

MATH3710
Higher Algebra I
Staff Contact: School Office
U.5 S1 HPW2
Prerequisite: MATH2501 (Cr) or MATH2601
Notes: Excluded MATH3500, MATH3710 and MATH3720 (both before 1992).

Groups, subgroups, 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.
Notes: 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
Notes: Excluded MATH3710 (before 1992). This subject offered in odd numbered years only.

Topics from rings; commutative rings; factorization theory; modules; associative and Lie algebras; Wedderburn theory; category theory.

MATH3740
Higher Number Theory
Staff Contact: School Office
U.5 S2 HPW2
Notes: 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: MATH2501 (Cr) or MATH2601, MATH2510 (Cr) or MATH2610
Notes: 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.
Notes: 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: MATH2501 (Cr) or MATH2601, MATH3500 (Cr) or MATH3710
Notes: 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,
Notes: 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
Notes: Excluded MATH3870, MATH3911.

Matrix theory. Multivariate 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
Notes: Excluded MATH3920.

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

MATH3830
Design and Analysis of Experiments
Staff Contact: School Office
U.5 S2 HPW2
Prerequisites: MATH2821, MATH3811
Notes: Excluded MATH3870, MATH3930.

Principles of good experimental design. Completely randomized experiment, randomized complete block design. Latin square design. Contrasts and multiple comparisons. Analysis of factorial experiments. Random effects models.

MATH3840
Statistical Inference
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH2821
Notes: Excluded MATH3940.

Uniformly minimum variance unbiased estimation. Cramer-Rao inequality, Lehman-Scheffe theorem. Monotone likelihood ratio distributions and uniformly most powerful unbiased tests. Generalized likelihood ratio test, exact test and large samples tests. Bayesian point estimation, interval estimation and hypothesis testing.

MATH3850
Nonparametric Methods
Staff Contact: School Office
U.5 S2 HPW2
Prerequisites: MATH2830, MATH2821
Notes: 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
Notes: 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
Notes: 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
Notes: Excluded MATH3801, MATH3880.

As for MATH3801 but in greater depth.

MATH3911
Higher Linear Models
Staff Contact: School Office
U1 S1 HPW4.5
Prerequisites: MATH2921, MATH2501, MATH2510
Notes: 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
Notes: 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
Notes: Excluded MATH3830, MATH3870.

As for MATH3830 but in greater depth.

MATH3940
Higher Statistical Inference
Staff Contact: School Office
U.5 S2 HPW2
Prerequisite: MATH2921
Notes: Excluded MATH3840.

As for MATH3840 but in greater depth.

MATH3950
Higher Nonparametric Methods
Staff Contact: School Office
U.5 S2 HPW2
Prerequisites: MATH2921, MATH2930
Notes: Excluded MATH3850.

As for MATH3850 but in greater depth.

MATH3971
Higher Probability Theory
Staff Contact: School Office
U1 Not offered in 1991 HPW4
Prerequisites: MATH2901, MATH2501, MATH2510.

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 HPW
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 1000, 1006, 1060, 1061 or 6810 with an appropriate set of Level III subjects. Some higher Mathematics subjects should normally be included at Levels II and III. Students must discuss their Level III selection of subjects with the department concerned.

MATH4003/4004
Mathematics and Computer Science Honours
Staff Contact: School Office
U10 F
Prerequisites: 7 Level III units including at least three from Computer Science; students should discuss their Year 3 program in the Department concerned.

Undergraduate thesis in Applied Mathematics or Pure Mathematics together with advanced lecture courses, half selected from MATH4103/4603, and half selected 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 program 1000 or 6810 including 6 Level III units (some Higher Mathematics subjects should normally be included at Levels II and III in order to enter Level IV Mathematics: students should discuss their Year 3 program in Department concerned.)

Skill in practical numerical computing is highly recommended for students taking this course. Those students who have not already taken a suitable computing course may be required to take a short bridging course.

Undergraduate thesis together with advanced lecture courses. Includes 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 program 1000 including 6 Level III units (some Higher Mathematics subjects should normally be included at Level II and III in order to enter Level IV Mathematics: students should discuss their Year 3 program in Department concerned.)

Undergraduate thesis together with advanced lectures on topics chosen from 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 program 1006 including 6 Level III units.

Specialized study, from the topics set out, for students attempting honours in the Science and Mathematics or Arts courses with a major in Statistics. Mathematical basis. Experimental design; response surfaces. Stochastic processes. Theories of inference. Sequential analysis. Non-parametric methods. Multivariate analysis. Mathematical programming. Information theory. Discrete distributions. Project. 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 S1 L1 T2
Notes: 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 S. Blairs
U.5 S1 L2 T1
Prerequisite: PHYS1002
Notes: 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.

MATS1253
Ferrous Alloys
Staff Contact: Dr P. Krauklis
U.5 S1 L1 T2
Notes: Restricted to Combined degree course **3681**.

Ferrous alloys. Iron-carbon phase equilibrium diagrams. Microstructure and properties of plain carbon steels. Austenite decomposition under equilibrium and non-equilibrium conditions. Dilatometry. Heat treatment of steels. Surface hardening treatments. Microstructure and properties of ordinary cast irons, including grey, white, mottled, malleable and ductile irons.

MATS8193
Origins of Microstructure (units 1-3)
Notes: Restricted to Combined degree course **3681**.

Unit 1: Phase Equilibra
Staff Contact: Dr A.G. Crosky
S1 L1 T1

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.

Unit 2: 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.

Unit 3: 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 AG.. Crosky
U.5 S1 L2 T1
Notes: 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 recrystallized structures, ferrous and non-ferrous microstructures and fracture and failure analysis.

Materials Science and Engineering Level III

MATS1042
Crystallography and X-Ray Diffraction
Staff Contact: Dr P. Munroe
U.5 S2 L2 T2
Notes: 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.

MATS1083
Non Ferrous Alloys
Staff Contact: Dr P. Krauklis
U.5 S2 L1 T2
Notes: Restricted to Combined degree course **3681**.

Metallography of non-ferrous alloys. Structure/property relationships in non-ferrous alloys. Hardening mechanisms. Metallography and properties of copper, aluminium, nickel, magnesium, lead, tin and titanium based alloys.

MATS1263
Alloy Steels
Staff Contact: Dr P. Krauklis
U.5 S2 L1 T1
Notes: Restricted to Combined degree course **3681**.

Alloy steels. Ternary equilibria involving iron and carbon. Metallography and properties of alloys steels. Effects of alloying elements on austenite formation and decomposition under equilibrium and non-equilibrium

conditions. Heat treatment of alloy steels. Metallography and properties of alloy cast irons.

MATS9193
Origins of Microstructure (Units 2 and 4)
Notes: Restricted to Combined degree course **3681**.

Unit 2: 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.

Unit 4: Phase transformations
Staff Contact: Dr B. Gleason
S2 L2 T1

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
Mechanical Behaviour of Materials
Notes: Restricted to Combined degree course **3681**.

Unit 1: Deformation
Staff Contact: Dr B. Gleason
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. Gleason
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.

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
Notes: Restricted to Combined degree course **3681**.

Unit 1: Deformation
Staff Contact: School Office
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. Gleason
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

MANF1110
Manufacturing Technology
Staff Contact: Dr P. Mathew
U.5 S2 HPW3
Corequisite: 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. Analysis of the primary functions of machine tool structures and their operation. Relationship between product design and manufacture processes. Elementary functional analysis of product designs, including linear loop equations, limits and fits, dimensional accuracy of processes and alternate design and manufacturing strategies.

MECH0160
Introductory Engineering Design and Drawing Practice
Staff Contact: A/Prof A.E. Churches
U.5 S1 L3 T2

Introduction to Engineering Design: Intended specifically for electrical engineering students and is to be

taken in conjunction with MECH0360. Introduction to engineering design: Engineering method, problem identification, creative thinking, mathematical modelling; computer-aided design; materials and processes; communication of ideas; the place of engineering in society.

Introduction to drawing practice: Graphic communication. First and third angle orthographic projection. Descriptive geometry fundamentals. Mechanical drawing practice and interpretation. Pictorial views. Theory of computer-aided drafting. Electrical drawing practice.

MECH0360
Introductory Engineering Mechanics

Staff Contact: A/Prof J.E. Baker
U.5 S1 L2 T1
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
Notes: Excluded MECH0330, MECH1300, MECH0440.

Intended specifically for electrical engineering students, and is to be taken in conjunction with MECH0160. Equilibrium. Friction. Systems of multiforce members, co-planar 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.

MECH1100
Mechanical Engineering Design 1

Staff Contact: A/Prof A.E. Churches
U.5 S2 HPW2
Corequisite: MECH1000
Notes: Restricted to Combined degree course **3681**.

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. Design philosophy. Design as the formulation and implementation of practical ways of fulfilling needs, including: recognising the need, generalising the question, considering a range of solutions, selecting a short-list, analysing the selected range, making a final choice. Commercial philosophy. Impetus for design, market competition, significance of innovation, intellectual property, financing, manufacturing, marketing, etc.

MECH1110
Graphical Analysis and Communications

Staff Contact: A/Prof A.E. Churches
U.5 S2 L1 T2
Corequisite: MANF1110
Notes: Excluded MECH0130, MECH0160.

Descriptive geometry as the basis of analysis and synthesis of spatial relationships: points, lines, plans, solids, intersections. Orthographic and other projection systems. Engineering drawing as a means of definition and communication, selection of views, construction of drawings, conventions, dimensions and tolerancing. Introduction to computer-based drafting systems.

MECH1300
Engineering Mechanics 1

Staff Contact: Dr K. Zarrabi
U.5 S1 or S2 L2 T2
Prerequisites: As for MECH0360
Notes: 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, co-plantar 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
Notes: Restricted to Combined degree course **3681**.

Stress and strain. 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: Dr R. A. Willgoss
U.5 S2 HPW3
Notes: 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

MECH2300
Engineering Mechanics 2A

Staff Contact: Dr S.S. Leong
U.5 S1 or S2 L2 T1
Prerequisites: ATH1032 or MATH1042, MECH1300 or MECH0360
Notes: 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: Dr S.S. Leong
U.5 S1 or S2 HPW2
Corequisite: MECH2300
Notes: 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.

MECH2400
Mechanics of Solids 2
Staff Contact: Dr H.L. Stark
F L1.5 T2
Prerequisites: MECH1400, MATH1032 or MATH1042
Notes: Restricted to Combined degree course **3681**.

Mechanical properties of materials: tensile and compressive behaviour; hardness; testing machines. Analysis of stress and strain at a point (2D, 3D, Mohr's Circles); generalized Hooke's Law; modulus of rigidity; bulk modulus; interdependence of elastic moduli; strain energy (total, volumetric and distortion); yield criteria; combined loads in beams; fatigue, stress concentrations, Miner's Rule; membrane stresses; bending of composite beams; bending and unsymmetrical beams; direct shear stresses in beams, shear centre; elastic and inelastic buckling of columns.

MECH2600
Fluid Mechanics 1
Staff Contact: A/Prof G. Morrison
F L1 T1
Prerequisites: MATH1032 or MATH1042, PHYS1919
Notes: Restricted to Combined degree course **3681**.

Units. Fluid properties; fluid statics. Flow fields; unsteady and compressible flow. Bernoulli's equation. Momentum equations. Ideal flow. Flow measurement. Dimensional analysis: similitude; dimensionless numbers; methods of analysis. Steady one dimensional flow in ducts: laminar and turbulent; pressure loss; friction factor; losses in bends and fittings. Elementary boundary layer flow; skin friction and drag. Pumps and turbines.

MECH2700
Thermodynamics 1
Staff Contact: A/Prof E. Leonardi
U1.5 F L1 T1
Prerequisite: MATH1032 or MATH1042, PHYS1919
Notes: Restricted to Combined degree course **3681**. Combined with MECH2600 worth 1.5 units.

Work, energy, power. Units. Systems, states and processes. Control mass and volume. *Fluid properties*: extensive; intensive. Equation of state. Tables of properties. First law of thermodynamics. Non-flow processes: reversible; irreversible. *Flow processes*: energy equation; enthalpy. Ideal processes and cycles. Reversibility. The second law of thermodynamics. Entropy. Isentropic processes. Cycles for engines and heat pumps. Energy conversion efficiency. Reciprocating pumps; compressors; engines. Energy analysis; P-V diagrams. Heat transfer.

Medicine

MDCN8001
Principles of Medicine for Optometry Students
Staff Contact: A/Prof L. Simons (St Vincent's Hospital)
F HPW1
Notes: 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

Microbiology and Immunology Level II Subjects

MICR2201
Introductory Microbiology
Staff Contact: Dr L. 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 Microbiolgy 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 S. Hazell
U1 S2 HPW6
Prerequisites: BIOS1011, BIOS1021, MICR2201
Corequisites: BIOC2312 and BIOC2021

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 sterilization. Introduction to applied aspects of microbiology especially the role of bacteria in ecosystems and medical microbiology.

Microbiology and Immunology Level III

MICR3011
Microbiology 2
Staff Contact: Dr B. Wallace
U1 S1 HPW6
Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2011

Essential for students majoring in microbiology. It extends material covered in Microbiology I with special emphasis on bacterial physiology and groups of medically and environmentally significant micro-organisms. Major topics include structure and function of bacterial cells, antibacterial agents and environmental effects.

MICR3021
Microbial Genetics
Staff Contact: Dr B. Wallace
U1 S1 HPW6
Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2011
Notes: 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.

MICR3031
Applied Mycology
Staff Contact: Dr I. Couperwhite
U1 S1 HPW6
Prerequisite: MICR2201 or MICR2011 or MICR2218.

An introduction to the applications and economic importance of fungi to people and the environment. Topics include the use of fungi as food and fodder, in food and beverage fermentations and for medical purposes; poisonous fungi, fungi as animal pathogens and fungal biodegradation.

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.

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: A/Prof R. Hawkes
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: Dr Y. Barnet
U1 S2 HPW6
Prerequisite: MICR2201

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

MICR3081
Medical Bacteriology
Staff Contact: Dr S. Hazell
U1 S2 HPW6
Prerequisites: MICR2011/MICR3011.

Includes strategies that the micro-organisms have adopted to overcome host defences, research processes that have led to an understanding of microbial pathogenesis, immunization, treatment and epidemiology. Laboratory classes develop practical skills required in a routine diagnostic laboratory.

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 systems 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, phorias, measurement of phorias. Modulation transfer function Gradient index optics.

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, polarization. *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.

OPTM1205
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 photoreceptor. 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.

OPTM2106
Pathology for Optometry Students

Staff Contact: Prof B. Collin
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 is designed to provide 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.

OPTM2208
Diagnosis of Ocular Disease

Staff Contact: Prof B. Collin
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: OPTM1202

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 spherical and cylindrical spectacle and contact lenses. Prismatic effect and decentration of lenses. Bifocals and progressive power lenses. Lens aberrations and spectacle lens design. Control of aberrations. The optics of telescopes, microscopes and clinical instruments. Optics of low vision aids. Intra-ocular implants.

OPTM3208
Diagnosis and Management of Ocular Disease
Staff Contact: Prof B. Collin
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. Klein
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: Dr 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.

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 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, arthritis, pulmonary and myocardial infarction as well as lung, alimentary and cerebral tumours. Correlation of pathological processes with development of specific clinical syndromes.

Pathology Level IV

PATH0005/PATH0006
Pathology (Honours)
Staff Contact: Prof A. Lykke
U10 F
Prerequisites: completion of program 7000 including 6 Level III units

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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.

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: Phillip Staines, Convenor
U1 C6 S1 HPW3
Notes: Excluded 52.103.

A team-taught introduction to philosophical thought and issues through study of traditional and contemporary discussions of three topic areas. Particular topic areas vary from year to year. In 1992, the areas included ethics and political philosophy, the nature of argument, and philosophy of mind.

PHIL1007
Introductory Philosophy B
Staff Contact: Neil Harpley, Convenor
U1 C6 S2 HPW3
Notes: 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. In 1992, the topic areas included theory of knowledge, science and religion, and perception.

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

Specialization 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.

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 Centruy 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 1-3 of programs 5200 or 5262 with an average of at least 70% in their Philosophy subjects, including at least one Distinction result; plus PHIL3106 (Pre-Honours Seminar). 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
Notes: Excluded 52.2030 and 52.2031, 52.220, MATH3400.

This subject is about deductive logic (in particular, propositional logic and predicate logic). Aims to construct - and to understand - a precise, unambiguous, formal language. Many important parts of English are translatable into it, hence many arguments of English are translated into it too. It is a language with which we can better understand the concept of deductive proof.

PHIL2107
Advanced Philosophy of Science

Staff Contact: Michaelis Michael
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Notes: Excluded 52.304.

Explores some current issues in the philosophy of the sciences and includes discussion of the role of experiment in science; the cognitive status of theories; explanation; inter-theoretical reduction; reductionism; models and metaphors; the issues of scientific realism and anti-realisms.

PHIL2108
Ways of Reasoning

Staff Contact: San MacColl
U1 C6 S2 HPW3
Prerequisite: Upper level status in Philosophy
Notes: 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.

Assessment: Three short assignments and one 2000 word essay.

PHIL2109
Metaphysics (Realisms)

Staff Contact: Stephen Hetherington
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Subject not offered in 1993.

PHIL2116
Scientific Method

Staff Contact: Michaelis Michael
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy, or contact School
Notes: Excluded 52.2140.

Science has a serious claim to being the major cultural force shaping our world-view. The aim of this subject is to enable us to understand better our own view about science by tracing their historical development. Examines, in some depth, the conceptions of science to be found in the writings of Aristotle, Descartes, various Positivists, and some more recent philosophers, with a view to understanding how their conceptions of science and their conceptions of which questions philosophers should ask about science differ from each other and from our own.

PHIL2117
Philosophical Logic

Staff Contact: Michaelis Michael
U1 C6 S2 HPW3
Prerequisite: PHIL2106 or equivalent, or contact School

Follows on from PHIL2106 Logic and is intended to introduce students to the ways various logics have been deployed within philosophy, with a view to illuminating such topics as linguistic meaning, content of thought, modalities, necessity and possibility, contrary-to-fact conditionals, laws of nature, action, value, deducibility and fiction.

PHIL2206
Contemporary Philosophy of Mind

Staff Contact: Philip Cam
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: 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
Notes: 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
Epistomology (Knowledge and Justification)
Staff Contact: Stephen Hetherington
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Subject not offered in 1993.

PHIL2216
Human Nature and Human Understanding: the Empiricist Approach
Staff Contact: Neil Harpley
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Excluded 52.2130, 52.2170, 52.231.

The traditional empiricists - Locke, Berkeley and Hume - developed a substantial framework for theories concerning human nature and particularly for the consideration of issues arising in the attempt to explain our perception and knowledge of the world. The empiricist approach to these matters was revivified and became dominant in the first half of this century. Concentrates on the traditional empiricists and looks at the continuation of discussion of some of their major concerns in modern empiricism.
Assessment: Exercises and essays or examination.

PHIL2217
Personal Identity
Staff Contact: Neil Harpley
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: 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
Notes: Excluded 52.2026. Subject not offered in 1993.

PHIL2219
Topics in Philosophy of Language
Staff Contact: John O'Leary-Hawthorne
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy

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
Staff Contact: John O'Leary-Hawthorne
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy

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
Staff Contact: John O'Leary-Hawthorne
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
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
Notes: 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.

Assessment: To be decided in consultation with students.

PHIL2309
The Heritage of Hegel: Philosophy, Experience, Death
Staff Contact: Lisabeth During
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: May not be offered in 1993 - Consult School. Excluded 52.221, 52.3025 in 1988.

Much of what is revolutionary in modern thought can be read in terms of its responses to one nineteenth century philosopher. Looks at the Hegelian project in the light of its meaning for those who renounce it (Kierkegaard, Nietzsche, Deleuze) and those who build on it (Feuerbach, Kojeve, Gadamer, Habermas, Bataille, Lacan, Derrida). Of special interest in 1993 are the themes of intersubjectivity (Hegel's dialectic of recognition and the problem of inexpressibility) and time (Does the dialectic of history come to an end?)

Assessment: To be decided in consultation with class.

PHIL2316
Philosophy of Religion
Staff Contact: Lisabeth During, John O'Leary-Hawthorne
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
Staff Contact: Lisabeth During
U1 C6 S2 HPW3
Prerequisite: Upper Level status is Philosophy
Notes: May not be offered in 1993 - Consult School. Excluded 60.014.

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.

Assessment: To be decided in consultation with class.

PHIL2409
Speaking through the Body: Feminism, Psychoanalysis, Literature
Staff Contact: Lisabeth During
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: May not be offered in 1993 - 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.

Assessment: One long essay (3500 words); tutorial presentation and written exercise (1500 words).

PHIL2416
Power, Knowledge and Freedom
Staff Contact: San MacColl
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Subject not offered in 1993.

PHIL2417
Relativism: Cognitive and Moral
Staff Contact: Michaelis Michael
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy, or contact 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
Staff Contact: Linda Barclay
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.

PHIL2506
Classical Political Philosophy
Staff Contact: Stephen Cohen
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Excluded 52.203, 52.2050, 52.240.

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.

Assessment: Essay, class participation and an examination.

PHIL2507
The Ethics of Plato and Aristotle
Staff Contact: Stephen Cohen
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Subject not offered in 1993. Excluded 52.523, 52.2220, 52.5231, 52.242.

PHIL2508
Theories in Moral Philosophy
Staff Contact: Stephen Cohen
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Excluded 52.523, 52.2230, 52.5232, 52.243.

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.

Assessment: Essay, class participation, and an examination.

PHIL2509
Philosophy of Law
Staff Contact: Stephen Cohen
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: 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.
Assessment: Essays, class participation, and possibly an examination.

PHIL2516
Philosophical Foundations of Marx's Thought
U1 C6 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: May not be offered in 1993 - Consult School. Excluded 52.373, 52.219.

A discussion of the basics of Marx's historical materialism and dialectical materialism.

Assessment: Exercises and essays.

PHIL2517
Philosophy and Gender
Staff Contact: San MacColl
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: Excluded 52.216.

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.

Assessment: Two essays of 2,000 words each.

PHIL2518
Greek Philosophy: Issues in Ethics and Epistemology
Staff Contact: Genevieve Lloyd, San MacColl
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: 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.
Notes: May not be offered in 1993 - 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
Staff Contact: Lisabeth During
U1 C6 S1 HPW3
Prerequisite: Upper Level status in Philosophy
Notes: May not be offered in 1993 - 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
Notes: May not be offered in 1993 - Consult School.

Explores philosophical aspects of the concept of representation in relation to literature, discussing theories of the differences between philosophy and literature, and of the nature and role of the metaphor. A study of some central texts of Greek philosophy in conjunction with some contemporary philosophical discussions of literature which make use of them. Topics include: Plato's criticism of the poets in the Republic; Iris Murdoch on 'the true' and 'the good' and the ethical significance of literature; Ricoeur on mimesis and narrative; Richard Rorty on philosophy as a 'kind of writing'.

PHIL2608
Questions of Narrative
Staff Contact: Genevieve Lloyd, Lisabeth During
U1 C6 S2 HPW3
Prerequisite: Upper Level status in Philosophy

Explores philosophical aspects of concepts drawn from theory of narrative, such as 'point of view', 'person', 'voice', in relation to literature and, where appropriate, film, paying particular attention to issues of time and self-consciousness, truth, illusion and truth-telling.

Examines a selection of works and extracts from Proust, Virginia Woolf, and Henry James, together with a selection of films. Philosophical and theoretical works discussed include Paul Ricoeur, *Time and Narrative* (Vol.2); Wayne Booth, *The Rhetoric of Fiction*; Bernard Harrison, *Inconvenient Fictions*, as well as a selection of extracts from works by Stanley Cavell, Roland Barthes and Christian Metz.

PHIL2706
Seminar A
U1 C6 S1 HPW3
Notes: May not be offered in 1993 - 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
Notes: May not be offered in 1993 - 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
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: Prof G. Lloyd, Mr N. Harpley
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

PHIL4500
Combined Philosophy Honours (Research) F/T

PHIL4550
Combined Philosophy Honours (Research) P/T
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 co-requisites, the higher levels of such subjects are acceptable and preferable. The total unit value of the combinaton 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 67-100, or 3 unit Mathematics 1-50, or 4 unit Mathematics 1-100 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.

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 polarization.

Elective Syllabus
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.

QUANTUM AND LASER PHYSICS
Waves in elastic media; sound waves; early quantum physics; the laser, operation and applications, interference, diffraction and polarization.

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; tests of Planetary atmospheres.

PHYS1022
Introductory Physics 1 (For Health and Life Scientists)
Staff Contact: First Year Director
U2 F HPW6
Corequisites: MATH1011 and MATH1021 or MATH1032.

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
Notes: 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: School Office
U1 HPW6
Corequisites: MATH1011 and MATH1021 or MATH1032 and PHYS1002 or PHYS1022
Notes: Excluded programs 0600. Not offered in 1993.

PHYS1999
Physics I (Optometry)
Staff Contact: First Year Director
U1 S1 HPW6
Notes: Restricted to course **3950**.

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 Unit PHYS2989 of course **3640** may be acceptable in place of PHYS2021. Enquiry should be made to the School of Physics.

PHYS2001
Mechanics, and Computational Physics
Staff Contact: Executive Assistant
U1 S1 HPW4
Prerequisites: PHYS1002, MATH1032.
Corequisite: MATH2100
Notes: 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.
Corequisites: MATH2100
Notes: Excluded PHYS2999.

Electric field strength and potential, Gauss' law, Poisson's and Laplace's equations, capacitance, dielectrics and polarization, 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
Notes: 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
Notes: Excluded PHYS2920.

Alternating current circuits, complex impedance, resonance, mutual inductance, introductory electronics, diodes, power supplies, transistor characteristics, amplifiers. Experimental investigations in a choice of areas including radioactivity, spectroscopy, properties of materials, Hall effect, nuclear magnetic resonance, photography, vacuum systems.

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: Dr K. Vost
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.
Corequisites: MATH2100, MATH2120, MATH2510
Notes: Not offered in 1993.

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.

PHYS2810
Introductory Atmospheric Science
Staff Contact: Dr K. Vost
U.5 S1 HPW2
Prerequisites: PHYS1002 or PHYS1022, MATH1032
Corequisite: MATH2100
Notes: Excluded PHYS3180.

Introduction to the properties and problems of the atmosphere: composition and structure, thermodynamics and stability, solar and terrestial radiation, ozone layer, equations of motion and their consequences, physical basis of climate and climate change.

PHYS2820
Introductory Meteorology
Staff Contact: Executive Assistant
U.5 S2 HPW3
Corequisite: PHYS2810

Atmospheric circulation; synoptic meteorology, including surface and upper level information, meteorological instruments and satellites; applied thermodynamics and cloud macrophysics, thunderstorms and cyclones.

PHYS2920
Electronics (Applied Science)
Staff Contact: Executive Assistant
U.5 S1 HPW3
Prerequisite: PHYS1022 or PHYS1002
Notes: 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.

Physics Level III Subjects

Notes: See notes for Physics Level II subjects.

PHYS3010
Quantum Mechanics
Staff Contact: Executive Assistant
U.5 S1 HPW2
Prerequisites: PHYS2021, 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 condenzation, 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.

PHYS3180
Atmospheric Physics
Staff Contact: Executive Assistant
U.5 S2 HPW2
Prerequisites: PHYS1002, PHYS2011 or CHEM2011

Atmospheric thermodynamics, radiation, dynamics; energy balance, greenhouse effect, climate models and climate change, upper atmosphere physics.

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
Corerequisite: PHYS3030

Relativistic transformations of electric and magnetic quantities, covariant formulation of electrodynamics, four-vectors, 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 stand-alone systems.

PHYS3610
Computational Physics
Staff Contact: Executive Assistant
U.5 S2 HPW3
Prerequisites: PHYS2001, PHYS2021, MATH2120

Use of computers in solving and visualizing 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
Notes: Excluded ELEC4042.

Measurement and sampling; noise power spectra; signal-to-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
Prerequisites: PHYS2031, PHYS2630

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
Notes: 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
Notes: 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

Aims to make students conversant with the techniques employed in laser technology and become familiar with various components used in laser applications. Includes the study of the construction, operation and characterization of several types of lasers. Other experiments involve applications of lasers such as holography, acousto-optics, fibre optics, optical spectroscopy, and a study of the safety aspects of lasers.

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

Notes: 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.

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
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, polarization. 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 (Surveying)
Staff Contact: First Year Director
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 polarization.

PHYS1939
Physics 1 (Building and Design)
Staff Contact: First Year Director
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, steady state currents, magnetostatics in vacuum, ferromagnetism, electromagnetic induction, transient currents. Vectors, kinematics, particle dynamics, work and energy, the conservation of energy, conservation of linear momentum, collisions, 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, geometrical optics, interference, diffraction, gratings and spectra, polarization.

PHYS1989
Physics 1 (Civil Engineering)
Staff Contact: First Year Director
For students in the School of Civil Engineering.

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.

PHYS1999
Physics 1 (Optometry)
Staff Contact: First Year Director
Vectors, linear mechanics, Newton's Laws of Motion. Rotational mechanics, electric forces, fields and potential. Magnetic forces and fields. Ampere's Law, Faraday's Law. Electric circuit theory, AC, DC and transient circuits. Fluid mechanics; Bernoulli's equation; viscosity; Stoke's Law. Nuclear Physics; radioactivity, half-life, nuclear forces, binding energies, fission and fusion.

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 (Surveying)
Staff Contact: Executive Assistant
Resolution, accuracy and sensitivity of instruments. Errors of observation; transducers; thermometry; electrical noise; mechanical design of apparatus; optical instruments optical fibres; photometry; analogue-to-digital conversion and digital instruments. Measurements of very large and very small quantities.

PHYS2979
Electromagnetic Theory
Staff Contact: Executive Assistant
Electro statics in vacuum and in dielectric materials. Electric current. Magnetostatics in vacuum and magnetic media, magnetic materials and magnetic circuits. Time-varying fields. Capacitance and inductance calculations. General field concepts. Superconductivity. Maxwell's equation.

PHYS2989
Solid State Physics (Electrical Engineering)
Staff Contact: Executive Assistant
The concepts of waves and particles, introductory quantum mechanics, atomic structure, 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. Morley
U2 F HPW6
Prerequisites: BIOS1021, CHEM1002 or CHEM1101 and CHEM1201, or a credit level pass in CHEM1302 or CHEM1401 and CHEM1501, MATH1032 or MATH 1042 or MATH1011 and MATH1021
Corequisites: BIOC2312
Notes: 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 specialized 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 program.

PHPH2122
Principles of Physiology (Optometry)
Staff Contact: Dr J. Morley
U2 F HPW6
Notes: 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
Notes: From 1995, student numbers in Physiology 2 will be limited and entry to the course will be 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: A/Prof P.H. Barry
U1 S1 HPW6
Prerequisites: Normally as for PHPH3114 but may be studied only with permission of the Head of School.
Notes: From 1995, student numbers in this subject will be limited and entry to the course will be 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 mechanisms in renal physiology. Stress on modern research techniques 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.
Notes: From 1995, student numbers in this subject will be limited and entry to the course will be 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.J. Perry
U2 S2 HPW12
Prerequisites: Normally as for PHPH3114 but may be studied only with permission of the Head of School.
Notes: From 1995, student numbers in this subject will be limited and entry to the course will be 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 (including human) preparations.

PHPH3152
Pharmacology
Staff Contact: A/Prof G. Graham
U2 F HPW6
Prerequisite: PHPH2112, BIOC2312

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.

Psychiatry

Psychiatry Level II

PSCY2201
Human Behaviour
Staff Contact: Dr C. Mason
U1 F HPW3
Notes: Restricted to Combined degree course **3820.**
As for PSCY2101. See Undergraduate Study: 3820 Combined Science and Medicine Course, earlier in this handbook.

Psychology

Psychology Level I Subject

PSYC1002
Psychology 1
Staff Contact: Dr A. Adams
U2 F HPW5
Notes: 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

Notes: From 1994 the prerequisite for entry into PSYC2001 Research Methods 2, PSYC2021 Attention, Memory and Thought, and PSYC2031 Personality and Social Psychology will change to an Advanced Pass (a mark of 55 or greater) for PSYC1002 Psychology 1.

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

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. Andrews
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: Dr H. Stanislaw
U1 S1 HPW4
Prerequisite: PSYC1002

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 S2 HPW4
Prerequisite: PSYC1002

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: A/Prof B. Hesketh
U2 F HPW4
Notes: Restricted to course **3431**. Excluded PSYC3091.

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. Principles and techniques of interviewing and counselling in a variety of contexts.

PSYC2051
Human Development
Staff Contact: Dr D. Burnham
U1 S1 HPW4
Prerequisite: PSYC1002
Notes: 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 enrol in more than three Level III Psychology units unless PSYC2001 Research Methods 2 has been passed.

Students may not enrol in 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 localize themselves within it; the study of perceptual development in infants and young children.

PSYC3031
Behavioural Neuroscience
Staff Contact: A/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
Staff Contact: A/Prof R. F. Westbrook
U1 S2 HPW4
Prerequisite: PSYC3031

The conditions which promote learning, the contents of learning and the mechanisms by which learning is deployed in action. Emphasizes the distinction between specialized 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 localization of function in humans. Clinical conditions are considered to the extent that they illuminate mechanisms of brain control or they relate to theorizing about brain function.

PSYC3061
Perceptual Theory
Staff Contact:
U1 S2 HPW4
Prerequisite: PSYC3021
Notes: Not offered in 1993.

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

PSYC3071
Abnormal Psychology
Staff Contact: Dr P. Birrell
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 S1 HPW4
Prerequisites: PSYC2001 and PSYC2011
Notes: Excluded PSYC2042.

Theory and practice of counselling in a variety of contexts. Emphasises major theoretical orientations, counselling skills development and the evaluation of counselling effectiveness through behavioural and other assessments.

PSYC3101
Individual Differences
Staff Contact: Dr K. Lanning
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 D. Burnham
U1 S2 HPW4
Prerequisites: PSYC2001 and *either* PSYC2021 or PSYC2031
Notes: Excluded PSYC2051, PSYC2116.

Issues, methods, and theories in developmental psychology; the development of infants, toddlers, school children, and adolescents with reference to significant cognitive and social events in each of these periods.

PSYC3121
Social Psychology
Staff Contact: Prof J. Forgas
U1 S1 or S2 HPW4
Prerequisites: PSYC2001 and PSYC2031
Notes: 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 S2 HPW4
Prerequisites: PSYC2001 and PSYC2031
Notes: Excluded PSYC3121. Not offered in 1993.

The social psychology of intergroup relations or contact between culturally diverse individuals and groups. Includes intercultural communication, inter-group 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 B. Hesketh
U1 S2 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: Dr S. Andrews
U1 S2 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
Staff Contact: Dr M. Taft
U1 S1 HPW4
Prerequisites: PSYC2001 and PSYC2021

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

PSYC3171
Recent Developments in Experimental Psychology
U1 HPW4
Prerequisites: PSYC2001 and PSYC2021
Notes: Not offered in 1993.

An occasional elective dealing with recent developments in experimental psychology.

PSYC3181
Issues in Applied Psychology
U1 HPW4
Prerequisites: PSYC2001 and PSYC2011
Notes: Not offered in 1993.

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: School Office
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 M. Taft
U10 F

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 M. Taft
U10 F

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 M. Taft
U10 F
Prerequisites: Completion of program 1200 or 1206 including 8 Level III units

Psychology 4 in the Arts, and the Science and Mathematics degree courses. 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 'Issues in Psychology as a Science and a Profession', which forms part of Year 4 program.

PSYC4033
Psychology 4 Honours
Staff Contact: Dr M. Taft
U10 F
Prerequisites: Completion of program 1200 including 8 Level III units

Psychology 4 in the Arts, and the Science and Mathematics degree courses. 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 'Issues in Psychology as a Science and a Profession', which forms part of Year 4 program.

PSYC4043
Computer Science and Psychology 4 (Honours)
Staff Contact: Dr M. Taft
U10 F
Prerequisites: Completion of program 1206 including 8 Level III units

Combined Honours in Computer Science and Psychology.

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

Servicing Subjects

These are subjects taught within courses offered by other faculties.

PSYC2106
Psychology (Industrial Relations)
HPW3
Notes: Not offered in 1993.

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 D. Burnham
S1 HPW3
Notes: Restricted to Course 3950. Excluded PYSC2051, 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.

PSCY3506
Psychology for Optometrical Practice
Staff Contact: Dr P. Birrell
S2 HPW3
Prerequisite: PSYC2116
Notes: Restricted to Course 3950. Excluded PSYC4106.

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: standardization, 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.

PSYC4106
Psychology (Optometry)
Staff Contact: Dr K. Llewellyn
U1 F HPW2
Notes: Restricted to course 3950.

Visual perception: The nature and characteristics of visual perception. Topics include: psychophysics, the organization of visual perception, the influence of context, and the effects of learning and motivation on perception. Emphasises an examination of relevant experimental data. Abnormal psychology: the concepts of normality and abnormality, and an examination of the principal psychodynamic processes. Causes and symptoms of various mental disorders are introduced with some emphasis on the importance of these symptoms in optometrical practice.

Science and Technology Studies

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: Anthony Corones
U1 C6 S1 HPW3
Notes: Excluded 62.111, 62.219U, 62.102I.

First of a two-part study of 'Humanity and the Cosmos', introducing the history and philosophy of science and technology. Provides a background to HPST1002 but is a self-contained subject presupposing no prior knowledge of science and mathematics. Examines the evidence for scientific knowledge in prehistoric cultures (with special reference to the Western European megalithic cultures), the astronomy and cosmology of the ancient Near Eastern civilisations, and the developments in earlier Greek geometry, astronomy, cosmology, and method which provided the foundations for medieval and modern Western science. *Topics*: naked-eye astronomy, archaeoastronomy; ley lines and 'fringe' archaeology; dating and the development of archaeological theory; Pacific Islands' navigation; Australian Aboriginal cosmology and astronomy; interpretation of mythology; astronomy and cosmology of Mesopotamia and Egypt; an assessment of astrology; origins and development of mathematics; patterns of reasoning and the foundations of scientific method; mystery of the Dogons and the Von Daniken phenomenon.

Assessment: 2 short essays, 2 tests, tutorials.

HPST1107
From the Closed World to the Infinite Universe
Staff Contact: Guy Freeland
U1 C6 S2 HPW3
Notes: Excluded 62.211, 62.219U, 62.104I.

Part two of 'Humanity and the Cosmos'. Follows on from HPST1001 but is a self-contained subject without prerequisites. Examines the momentous transition from the ancient/medieval model of a closed world to modern cosmology. *Topics*: the ancient and medieval cosmos; the labyrinth, the *mappa mundi* and Biblical interpretation; the Ptolemaic system; perspective and the printing press; *Terra Australis* and the voyages of discovery; the Copernican Revolution; scientific methodology; Kepler, Galileo and Descartes; Newton and the clockwork universe; the Scientific Revolution; microscope and microcosm; galaxies and the plurality of worlds; relativity theory; the big bang and black holes; God and the new cosmology.

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 C6 S2 HPW3
Notes: Excluded 62.115I.

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, involving issues such as the nature of observation and evidence, theories and laws, explanation and prediction, etc. These questions are placed in an historical context: from the Pre-Socratics to Hume, Kant and the twentieth-century philosophers Wittgenstein, Popper and the 'Logical Positivists'.

Assessment: Essay, tutorials, class tests.

SCTS1106
Science, Technology and Social Change
Staff Contact: David Miller
U1 C6 S1 HPW3
Notes: Excluded 62.110, 62.101I.

Evaluation of relations between science, technology and society in the 20th century. Theories of technological design and change. An examination of controversies in areas including: pollution and environmental protection; nuclear energy and alternative energy sources; information/communications technologies; genetic engineering. The control of technology. Technology assessment. Public involvement in decisions about scientific and technological developments.

Assessment: Essay, tutorials, class tests.

SCTS1107
Understanding Technological Controversy
Staff Contact: David Miller
U1 C6 S2 HPW3
Prerequisite: SCTS1001 or 62.101
Notes: Subject not offered in 1993. Excluded 62.103I.

Science and Technology Studies Level II/III

HPST2106
The Scientific Theory
Staff Contact: Guy Freeland
U1 C6 S1 HPW3
Prerequisite: Completion of Arts subjects carrying at least 24 credit points
Notes: Excluded 62.032, 62.505, 62.232, 62.219U, 62.202U.

An examination of the scientific theory - its origins, nature and nurture. Analyses, with reference to selected historical examples, of a number of philosophically interesting problems. *Topics*: theory construction; perception and

observation; the structure of theories; reduction and scientific revolutions; explanation; laws and theoretical terms; theory and practice; theory establishment and rejection.

Assessment: One essay, two tests, tutorials.

HPST2107
The Darwinian Revolution
Staff Contact: David Oldroyd
U1 C6 S1 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.104, 62.243, 62.208U.

Scientific, philosophical, and social antecedents and consequences of Darwin's theory of evolution. The prevailing ideas in biology before Darwin in the context of the climate of ideas in the 18th and early 19th centuries. *Topics*: classification; Lamarck and Lamarckism; the design argument; Malthus; age of the Earth; Darwin's life and work; *The Origin of Species*; Mendel; the impact of evolutionary ideas in such fields of thought as religion, political theory, philosophy, psychology, anthropology, and sociology; Social Darwinism, sociobiology, and racism.

Assessment: One essay, two tests, tutorials.

HPST2108
History of Medicine
Staff Contact: Randall Albury
U1 C6 S1 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.109, 62.273, 62.309, 26.568, 25.2506, 62.210U.

Development of theory and practice in Western medicine from Hippocratic times to the 20th century. Material covered in four sections: (1) 'bedside' medicine from antiquity to the French Revolution; (2) 'hospital' medicine in the early 19th century; (3) 'laboratory' medicine in the late 19th century; and (4) 'technological' medicine in the 20th century, emphasising the social role of modern medicine.

Assessment: Essay, tutorials, tests.

HPST2109
Computers, Brains and Minds: Foundations of Cognitive Science
Staff Contact: Peter Slezak
U1 C6 S2 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.554, 52.564, 62.217U.

Introduction to contemporary discussions of the mind, thought, intelligence and consciousness. Focuses on the issues which arise in connection with the so-called 'cognitive sciences'—the disciplines which include such fields as neuro-science, psychology, linguistics, the philosophy of mind and 'artificial intelligence'. Can computers think? Is the brain a machine?

Assessment: Essay, class tests, tutorials.

HPST2116
History of the Philosophy and Methodology of Science
Staff Contact: Guy Freeland
U1 C6 S2 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.543, 62.551, 62.561, 62.215U, 62.216U, 62.224U. 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, including 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 C6 S2 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 26.564, 26.251, 62.022, 62.253, 62.201U.

History of technology in its social and cultural context, with special emphasis on the Industrial Revolution which is examined in some detail. Concentrates on technology and its effects on human beings. Considers the professionalisation of engineering, the spread of industrialisation in Britain, in Europe and the USA, and examines 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 C6 S1 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.106, 62.273, 62.302, 62.209U.

Examines the development of ideas concerning the nature of mind and its relation to the body. *Topics*: Plato's doctrine of the immortality of the soul; Descartes' division of mind and body; the classical dispute between rationalism and empiricism over innate ideas; the behaviourism of Watson and Skinner; the Freudian Revolution; the rise of experimental psychology from Wundt and Fechner to Chomsky 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 C6 S1 HPW3
Prerequisite: As for HPST2001

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 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 C6 S1 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.103, 62.223, 62.207U.

The history of time, from Antiquity through the Twentieth Century. *Topics*: time measurement; calendars; concepts of time; philosophy and theology of time; time, architecture and iconography; conceptions of history and progress; the cognition of time; the age of the Earth and the antiquity of humanity; Newton and Einstein; time travel.

Assessment: Essay, tutorials, 2 class tests.

HPST3107
Relations Between Science and the Arts
Staff Contact: David Oldroyd
U1 C6 S1 HPW3
Prerequisite: As for HPST2001
Notes: Subject not offered in 1993. Excluded 62.241, 62.211U.

HPST3108
Deity and Mother Earth
Staff Contact: Guy Freeland
U1 C6 S2 HPW3
Prerequisite: As for HPST2001
Notes: Excluded 62.285, 62.214U.

Conceptions of deity in relation to changing notions of sexuality and generation, and the place of human beings in relation to their environment. *Topics*: the Earth Mother; *feng-shui*; symbolism of city, temple and dwelling; mythology and generation in ancient and primal cultures including the Australian Aborigines; Medieval and Renaissance world views; the tyranny of the machine; exploitation, conservation and stewardship; the *cultus* of the Virgin Mary; place making; theories of biological generation; Deity, Nature, and environmentalism; the Gaia hypothesis; typology of religions.

Assessment: 1 essay, 2 class tests, tutorials.

HPST3117
Philosophical Problems in Evolutionary Biology
Staff Contact: David Oldroyd
U1 C6 S2 HPW3
Prerequisite: Completion of Arts or other approved subjects, carrying at least 72 credit points; or permission of Head of School
Prerequisite or Corequisite: HPST2001 or HPST2002
Notes: Excluded 62.3001, 62.301U.

Current controversies in evolutionary theory. *Topics*: transcendental anatomy; essentialism and population thinking; falsifiability of the principle of natural selection; group selection controversy; sociobiology; problems in classification and cladism; neutral theory of evolution and the role of chance; punctuated equilibrium theory; origin of life; 'creation science'.

HPST3118
Reading Option in History and Philosophy of Science
Staff Contact: David Oldroyd
U1 C6 S1 or S2 HPW3
Prerequisite: As for HPST2001
Notes: Permission for enrolment in the reading option must be obtained from 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. Not more than one such subject may be counted towards a degree. 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: David Oldroyd
U1 C6 S1 HPW3
Prerequisite: Completion of Arts subjects carrying at least 24 credit points
Notes: Subject not offered in 1993. Excluded 62.052, 62.252, 62.203U.

SCTS2107
The Sociology of Science and Technology
Staff Contact: David Miller
U1 C6 S2 HPW3
Prerequisite: As for SCTS2001
Notes: Subject not offered in 1993. Excluded 62.062, 62.262, 62.204U.

SCTS2108
Information Technology, Politics and Policies
Staff Contact: David Oldroyd
U1 C6 S1 HPW3
Prerequisite: As for SCTS2001
Notes: Subject not offered in 1993. Excluded 62.221U.

SCTS2109
The New Biotechnologies and their Social Context
Staff Contact: David Oldroyd
U1 C6 S2 HPW3
Prerequisite: As for SCTS2001
Notes: Subject not offered in 1993. Excluded 62.245, 62.212U.

SCTS3020
The Social Construction of the Environment: Botany Bay and the Sydney Region
Staff Contact: Gavan McDonell
U1 C6 S2 HPW2
Prerequisite: Any three of SCTS3004, SCTS3011, GEOG2081, GEOG2102, HIST2039, SOCI3607, SPAN2418

Interprets the concept of the social construction of the environment in the specific context of Botany Bay and its region. Environmental issues are identified and examined in the light of historical, sociological, economic and political developments at the regional, national and global levels. Prospects and processes for intervention. In addition to other work, each student completes a substantial research report.

SCTS3106
Technology, Sustainable Development and the Third World
Staff Contact: John Merson
U1 C6 S1 HPW3
Prerequisite: As for SCTS2001
Notes: Excluded 62.082, 62.282, 62.206U.
This subject is about sustainable development along with the technological and social changes that are involved in achieving it, both at a national and global level. It 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 C6 S1 HPW2
Prerequisite: As for SCTS2001

Begins with a discussion of the constraints and opportunities facing women scientists as a result of the interaction between their work, family and intellectual roles. Continues with a historical survey of women scientists, including some eminent Australians, relating their careers to the findings in the earlier part of the unit. Concludes by examining some of the philosophical issues and implications for social policy which are raised by women's participation in science.

Assessment: Seminar presentations, essays, class participation.

SCTS3108
Technological Development in 20th Century Australia
Staff Contact: David Oldroyd
U1 C6 S2 HPW3
Prerequisite: As for SCTS2001
Notes: Subject not offered in 1993. Excluded 62.246, 62.213U.

SCTS3109
Society, Technological Hazards and Environmental Management
Staff Contact: Gavan McDonell
U1 C6 S1 HPW3
Prerequisite: As for SCTS2001
Notes: Excluded 62.220U.

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: Gavan McDonell
U1 C6 S2 HPW3
Prerequisite: As for SCTS2001
Notes: 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: David Oldroyd
U1 C6 S2 HPW3
Prerequisite: Arts or other approved subjects carrying at least 72 credit points, including at least 12 credit points in SCTS subjects
Notes: Subject not offered in 1993. Excluded 62.3003, 62.303U.

SCTS3119
Reading Option in Science and Technology Studies
Staff Contact: David Oldroyd
U1 C6 S1 or S2 HPW3
Prerequisite: As for SCTS2001
Notes: Permission for enrolment in the reading option must be obtained from 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. Not more than one such subject may be counted towards a degree. 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: Prof W.R. Albury
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
Notes: 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
Notes: 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
Notes: 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 utilization. Interaction of natural and artificial selection. Limits of selective progress. Applications of molecular genetics.

Faculty of Biological and Behavioural Sciences

Dean: Professor W. 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 Food and Drug analysis (**5510**) and Physical Oceanography (**5530**). The Schools of the Faculty also offer facilities for students to proceed to the award of masters degrees in Chemistry (**8770** and **8780**), Mathematics (**8740**), Optometry (**8760**), Physics (**8730**) 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 1993 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)
BIOT4073 Biotechnology Honours (Full-time)
BIOT4083 Biotechnology 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
BIOT6013 Biotechnology
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 general microbiology, microbial genetics, environmental microbiology, immunology, mycology, plant/microbe interactions, 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 infection, the immunology of the intestinal tract and arbovirus research.

School of Psychology

5330
Psychology Graduate Diploma Course
Full-time

Graduate Diploma
GradDip

Staff Contact: Dr K. Llewellyn

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 inter-relationship 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
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 B. Gillam

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(Applied)

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 Ergonomics, Organizational and Vocational Psychology, 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 professional practice component.

Subjects from other graduate degrees, including the Master of Psychology (Clinical) degree, 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
either
PSYC7103 Applied Experimental Psychology*
or
PSYC7104 Applied Cognitive Psychology*
PSYC7105 Professional Practice (Applied):
PSYC7106 Graduate Colloquium (Applied)
PSYC7109 Principles of Ergonomics

Year 2
Core Program
PSYC7105 Professional Practice (Applied)
PSYC7107 Seminars in Applied Psychology
PSYC7108 Research Thesis (Applied)

Elective program
PSYC7103 Applied Experimental Psychology*
PSYC7104 Applied Cognitive Psychology*
PSYC7110 Advanced Ergonomics
PSYC7111 Cross-cultural Perspectives in Applied Psychology*
PSYC7112 Vocational Psychology*

PSYC7113 Special Topic
PSYC7114 Graduate and Applied Seminars
PSYC7208 Health Psychology
PSYC7209 Developmental Disabilities and Disorders
PSYC7210 Human Neuropsychology

**PSYC7104 and PSYC7111 will not be offered in 1993 but will be offered in 1994.*
**PSYC7103 and PSYC7112 will be offered in 1993 but will not be offered in 1994.*

Note: Part-time students normally are expected to take half the full-time program in any one session.

8251
Master of Psychology (Clinical) Degree Course
Full-time or Part-time

Master of Psychology (Clinical)
MPsychol(Clinical)

This course is designed to provide professional training 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
PSYC7200 Experimental Clinical Psychology 1
PSYC7202 Drug Therapy, Drug Abuse and Sleep Disorders
PSYC7203 Theory and Research in Psychopathology
PSYC7204 Child Clinical Psychology
PSYC7205 Professional Practice (Clinical)
PSYC7208 Health Psychology
PSYC7209 Developmental Disabilities and Disorders
PSYC7210 Human Neuropsychology

Year 2
PSYC7003 Graduate Colloquium
PSYC7201 Experimental Clinical Psychology 2
PSYC7205 Professional Practice (Clinical)
PSYC7206 Research Thesis (Clinical)*
PSYC7207 Ethical Issues and Special Topics
PSYC7211 Behavioural Medicine

**Contributes approximately 25 per cent to the overall grading for the degree.*

Note: 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 Mathematics: Graduate Diploma (in Physical Oceanography)
School of Optometry: Master of Optometry
School of Chemistry: Master of Chemistry, Graduate Diploma (in Food and Drug Analysis)
School of Mathematics: Master of Mathematics, Master of Statistics
School of Physics: Graduate Diploma in Physics, Graduate Diploma in Physics Research Techniques

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.

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: A/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.

School of Physics

5515
Physics Graduate Diploma Course
Full-time or Part-time

Diploma in Physics
DipPhys

Staff Contact: A/Prof D. Miller

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 Grad. Dip. Phys. 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 Grad. Dip. Phys. 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. 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

Diploma in Physics
DipPhysResTech

Staff Contact: A/Prof D. Miller

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 sessoins, plus a research project and a literature review. 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.

Masters Degrees

School of Chemistry

Head of School: Professor I. Dance

Director of Graduate Studies: A/Prof G. Crank (contactable via Chemistry Academic Office)

The School of Chemistry offers two Master of Chemistry degree courses, with different goals. The degree course in *Modern Developments in Chemical Synthesis and Analysis* is broadly based and is intended for students who wish to obtain an overall perspective of advances in chemistry. The degree course in *Food and Drug Chemistry* is directed specifically to students who wish to pursue advanced study of the chemistry of the components of food and drugs. These degree courses are intended for Honours graduates in chemistry. Applicants for the Master of Chemistry degrees who are not considered to be qualified for entry may undertake a qualifying program which is specified after the application has been fully considered. The degree course in *Modern Developments in Chemical Synthesis* and Analysis will not be offered if insufficient students enrol.

8770
Master of Chemistry (Modern Developments in Chemical Synthesis and Analysis)

This course is designed to give students a broad, modern perspective of the advances in chemistry and allows pursuit of particular interests, through involvement in a variety of sourse and hands-on experience with state-of-the-art facilities available in the School of Chemistry for the synthesis of materials and the characterization of their composition, structure and reactivity. The course is available on a full-time basis only. Students are required to complete

a series of lecture courses with associated laboratory work and field trips, to undertake a literature survey, and to participate in a seminar program. In addition, students join one of the research groups in the School for more specific training and experience.

Formal Coursework
Students are required to complete all of the following courses of lectures and associated laboratory work.

1. Modern developments in chemical synthesis

2. Chemistry of new materials

3. Catalysis and industrial synthesis

4. Separation and purification techniques, including various forms of chromatography, radiochemical techniques and gas purification.

5. Methods of determination of composition and structure, including spectroscopic techniques, X-ray diffraction, and atomic absorption spectrometry

6. Environmental chemistry, including aquatic, terrestrial and atmospheric pollution, and quality control

7. Laboratory control, including data processing, safety in laboratories, computers in chemistry, computer networking of instruments, and statistical methods

The lecture time for the formal coursework is about 140 hours with a further 330 hours for associated laboratory instruction.

Laboratory experience
Students are assigned to one of the investigative groups in the School of Chemistry, to observe and participate in the operation and application of various synthetic, instrumental or computational techniques. A choice is offered to allow for the pursuit of particular interests. Approximately 200 hours are allocated to this activity and students are expected to submit a report for assessment of these activities.

Seminar program and literature survey
A program is prescribed for each student. This involves the preparation of a topic and the presentation of a seminar, as well as participation in the overall seminar program.

8780
Master of Chemistry (Food and Drug Chemistry)

This course involes 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 I. Sloan
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 Non-Parametric 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, non-linear 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: Vacant

The School offers a formal graduate course leading to the award of the degree of Master of Optometry (MOptom). This course comprises the study of three elective graduate subjects and of advanced Clinical Optometry, together with the preparation of a thesis on an assigned project. It 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 orthoptics.

Conditions for admission and for the award of the degree of Master of Optometry are set out elsewhere in this handbook.

8760
Master of Optometry Degree Course
Full-time or Part-time

Master of Optometry
MOptom

Not offered in 1993.

OPTM8001 Advanced Clinical Optometry
Three elective graduate subjects chosen from the list below
OPTM8008 Project

Elective Graduate Subjects

OPTM8002 Advanced Physiological Optics
OPTM8003 Pleorthoptics and Binocular Vision
OPTM8004 Advanced Contact Lens Studies
OPTM8005 Advanced Contact Lens Practice
OPTM8006 Occupational Optometry
OPTM8007 Clinical Photography
OPTM8009 Ocular Therapy

The seven elective graduate subjects offered are quite independent, and any three of them are suitable for a student seeking advanced professional training of a general nature. If clinical specialization is aimed at, the student would be advised to elect the graduate subjects shown below:

Specialization	**Graduate Subjects**
Contact Lenses	Advanced Contact Lens Studies Advanced Contact Lens Practice Clinical Photography
Occupational Optometry	Occupational Optometry Pleorthoptics and Binocular Vision Advanced Physiological Optics
Orthoptics	Pleorthoptics and Binocular Vision Clinical Photography

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
Notes: 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 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 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 MICR2011
Notes: 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.

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.

BIOT6013
Alternative Higher Degree Qualifying Program
Staff Contact: Ms R. Lee
Training similar in content and standard to BIOT4073 Biotechnology Honours, but designed specifically for students who cannot regularly attend the University.

BIOT7010
Reading List in Biotechnology (Microbiology)
Staff Contact: A/Prof N. Dunn
S1 or S2 T3

BIOT7020
Reading List in Biotechnology (Biochemistry)
Staff Contact: A/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.

BIOT8010
Graduate Seminars
Staff Contact: Department Office
F T2

Chemistry

CHEM7115
Treatment of Analytical Data
Staff Contact: A/Prof A.D. Rae
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
and
CHEM7225
Food and Drugs 2
Staff Contact: A/Prof G. Crank
F L1 T3

These two units contain common subject material but are subdivided to enable them to be taken over one or two years.

Food: Considerations of proximate analysis gross determination of classes of food components plus detailed examinations within the groups for more important compounds. Origin, general introduction to analytical methods, relation to likely adulterations and impurities, groups of constituents; carbohydrates, sugars, by physical and chemical methods, jams and preserves, pectin, agar, alginates, oils and fats; protein foods, meat, gelatin, fish products; dairy products, milk, cream, cheese etc; fermented liquids, beer, wine, spirits, minor constituents. Principles of food processing, dehydration, quick freezing, canning; cereal products; beverages and flavouring essences; nutritional aspects, vitamins in detail; preservatives and food additives; radiation chemistry of food products. Background to food handling. *Drugs:* Simple materials, including identification of unknowns by macro and micro procedures plus the examination of compounded materials. Elements of pharmacology chemotherapy and modes of action, galenicals, identification tests for alkaloids etc. Analytical chemistry of analgesics, sedatives, hypnotics, steroid hormones, antihistamines etc. Antibiotics, penicillin, streptomycin, aureomycin, sulphonamides. Activity of enzyme preparations; antiseptics and disinfectants; soaps and detergents. Chemotherapy etc.

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
F L1 T3

Principles involved in modern instrumental techniques; detailed application and interpretation of results. UV, IR, NMR, and ESR, emission and atomic adsorption spectroscopy, polarography, X-ray methods, fluorescence spectroscopy and gas chromatographic data and problems involving analysis of variance. Topics: description of sets of measurements, graphical representations, calculation of measures of location and spread; probability and random errors, binomial, normal and Poisson distributions; comparisons of sets of measurements, tests of significance; associated data, linear regression analysis; analysis of variance; biological assays, bacteriological counts, sampling problems.

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 proportion.

Civil Engineering

CIVL9403
Theory of Land Use Transport Interaction
Staff Contact: Prof J.A. Black
U3 SS
Notes: Not offered in 1993.

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: Prof J.A. Black
U3 SS
Notes: Not offered in 1993.

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: Prof J.A. Black
U3 F
Notes: Not offered in 1993.

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 moving-observer method; fundamental diagram of traffic; car-following theory; headway and counting distributions; introduction to queuing theory; simulation techniques; signalised and unsignalised intersections.

CIVL9835
Coastal Engineering 1
Staff Contact: Prof D.L. Wilkinson
U3 SS

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: Prof D.L. Wilkinson
U3 SS

Wave forces on structures, shore processes and beach erosion. Estuarine hydraulics, wave and tide models.

CIVL9863
Estuarine Hydraulics
Staff Contact: Prof D.L. Wilkinson
U3 S2

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.

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
Economics A
Staff Contact: Dr C. Freedman
S1 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
Economics B
Staff Contact: Dr M. Monadjemi
S2 HPW3
Prerequisite: ECON5114 or equivalent

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
U3 S1 L1 T2

The application of remotely-sensed data and information in the description, classification and assessment of earth resources and environmental conditions. Different types of remote sensing data and imagery, their attributes, acquisition and uses. Relevance of remote-sensing data and imagery to a range of applications, including assessment of conditions of terrain, soils and surface materials, 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.

GEOG9290
Image Analysis in Remote Sensing
Staff Contact: Mr A. Evans or Dr. A. Skidmore
U3 S1 L2 T1

Techniques for extracting information from satellite imagery including image enhancement techniques, classification and feature recognition, statistical methods, and related procedures. Emphasis is on applications relating to vegetation cover and natural resource management. Practical work will be undertaken using the ERDAS image processing software.

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, infinite-dimensional 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 complex-analytic 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 boundary-layer 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 first-order wave equation, Burgers equation, hyperbolic systems, gas dynamics and the wave equation. Dispersive waves - linear dispersive waves, wave patterns, linear and nonlinear theories of water waves, modulated waves including the weakly nonlinear theory, stability and wave resonances.

MATH5265
Atmosphere-Ocean Dynamics
Staff Contact: School of Mathematics Office
The dynamics of large-scale atmospheric and ocean circulation. Key concepts include geostrophy, potential vorticity, available potential energy and Ekman boundary layers and transport. Quasi-geostrophic models - eddies in the atmosphere and oceans and their role in the transport of heat and momentum and energy exchange. Wind-forced models for ocean gyres and the atmospheric circulation forced by meridional heating (including Hadley Cells). Additional topics may include tropical circulation and El Nino, air-sea exchange, climate change and the Greenhouse effect.

MATH5275
Topics in Modern Applied Mathematics B
Staff Contact: School of Mathematics Office
A selection of topics from dynamics, fluid mechanics and oceanography not offered in other graduate subjects.

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, push-down automata and context-free 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.

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 boundary-value 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 Harrison-Pliska model of option pricing.

MATH5705
Commutative Harmonic Analysis
Staff Contact: School of Mathematics Office
Topics from: Fourier series and integrals for $\mathbf{T}^n$ and $\mathbf{R}^n$. 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, Peter-Weyl 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 semi-simple 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. Non-linear 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, cross-over 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. Multi-stage 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. Rank-order statistics. Wilcoxon and signed-rank tests, one and two-way rank analyses of variance. Rank correlation. Randomization theory and permutation tests. Paired comparisons. Censoring and truncation.

MATH5905
Statistical Inference
Staff Contact: School of Mathematics Office
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 log-linear 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. Log-linear models. Multi-way 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 off-line quality control. Off-line 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.

Mechanical and Manufacturing Engineering

MANF9330
Simulation in Operations Research
Staff Contact: Dr R. Kerr
U2
Notes: Excluded MANF3609, 6.646.

The relationship of simulation to other methods of comparing alternative solutions to industrial problems. Computer simulation languages. Process generation. Variance reduction techniques. Analysis of simulation generated time series. Formulation and construction of models for simulation. Problems of simulation. Design of simulation experiments. Optimization through simulation. Examples of the use of simulation. Heuristics.

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 A/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. Cross-spectra, 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 courses.

OPTM8001
Advanced Clinical Optometry
HPW4

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.

OPTM8002
Advanced Physiological Optics
HPW4

Refractive state of the eye: physiological basis of ocular refraction, advanced study of the schematic eye, modern concepts of ocular image formation, resolution of the ocular image. Scatter, absorption and reflection of light within the eye, illumination of the retina, receptor density and the retina image, image-forming properties of the rods and cones. Ultrasonic, X-ray and optical techniques for defining the parameters of the refractive state. Aetiology of the refractive state. Perceptual organization of the retinal image: neural networks in the retina and their mathematical analogs, visual transfer functions. Mach bands, retinal inhibition, spatial and temporal resolution of the retina, static and dynamic visual acuity. Stabilization of the retinal image. Periodic stimulation processes. Electrophysiology of vision: electrical fields of the eye, monitoring the ocular potential. Electro-oculography, electro-retinogram, electro-myogram, electro-encephalogram. Electro-pathology of vision. Autonomic servo-mechanisms of the eyes: pupillometry. Accommodation. Colour vision: basic mechanics of colour vision; visual pigments, fundus reflectometry, Stiles' increment threshold technique. Derivation of fundamental response curves. Differential and incremental colour thresholds. Temporal and spatial effects. Defective colour vision. Parafoveal colorimetry. Colour scales and colour spaces.

OPTM8003
Pleorthoptics and Binocular Vision
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

Contact lens materials: polymer chemistry, physical and chemical properties of soft and hard lens materials. Contact lens design: the relationship of theoretical contact lens design and corneal topography. Clinical evaluation of current and new soft and hard lens designs. Contact lens care and maintenance: theory and performance of various soft and hard lens care and maintenance systems. Soft and hard lens parametric variations. Contact lens patients: systems and techniques for evaluating contact lens patients; new techniques for patient instruction and management. Evaluation of patient responses to lenses.

OPTM8005
Advanced Contact Lens Practice
HPW4

Examination, evaluation and aftercare of contact lens patients.

OPTM8006
Occupational Optometry
HPW4

Visual job analysis, human aspects of people-machine systems. Information theory, channel capacity. Visual aspects of people/machine relationships. Visual presentation of information, visual detection, identification and estimations, visual coding. Layout of workplaces, illumination, effects of environment on human performance. Relevant aspects of anthropometry. Visual screening techniques. Industrial eye protection and elements of safety engineering. Research techniques in human engineering. Visual factors in driving and road safety. Visual factors in aviation.

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 positioning, backgrounds and foregrounds, lighting, the 'safe-set' method. Copying, slide making, macro-photography, microphotography. 'Invisible light' photography ultra-violet and infra-red, photofluorography, speedlight techniques, fundus photography. Dark-room techniques, portable dark-rooms. Quantitative photographic data analysis.

OPTM8008
Project
HPW4

OPTM8009
Ocular Therapy
HPW4

Pharmacology and clinical pharmacy, anteria segment disease, glaucoma systemic/medical considerations in eye core CPR in emergencies, advanced diagnostic techniques.

Physics

Not all graduate subjects are necessarily offered in any one year. Initial contact should be made with Associate Prof D. Miller

PHYS9183
Methods of Theoretical Physics
Notes: 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
Notes: 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: Prof G. Paxinos
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 M. Nicholas
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 III-R, 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

Participation in the staff-graduate student colloquium.

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 B.Hesketh
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: A/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.

PSYC7103
Applied Experimental Psychology
Staff Contact: Dr H. Stanislaw
S2 HPW2
Notes: This subject will not be offered in 1994.

A discussion of the perceptual and attentional mechanisms that limit our ability to obtain information, and the implications for such practical areas as ergonomics and selection. Topics include psychophysics and signal detection performance on vigilance tasks.

PSYC7104
Applied Cognitive Psychology
Staff Contact: Dr H. Stanislaw
HPW2
Notes: This subject is not offered in 1993 but is offered in 1994.

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
Notes: 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.

PSYC7107
Seminars in Applied Psychology
Staff Contact: A/Prof B. Hesketh
S1 HPW2

A series of seminars on topics of particular relevance to the practice of applied psychology, eg the organization and regulation of psychology as a profession; ethical standards in relation to clients, members of other professions and the public; legal aspects of psychological practice. Additional topics dealing with contemporary issues in applied psychology chosen in consultation with students undertaking the seminars.

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
S1 HPW3
Selected topics within the area of ergonomics drawn from anthropometrics and biomechanics; the design of displays and controls, including visual display units, keyboards, and workstations; work physiology and energy expenditure, fatigue and its measurement; the sources and control of stress at the workplace; social and equipment-related workplace design problems; the effects on human performance of environmental stressors such as noise, heat, cold and sleep loss (including shiftwork).

PSYC7110
Advanced Ergonomics
Staff Contact: Dr A. Adams
S2 HPW3
Prerequisite: PSYC7109

Application of ergonomic principles and methods to the design and analysis of work tasks involving a high cognitive component, such as those involving human-computer interaction.

PSYC7111
Cross-cultural Perspective in Applied Psychology
Staff Contact: A/Prof S. Bochner
HPW2
Notes: This subject is not offered in 1993 but is offered in 1994.

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 B. Hesketh
S2 HPW2
Notes: This subject will not be offered in 1994.

Individual career counselling, decision-making and work adjustment throughout life, traditional and computerised approaches to occupational information and psychological testing; staff development; relationships between work, leisure, retirement and unemployment. Vocational problems of groups such as minorities and those with disabilities.

PSYC7113
Special Topic
Staff Contact: A/Prof S. Bochner
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.

PSYC7200
Experimental Clinical Psychology 1
Staff Contact: Dr M. Nicholas
F HPW4

The theoretical basis of clinical practice in individual, group, institutional, and community settings. The application of the principles of experimental psychology to the analysis of both adaptive and maladaptive patterns of behaviour. The study of a wide range of techniques of behavioural intervention.

PSYC7201
Experimental Clinical Psychology 2
Staff Contact: Dr J.C. Clarke
S1 HPW2
Prerequisite: PSYC7200

An assessment of marital and family problems and a critical examination of the most influential and most effective intervention strategies. Psychiatric rehabilitation, obsessive-compulsive disorders, personality disorders, forensic psychology and gambling.

PSYC7202
Drug Therapy, Drug Abuse and Sleep Disorders
Staff Contact: Dr P. Birrell
S1 HPW2

Major biological treatments, especially pharmacotherapy currently used in the management of psychological disorders and dysfunctional behaviour. The light which the modes of action of these treatments throws on the biological substrates of psychological disorders. Psychopharmacology of drugs of abuse. Psychobiology and management of sleep disorders including both dyssomnias and parasomnias.

PSYC7203
Theory and Research in Psychopathology
Staff Contact: Dr P. Lovibond
S2 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.

PSYC7205
Professional Practice (Clinical)
Staff Contact: Dr M. Nicholas
Notes: 760 hours (380 hours in each of Years 1 and 2 of the course.)

Supervised work with clients in the School's clinic, and in approved institutions.

PSYC7206
Research Thesis (Clinical)
Staff Contact: Dr M. Nicholas

A research thesis involving an investigation into some aspect of clinical or community psychology.

PSYC7207
Ethical Issues and Special Topics
Staff Contact: Dr M. Nicholas
S1 HPW2

An examination of the ethical codes and legal requirements that clinical psychologists are expected to adhere to, and their applications to specific problems that confront practitioners, when dealing with social or cultural 'problems', making differential diagnoses, and interacting with their colleagues.

PSYC7208
Health Psychology
Staff Contact: Dr P. Birrell
F HPW2

Lectures, practical classes and supervised clinical experience concerned with the theoretical and practical issues associated with the design, implementation and evaluation of integrated behavioural programs for the promotion of positive mental and physical health. Special attention to cardiovascular diseases, mature onset diabetes, AIDS, and sexual dysfunctions in clinical practice.

PSYC7209
Developmental Disabilities and Disorders
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 J. Cranney
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.

PSYC7211
Behavioural Medicine
Staff Contact: Dr M. Nicholas
S2 HPW2

Theoretical and experimental foundations of behavioural medicine; assessment strategies; approaches to intervention/treatment; concepts of coping in behavioural medicine; pain and pain management; headaches and their behavioural management; medical rehabilitation; terminal illness; chronic illness; and AIDS.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Arts and Social Sciences Handbook.

PSYC7300
Experimental Psychology in Cognitive Science
Staff Contact: A/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. Taff
S2 HPW2

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.

Remote Sensing

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
Notes: 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: Dr K. Kothiyal
Assumed knowledge: SAFE9011 or PHYS1022
Note: A project forms a substantial proportion of the assessment for this subject.

Applied anatomy and kinesiology, anthropometry; application to workplace arrangement, seating and bench design, tool and equipment design, lifting techniques, consumer product and architectural design. Physiological and psychological aspects of work and fatigue; measurement of energy consumption, limits to energy expenditure at work, static muscular fatigue, boredom. Environment effects; natural and artificial lighting arrangements, problems of perception, colour, noise and vibration, heat and ventilation, thermal regulation in humans, criteria for comfort. Person-machine interfaces, displays, machine controls, reaction times, vigilance. Applications of ergonomics to occupational safety and health. Ergonomic research methodology.

SAFE9232
Introduction to Occupational Health and Safety Law

Staff Contact: Initial contact with Centre for Safety Science Office
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
Human Behaviour and Safety Science

Staff Contact: Ms D. Gardner
U3

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 R. Hall
U3
Prerequisite: SAFE9224 at credit level or equivalent
Decision making, vigilance, effects of workload and stress, applications to screen-based equipment. Human error in relation to human/system interaction. Work systems: the systems approach, practical evaluation and re-design of work systems. Experimental methodology, experimental design in ergonomics, critical evaluation of the literature.

SAFE9543
Management of Dangerous Materials

Staff Contact: Dr C. Winder
U3
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 R. Rosen
Assumed knowledge: SAFE9211 or SAFE9213

Principles and practices of radiation protection for both ionising and non-ionising radiation. Radiation physics, detection and measurement; background radiation; biological effects of radiation; dose limits; technical controls for radioactive sources and irradiating apparatus. Codes of safe practice; radiological monitoring and personal dosimetry; storage, transport and disposal of sources; environmental impact; administrative controls; emergency procedures; control of 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 *Table of Courses by Faculty* (Graduate Study) 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 Architectural Design	MArchDes	Architecture
Master of Architecture	MArch	Architecture
Master of Archives Administration	MArchivAdmin	Professional Studies
Master of Art	MArt	College of Fine Arts
Master of Arts Administration	MArtAdmin	College of Fine Arts
Master of Art Education	MArtEd	College of Fine Arts
Master of Arts	MA	Arts and Social Sciences University College
Master of Art Theory	MArtTh	College of Fine Arts
Master of Biomedical Engineering	MBiomedE	Engineering
Master of Building	MBuild	Architecture
Master of the Built Environment	MBEnv	Architecture
Master of the Built Environment (Building Conservation)	MBEnv	Architecture
Master of Business Administration	MBA	AGSM
Master of Business and Technology	MBT	Engineering
Master of Chemistry	MChem	Science*

Title	Abbreviation	Calendar/Handbook
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 Computer Science	MCompSc	Engineering
Master of Construction Management	MConstMgt	Architecture
Master of Education	MEd	Professional Studies
Master of Education in Creative Arts	MEdCA	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 Studies	MEnvStudies	Applied Science
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	Architecture
Master of Information Science	MInfSc	Engineering
Master of Landscape Architecture	MLArch	Architecture
Master of Landscape Planning	MLP	Architecture
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 Music	MMus	Arts and Social Sciences
Master of Nursing Administration	MNA	Professional Studies
Master of Optometry	MOptom	Science*
Master of Paediatrics	MPaed	Medicine
Master of Physics	MPhysics	Science*
Master of Policy Studies	MPS	Arts and Social Sciences
Master of Project Management	MPM	Architecture
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 Psychotherapy	MPsychotherapy	Medicine
Master of Safety Science	MSafetySc	Applied Science
Master of Science	MSc	Applied Science Architecture Engineering Medicine Science*† University College
Master of Science *without supervision*	MSc	Applied Science Architecture Engineering
Master of Science (Acoustics)	MSc(Acoustics)	Architecture
Master of Science (Industrial Design)	MSc(IndDes)	Architecture
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 Statistics	MStats	Science*
Master of Surgery	MS	Medicine
Master of Surveying	MSurv	Engineering

Title	Abbreviation	Calendar/Handbook
Master of Surveying *without supervision*	MSurv	Engineering
Master of Surveying Science	MSurvSc	Engineering
Master of Town Planning	MTP	Architecture
Graduate Diplòmas		
Graduate Diploma	GradDip	AGSM Applied Science Architecture Arts and Social Sciences Engineering Science*†
	GradDipHPEd	Medicine
	GradDipClinEd	Medicine
	GradDipPaed	Medicine
	GradDipHEd	Professional Studies
	DipEd	Professional Studies
	DiplM-ArchivAdmin	Professional Studies
	DiplM-Lib	Professional Studies
	DipFDA	Science*
Graduate Certificates		
	GradCertPhilT	Arts and Social Sciences
	GradCertHEd	Professional Studies

**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,

**'School' is used here and elsewhere in these conditions to mean any teaching unit authorised to enrol research students and includes a department where that department is not within a school, a centre given approval by the Academic Board to enrol students, and an interdisciplinary unit within a faculty and under the control of the Dean of the Faculty. Enrolment is permitted in more than one such teaching unit.*

supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the guidelines for promoting postgraduate study within the University.

(3) The candidate shall be enrolled either as a full-time or a part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than three years and no later than five years from the date of enrolment and a part-time candidate will present the thesis for examination no earlier than four years and no later than six years from the date of enrolment, except with the approval of the Committee.

(5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.

(6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.

(7) The research shall be supervised by a supervisor and where possible a co-supervisor who are members of the academic staff of the School or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression

4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.

(i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.

(ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis

5.(1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.

(3) The thesis shall comply with the following requirements:

(a) it must be an original and significant contribution to knowledge of the subject;

(b)the greater proportion of the work described must have been completed subsequent to enrolment for the degree;

(c)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 re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance at the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present 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), Master of Optometry (MOptom) and Master of Physics (MPhysics)

1. The degree of Master of Chemistry or Master of Mathematics or 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 four-year 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 re-present 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 stage 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

**Or department where a department is not within a school, or schools or departments where the research is being undertaken in more than one school of department.*

(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 re-present 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 Optometry (MOptom), Master of Physics (MPhysics)

See Master of Chemistry above for these degrees

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** Conditions

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 made to the Registrar and Deputy Principal by 14 January each year. Please note that not all of these awards are available every year.

General

John Crawford Scholarship Scheme

V Tuition fees. Some students maybe eligible for airfares and a stipend.

T Determined by normal course duration

C 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.

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.

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 of Alumni of the University of NSW and may be either permanent residents of Australia or international students.

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, PO Box 1, Kensington 2033.

Science

Faculty of Biological and Behavioural Sciences

V Up to $3000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress

C Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Biological and Behavioural Sciences.

Faculty of Science

V Up to $2000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress

C Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Science.

BSSM

Esther Louise Buchwald Memorial Scholarship

V $500 pa

T 1 year

C Available only to a physically disabled student enrolled in any year of a course in the Board of Studies in Science and Mathematics

Chemistry

John Ragnar Anderson Memorial Bequest

V Up to $1500 pa

T 1 year with prospect of renewal

C Permanent residence in Australia and eligibility for admission to a full-time degree course in Chemistry

Mathematics

George Szekeres Award

V $200 pa

T 1 year

C Open to students entering the final year of the honours degree course in Pure Mathematics

Optometry

OPSM/Gibb and Beeman

V Up to $2000 pa

T 1 year renewable for the duration of the course, subject to satisfactory progress

C Available to students under 21 years of age who are permanent residents of Australia enrolling in Year 1 of the full-time degree course in Optometry

The UNSW Co-op Program

The University of New South Wales has industry-linked education scholarships to the value of $9600 per annum in the following areas: Accounting (and Economics, Finance, Information Systems or Japanese Studies); Business Information Technology, Aeronautical, 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. Information is also available on additional scholarships which may become available from time to time, mainly from funds provided by organizations sponsoring research projects.

The following publications may also be of assistance: **1.** *Awards for Postgraduate Study in Australia and Awards for Postgraduate Study Overseas,* published by the Graduate Careers Council of Australia. PO Box 28, Parkville, Victoria 3052;* 2. *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

University Postgraduate Research Scholarships

T 1-2 years for a Masters and 3-4 years for a PhD degree

V Living allowance of $14,260 pa. Other allowances may also be paid. Tax free.

C Applicants must be honours graduates or equivalent in the Medicine or Commerce faculties, or the University College, Australian Defence Force Academy. A limited number of scholarships are offered subject to the availbility of funds. Information should be obtained from the Faculty office.

Australian Postgraduate Research Awards

T 1-2 years for a Masters and 3-4 years for a PhD degree

V $14,260 to $18,403

C Applicants must be honours graduates or equivalent or scholars who will graduate with honours in current academic year, and who are domiciled in Australia. Applications to Registrar by 31 October.

Australian Postgraduate Course Awards

V Living allowance of $11,214 pa. Other allowances may also be paid. Tax free.

T 1-2 years; minimum duration of course

C Applicants must be graduates or scholars who will graduate in current academic year, and who have not previously held a Commonwealth Postgraduate Award. Applicants must be domiciled in Australia. Preference is given to applicants with employment experience. Applications to the Registrar by 30 September.

John Crawford Scholarship Scheme

V Tuition fees. Some students may be eligible for air fares and a stipend.

T Determined by normal course duration

C Information should be obtained from Australian Diplomatic Posts. 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 Travel expenses and $A2000 as establishment allowance

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, telephone (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, (telephone (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.

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 $9982-15,440 pa plus allowance

T 1 year renewable

C Appplications close 31 May with The Secretary, NHF, PO Box 2, Woden, ACT 2606. An alternative closing date of 31 October applies to Postgraduate Science Research Scholarships to accomodate students currently in the final year leading to the award of the degree of Bachelor of Science at honours level.

Science

Australian Telecommunications

V $9000 intended as a supplement to other awards

T 1 year for a Masters and 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 and who are aged under 25 years at 1 January. Applications close November 2 with ATERB, PO Box 76, Epping, NSW 2121.

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 late October with the Registrar.

Contact Lens Society of Australia

V $2000 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 Associate Professor B. Holden, School of Optometry.

Gordon Godfrey Scholarship in Theoretical Physics

V $1500 pa

T 1-3 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

V $12,500 pa

T 1 year normally

C Applicants must be Australian citizens undertaking a postgraduate degree in Law, Science Law, legal studies or other appropriate discipline at an Australian tertiary institution. Applications close 30 November with Lionel Murphy Foundation, GPO Box 4545 Sydney, NSW 2001.

Shell Scholarship in Science or Engineering

V Adequate funds for living allowance tuition and travel expenses

T 2 years, sometimes 3

C Applicants must be Australian citizens, under 25 years of age, with at least 5 years' domicile in Australia and who are completing the requirements for an honours degree in Science or Engineering. The successful candidate will attend a British university to pursue a higher degree. Applications close 30 September with Shell Australia, 140 Phillip Street, Sydney, NSW 2000.

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.

Information regarding the establishment of new prizes may be obtained from the Examinations 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

V Statuette Association Prize

C Achievement for community benefit by a student in the final or graduating year

School of Chemistry

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

V $100.00 Chemical Society Parke-Pope Prize

C The best performance in a subject selected by the Head of School

The University of New South Wales

V $100.00 Chemical Society George Wright Prize

C The best performance in a subject selected by the Head of School

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 Limited 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 Michael Mihallavitch Erihman Award

V $750.00

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 either MATH1032 Mathematics 1 or MATH1042 Higher Mathematics 1 by a student in a bachelor degree or diploma course

The School of Mathematics Prize

V $50.00

C The best performance in basic Year 2 Higher Mathematics units by a student in a bachelor shared 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 $100.00

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 either MATH3601 Pure Mathematics 3 or MATH3181 Applied Mathematics 3

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 $200.00

C The best performance in a subject selected by the Head of School

The Bausch & Lomb Soflens Prize

V Contact Lenses valued at $700.00

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 (Australia) Pty Ltd Prize

V $100.00

C The best performance in Year 4 of the Bachelor of Optometry degree course

The Hydron (Australia) Pty Ltd 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 OPTM9021 Anatomy and Physiology of the Eye and Visual System 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 a subject selected by the Head of School

The Optometric Vision Research Foundation

V $200.00

C The best research project in the final year of the Prize Bachelor of Optometry degree course

The Optometrists Association of NSW Prize

V $100.00

C The best performance in a subject selected by the Head of School

The Optyl (Australia) Pty Ltd Prize

V $100.00

C The best performance in the practical work of OPTM9034 Clinical Methods in the Bachelor of Optometry degree course

The Safilo Australia Prize

V $150.00

C The best performance in a subject selected by the Head of School

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

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School of Physics

The Australian Institute of Physics Prize

V $100.00 and one years 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
- PHYS360 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 Bodal Prize

V $100.00

C The best performance in a competition based on the use of microcomputers in PHYS1601 Computer Applications

The Bodal 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 the Theoretical Physics subject PHYS4103 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, PHYS3530, PHYS3550, PHYS3560

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

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,
- PHYS 2011 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

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 in the degree of Bachelor of Science course

School of Psychology

The Australian Psychological Society Prize

V $100.00

C The best performance in a Psychology 4 Honours subject selected by the Head of School

The Milon Buneta Prize

V $80.00

C The best performance in Year 2 of the Bachelor of Science degree course in Psychology

The Psychology Staff Prize

V $80.00

C The best performance in Year 2 Psychology by a student in the Bachelor of Science degree course in Psychology

Graduate University Prizes

The following information summarizes graduate prizes awarded by the University.

School of Mathematics

The J.R. Holmes Prize

V $75.00

C Excellence in at least 4 pass-level pure mathematics level 3 units, taken over no more than two consecutive years by a student in the Science, Arts or Education degree courses

School of Optometry

The Hydron Contact Lens Prize

V Trial fitting set of contact lenses

C The best performance in OPTM8005 Advanced Contact Lens Theory and Practice in the Master of Optometry degree course

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

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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**
Mathews Theatres **D23**
Parade Theatre **E3**
Physics Theatre *(Main Building)* **K14**
Rex Vowels Theatre **F17**
Science Theatre **F13**
Sir John Clancy Auditorium **C24**

Buildings

Applied Science **F10**
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**
International House **C6**
John Goodsell *(Commerce and Economics)* **F20**
Kensington Colleges *(Office)* **C17**
Library *(University)* **E21**
Link **B6**
Maintenance Workshop **B13**
Mathews **F23**
Menzies Library **E21**
Morven Brown *(Arts)* **C20**
New College **L6**
Newton **J12**
NIDA **D2**
Parking Station **H25**
Philip Baxter College *(Kensington)* **D14**
Robert Heffron *(Chemistry)* **E12**
Sam Cracknell Pavilion **H8**
Samuels Building **F26**
Shalom College **N9**
Sir Robert Webster **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 Student Centre:
47 Botany St, Randwick
Accommodation *(off-campus)* **F15**
Accounting **F20**
Admissions **C22**
Adviser for Prospective Students **C22**
Anatomy **C27**
Applied Bioscience **D26**
Applied Economic Research **G14**
Applied Geology **F10**
Applied Science *(Faculty Office)* **F10**
Architecture *(Faculty Office)* **H14**
Archives, University **E21**
Arts and Social Sciences *(Faculty Office)* **C20**
Asia-Australia Institute:
34 Botany St, Randwick
Audio Visual Unit **F20**
Australian Graduate School of Management **G27**
Banking and Finance **F20**
Biochemistry and Molecular Genetics **D26**
Biological and Behavioural Sciences *(Faculty Office)* **D26**
Biomedical Engineering **F26**
Biomedical Library **F23**
Biotechnology **F26**
Cashier's Office **C22**
Chaplains **L12 & L13**
Chemical Engineering and Industrial Chemistry **F10**
Chemistry **E12**
Civil Engineering **H20**
Co-op Bookshop **G17**
Commerce and Economics *(Faculty Office)* **F20**
Communications Law Centre **C15**
Community Medicine **D26**
Computer Science and Engineering **G17**
Computing Services Department **F26**
Cornea and Contact Lens Research Unit:
22-32 King St, Randwick
Economics **F20**
Education Studies **G2**
Educational Testing Centre **K14**
Electrical Engineering **G17**
Energy Research, Development & Information Centre **F10**
Engineering *(Faculty Office)* **K17**
English **C20**
Examinations **C22**
Fees Office **C22**
Fibre Science and Technology **G14**
Food Science and Technology **B8**
French **C20**
Geography **K17**
German and Russian Studies **C20**
Graduate Office and Alumni Centre **E4**
Graduate School of the Built Environment **H14**
Groundwater Management and Hydrogeology **F10**
Health Service, University **L14b**
Health Services Management **C22**
History **C20**
House at Pooh Corner *(Child Care)* **N8**
Industrial Design **G15**
Industrial Relations and Organizational Behaviour **F20**
Information Systems **F20**
Institute of Languages:
14 Francis St, Randwick
International Student Centre **F16**
IPACE Institute **F23**
Japanese Economic and Management Studies **F20**
Kanga's House *(Child Care)* **O14**
Landscape Architecture **K15**
Law *(Faculty Office)* **F21**
Law Library **F21**
Legal Studies & Taxation **F20**
Liberal and General Studies **C20**
Librarianship **F23**
Lost Property **C22**
Marine Science **D26**
Marketing **F20**
Materials Science and Engineering **E8**
Mathematics **F23**
Mechanical and Manufacturing Engineering **J17**
Medical Education **C27**
Medicine *(Faculty Office)* **B27**
Membrane and Separation Technology **F10**
Microbiology and Immunology **D26**
Mines **K15**
Minor Works and Maintenance **B14A**
Music **B11**
News Service **C22**
New South Wales University Press:
22-32 King St, Randwick
Optometry **J12**
Pathology **C27**
Patrol and Cleaning Services **C22**
Performing Arts **B10**
Petroleum Engineering **D12**
Philosophy **C20**
Physics **K15**
Physiology and Pharmacology **C27**
Political Science **C20**
Printing Section **C22**
Professional Development Centre **K13**
Professional Studies *(Faculty Office)* **G2**
Property and Works **C22**
Psychology **F23**
Publications Section **C22**
Remote Sensing **K17**
Safety Science:
32 Botany Street, Randwick
Science *(Faculty Office)* **F23**
Science and Technology Studies **C20**
Social Science and Policy **C20**
Social Policy Research Centre **F26**
Social Work **G2**
Sociology **C20**
Spanish and Latin American Studies **C20**
Sport and Recreation Centre **B6**
Squash Courts **B7**
Staff Office **C22**
Student Centre *(off Library Lawn)* **C22**
Students' Union **E4, C21**
Student Services:
Careers, Loans, Accommodation etc **L14**
Counselling **L13**
Students' Union **E4, C21**
Surveying **K17**
Swimming Pool **B4**
Textile Technology **G14**
Theatre and Film Studies **B10**
Town Planning **K15**
WHO Regional Training Centre **C27**
Wool and Animal Sciences **G14**