The University of New South Wales

Sciences

Board of Studies in Science and Mathematics

Faculty of Biological Sciences

Faculty of Science

1985 Faculty Handbook

How to use this Handbook

The information in this book has been divided into **nine parts.**

General Information (pages 1-24) lists what you need to know about the University as a whole, introduces some of the services available and notes the most important rules and procedures. You should read this part in its entirety.

For further information about the University and its activities, see the University Calendar.

Faculty Information.

Undergraduate Study outlines the courses available in each school in the faculty.

Undergraduate Study: Subject Descriptions lists each subject offered by the schools in the faculty. The schools are listed numerically.

Information includes:

- Subject number, title and description
- Prerequisite, co-requisite and excluded subjects, where applicable
- Additional information about the subject such as credit value, class contact or teaching hours per week, sessions when taught

Graduate Study is about higher degrees.

Graduate Study: Subject Descriptions lists each subject offered by the schools in the faculty. The schools are listed numerically.

Information included is as for **Undergraduate Study: Subject Descriptions,** above.

Conditions for the Award of Higher Degrees.

Scholarships and Prizes available at undergraduate and graduate level in the faculty.

Staff list.

For detailed reference, see the list of **Contents.**

The University of New South Wales
PO Box 1 Kensington NSW Australia 2033 Phone 697 2222

Sciences

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

Information in this Handbook has been brought up to date as at 9 July 1984, but may be amended without notice by the University Council.

Contents

General Information

To obtain the maximum benefit from your studies you should make an effort to learn what facilities the University offers, to investigate the best methods of study and to discover as much as possible about the course for which you are enrolled.

This Handbook has been specially designed as a detailed source of reference for you in all matters related to your Faculty. This **General Information** Section is intended to help you put the Faculty into perspective with the University as a whole, to introduce you to some of the services available to students and to note some of the most important rules and procedures.

For fuller details about some aspects of the University and its activities you might need to consult the University Calendar.

Note: All phone numbers below are University extension numbers. If you are outside the University, dial 697 2222 and ask for the extension. Alternatively you may dial 697 and then the extension number. This prefix should only be used when you are certain of the extension that you require as callers using 697 cannot be transferred to any other number.

Some people who can help you

If you are experiencing difficulties in adjusting to the requirements of the University you will probably need advice. The best people to talk to on matters relating to progress in studies are your tutors and lecturers. If your problem lies outside this area there are many other people with specialized knowledge and skills who may be able to help you.

The **Student Services** staff, located on the first floor of the Chancellery, will help those students who need advice and who have problems but who do not seem to be provided for by the other organizations and services mentioned. As well as dealing with general enquiries the staff is especially concerned with the problems of overseas, Aboriginal, and physically handicapped and disabled students. Enquire at Room 148E, phone 3114.

The **Assistant Registrar (Student Records and Scholarships — Undergraduate and Postgraduate)**, Mr Graham Mayne, is located on the ground floor of the Chancellery. For particular enquiries regarding illness and other matters affecting performance in examinations and assessment, graduation ceremonies, release of examination results and variations to enrolment programs, phone 3102 or 3097.

The **Senior Administrative Officer (Admissions)**, Mr John Beauchamp, is located on the ground floor of the Chancellery. General inquiries should be directed to 3095.

The **Senior Administrative Officer (Examinations)**, Mr John Grigg, is located on the ground floor of the Chancellery. Enquiries regarding examinations, including examination timetables and clash of examinations should be directed to 3088.

The **Adviser for Prospective Students**, Mrs Fay Lindsay, is located in the Chancellery and is available for personal interview. For an appointment phone 3113.

The **Careers and Employment Section** is located in Room LG5 in the Chancellery. Enquiries should be directed to 3122.

The **Off-campus Housing Service** is located in Room 148E in the Chancellery. For assistance in obtaining suitable accommodation phone 3116.

Student Loans enquiries should be directed to Room 148E in the Chancellery, phone 3115.

The **Student Health Unit** is located in Hut E15b at the foot of Basser Steps. The Director is Dr Geoffrey Hansen. For medical aid phone 5427, 5426 or 5425.

The **Student Counselling and Research Unit** is located at the foot of Basser Steps. Dr Pat Cleary is the Head of the Unit. For assistance with educational or vocational problems ring 5418 or 5422 for an appointment.

The **University Librarian** is Mr Allan Horton. Library enquiries should be directed to 2649.

The **Chaplaincy Centre** is located in Hut E15a at the foot of Basser Steps.

The **Students' Union** has two offices on campus. One is located at the back of the Library Lawn (between the Chancellery and the Morven Brown Building), where the SU President, Education Vice President, Education Officer, Clubs and Societies Secretary and Postgraduate Officer are available to discuss student problems. The other is on the second floor of the Squarehouse, where the Secretary/Treasurer, Women's Officer, Overseas Student Director, the full-time Solicitor, *Tharunka* and *Campuswide* provide information and student services.

Cashier's Hours The University Cashier's office is open from 9.30 am to 1.00 pm and from 2.00 pm to 4.30 pm, Monday to Friday. It is open for additional periods at the beginning of Session 1. Consult noticeboards for details.

Calendar of Dates

The Academic Year

The academic year is divided into two sessions, each containing 14 weeks for teaching. There is a recess of five weeks between the two sessions and there are short recesses of one week within each of the sessions.

Session 1 commences on the first Monday of March.

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Faculties other than Medicine

Session 1	4 March to 12 May
(14 weeks)	*May Recess: 13 May to 19 May*
	20 May to 16 June
	Midyear Recess: 17 June to 21 July
Examinations	18 June to 3 July
Session 2	22 July to 25 August
(14 weeks)	*August Recess: 26 August to 1 September*
	2 September to 3 November
	Study Recess: 4 November to 10 November
Examinations	11 November to 29 November

Faculty of Medicine

First and Second Years	As for other faculties	
Third and Fourth Years	Term 1 (10 weeks)	21 January to 31 March
	Term 2 (9 weeks)	9 April to 12 May
	May Recess:	*13 May to 19 May*
		20 May to 16 June
	Term 3 (9 weeks)	24 June to 25 August
	August Recess:	*26 August to 1 September*
	Term 4 (10 weeks)	2 September to 10 November
Fifth Year	Term 1 (8 weeks)	21 January to 17 March
	Term 2 (8 weeks)	25 March to 19 May
	Term 3 (8 weeks)	27 May to 21 July
	Term 4 (8 weeks)	29 July to 22 September
	Term 5 (8 weeks)	30 September to 24 November

January

Tuesday 1	Public Holiday — New Year's Day
Monday 7	List of graduands in Medicine for February Graduation Ceremony published in *The Sydney Morning Herald*
Friday 11	Last day for acceptance of applications by office of the Admissions Section for transfer to another undergraduate course within the University
Monday 14	Last day for applications for review of results of assessment
Monday 28	Public Holiday — Australia Day

February

Friday 1	Enrolment period begins for new undergraduate students and undergraduate students repeating first year
Monday 18	Enrolment period begins for second and later year undergraduate students and graduate students enrolled in formal courses
Tuesday 26	Last day for undergraduate students who have completed requirements for pass degrees to advise the Registrar they are proceeding to an honours degree or do not wish to take out the degree for which they have applied for any other reason

March

Monday 4	**Session 1 begins** — all courses except Medicine III, IV and V
Wednesday 6	List of graduands for April/May ceremonies and 1984 prizewinners published in *The Sydney Morning Herald*
Monday 11	Last day for notification of correction of details published in *The Sydney Morning Herald* on 6 March concerning April/May graduation ceremonies
Friday 15	Last day for acceptance of enrolment by new undergraduate students (late fee payable thereafter)
Friday 29	Last day for acceptance of enrolment by undergraduate students re-enrolling in second and later years (late fee payable thereafter)

April

Friday 5	Good Friday — Public Holiday
Saturday 6	Easter Saturday — Public Holiday
Monday 8	Easter Monday — Public Holiday
Friday 19	Last day for undergraduate students to discontinue without failure subjects which extend over Session 1 only
Thursday 25	Anzac Day — Public Holiday

May

Wednesday 1	*Confirmation of Enrolment* forms despatched to all students
Friday 10	Last day for acceptance of corrected *Confirmation of Enrolment* forms
Monday 13	**May Recess begins**
Wednesday 15	Last day for undergraduate students completing requirements for degrees at the end of Session 1 to submit *Application for Admission to Degree* forms
Thursday 16	Publication of provisional timetable for June/July examinations
Sunday 19	**May Recess ends**
Friday 24	Last day for students to advise of examination clashes

June

Tuesday 4	Publication of timetable for June/July examinations
Monday 10	Queen's Birthday — Public Holiday
Sunday 16	**Session 1 ends**
Monday 17	**Midyear Recess begins**
Tuesday 18	Examinations begin

July

Wednesday 3	Examinations end
Monday 15	Assessment results mailed to students
Tuesday 16	Assessment results displayed on University noticeboards *To Friday 19 July:* Students to amend enrolment programs following receipt of June examination results
Sunday 21	**Midyear Recess ends**
Monday 22	**Session 2 begins**

August

Friday 2	Last day for students to discontinue without failure subjects which extend over the whole academic year
Monday 26	**August Recess begins**
Tuesday 27	Last day for undergraduate students who have completed requirements for pass degrees to advise the Registrar they are proceeding to an honours degree or do not wish to take out the degree for which they have applied for any other reason

September

Sunday 1	**August Recess ends**
Wednesday 4	List of graduands for October graduation ceremonies published in *The Sydney Morning Herald*
Monday 9	Last day for notification of correction of details published in *The Sydney Morning Herald* on 4 September concerning October graduation ceremonies
Friday 13	Last day for undergraduate students to discontinue without failure subjects which extend over Session 2 only
Monday 23	*Confirmation of Enrolment* forms despatched to all students
Monday 30	Last day to apply to UCAC for transfer to another tertiary institution in New South Wales

October

Wednesday 2	Last day for acceptance of corrected *Confirmation of Enrolment* forms
Thursday 3	Publication of provisional examination timetable
Friday 4	Last day for applications from undergraduate students completing requirements for degrees at the end of Session 2 to submit applications for *Admission to Degree* forms
Monday 7	Eight Hour Day — Public Holiday
Friday 11	Last day for students to advise of examination timetable clashes
Thursday 24	Publication of timetable for November examinations.

November

Sunday 3	**Session 2 ends**
Monday 4	**Study Recess begins**
Sunday 10	**Study Recess ends**
Monday 11	Examinations begin
Friday 29	Examinations end

December

Monday 16	Assessment results mailed to students
Tuesday 17	Assessment results displayed on University noticeboards
Wednesday 25	Christmas Day — Public Holiday
Thursday 26	Boxing Day — Public Holiday

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Faculties other than Medicine and University College/Australian Defence Force Academy

Session 1 (14 weeks)	3 March to 11 May
	May Recess: 12 May to 18 May
	19 May to 15 June
	Midyear Recess: 16 June to 20 July
Examinations	17 June to 2 July
Session 2 (14 weeks)	21 July to 24 August
	August Recess: 25 August to 31 August
	1 September to 2 November
	Study Recess: 3 November to 9 November
Examinations	10 November to 28 November

Faculty of Medicine

First and Second Years	As for other faculties
Third and Fourth Years	Term 1 (10 weeks) 20 January to 30 March Term 2 (9 weeks) 7 April to 11 May *May Recess: 12 May to 18 May* 19 May to 15 June Term 3 (9 weeks) 23 June to 24 August *August Recess: 25 August to 31 August* Term 4 (10 weeks) 1 September to 9 November
Fifth Year	Term 1 (8 weeks) 20 January to 16 March Term 2 (8 weeks) 24 March to 18 May Term 3 (8 weeks) 26 May to 20 July Term 4 (8 weeks) 28 July to 21 September Term 5 (8 weeks) 29 September to 23 November

Australian Graduate School of Management

Term 1 (10 weeks) 3 March to 9 May
Term 2 (10 weeks) 2 June to 8 August
Term 3 (10 weeks) 1 September to 7 November

University College/Australian Defence Force Academy

Session 1 (14 weeks)	3 March to 3 May *May Recess: 4 May to 18 May* 19 May to 20 June *Midyear Recess: 21 June to 13 July*
Examinations	23 June to 13 July
Session 2 (13 weeks)	14 July to 22 August *August Recess: 23 August to 7 September* 8 September to 24 October
Examinations	25 October to 15 November

January

Wednesday 1	Public Holiday (New Year)
Monday 6	List of graduands in Medicine for February Graduation Ceremony published in *The Sydney Morning Herald*
Friday 10	Last day for acceptance of applications by office of the Admissions Section for transfer to another undergraduate course within the University
Monday 13	Last day for applications for review of results of annual examinations
Monday 27	Australia Day — Public Holiday

February

Monday 17	Enrolment period begins for second and later year undergraduate students and graduate students enrolled in formal courses

March

Monday 3	Session 1 begins — all courses except Medicine III, IV and V
Friday 28 to Monday 31	Easter — Public Holiday

April

Friday 25	Anzac Day — Public Holiday

Organization of the University

The University of New South Wales was first incorporated by an Act of Parliament in 1949, under the name of the New South Wales University of Technology.

In 1984 the University had 18,036 students and over 3,800 staff who worked in more than eighty buildings. These figures include staff and students at Broken Hill (W.S. and L.B. Robinson University College), Duntroon (the Faculty of Military Studies) and Jervis Bay.

Arms of the University of New South Wales

The arms of the University are reproduced on the front cover of this handbook. The arms were granted by the College of Heralds in London, on 3 March 1952, and the heraldic description is as follows:

'Argent on a Cross Gules a Lion passant guardant between four Mullets of eight points Or a Chief Sable charged with an open Book proper thereon the word SCIENTIA in letters also Sable.

'The lion and the four stars of the Southern Cross on the Cross of St George have reference to the State of New South Wales which brought the University into being; the open book with SCIENTIA across its page reminds us of its original purpose. Beneath the shield is the motto 'Manu et Mente', ('with Hand and Mind') which is the motto of the Sydney Technical College, from which the University has developed. The motto is not an integral part of the Grant of Arms and could be changed at will; but it was the opinion of the University Council that the relationship with the parent institution should in some way be recorded.'

The University Colours

The colours of the University are black and gold.

The Council

The chief governing body of the University is the Council which has the responsibility of making all major decisions regarding its policy, conduct and welfare.

The Council consists of 44 members from the State Parliament, industry and commerce, agriculture, the trade unions, professional bodies, the staff, the students and the graduates of the University.

The Council meets at least five times per year and its members also serve on special committees dealing with, for example, academic matters, finance, buildings and equipment, personnel matters, student affairs and public relations.

The Chairman of the Council is the Chancellor, the Hon. Mr Justice Samuels.

The Professorial Board

The Professorial Board is one of the two chief academic bodies within the University and includes all the professors from the various faculties, non-professorial Heads of Schools and Chairmen of Faculty, and several ex-officio and appointed members. It deliberates on all questions such as matriculation requirements, the content of courses, the arrangement of syllabuses, the appointment of examiners and the conditions for graduate degrees. Its recommendations on matters of major policy are presented to Council for its consideration and adoption.

The Faculties/Boards of Studies

The executive head of a faculty or board of studies is the dean, with the exception of the Australian Graduate School of Management, where the executive head is the director. Members of each faculty or board meet regularly to consider matters pertaining to their own areas of teaching and research, the result of their deliberations being then submitted to the Professorial Board.

The term 'faculty' is used in two distinct senses in the University. Sometimes it is used to refer to the group of schools comprising the faculty, and at others to the deliberative body of academic members of the Schools within the faculty.

The eleven faculties are Applied Science, Architecture, Arts, Biological Sciences, Commerce, Engineering, Law, Medicine, Military Studies, Professional Studies and Science. In addition, the Board of Studies of the Australian Graduate School of Management (AGSM) and the Board of Studies in General Education fulfil a function similar to that of the faculties. The Board of Studies in Science and Mathematics, which was established to facilitate the joint academic administration of the Science and Mathematics degree course by the faculties of Biological Sciences and Science, considers and reports to the Professorial Board on all matters relating to studies, lectures and examinations in the Science and Mathematics degree course.

The Schools

Subjects come under the control of the individual schools (eg the School of Chemistry, the School of Accountancy). The head of the school in which you are studying is the person in this academic structure with whom you will be most directly concerned.

Executive Officers

As chief executive officer of the University, the Vice-Chancellor and Principal, Professor Michael Birt, is charged with managing and supervising the administrative, financial and other activities of the University.

He is assisted in this task by a Deputy Vice-Chancellor and two Pro-Vice-Chancellors, together with the Deans and the two heads of the administrative divisions.

General Administration

In recent years the administration of general matters within the University has been mainly the concern of the Registrar's Division, the Bursar's Division and the Property Division.

In 1984 the University approved the reorganization of the general administrative structure into two groups each headed by a Deputy Principal.

Implementation of the new structure is now in progress and it is envisaged that a Deputy Principal (Administration) will be responsible for registrarial, property and staffing matters and a Deputy Principal (Planning and Information) will be responsible for planning information and analysis, finance and the provision of computing services.

Student Representation on Council and Faculties/Boards

Three members of the University Council may be students elected by students. All students who are not full-time members of staff are eligible to stand for a two-year term of office. The students who are elected to the Council are eligible for election to the committees of Council.

Students proceeding to a degree or a graduate diploma may elect members for appointment by the Council to their faculty or board of studies. Elections are for a one-year term of office.

Open Faculty/Board Meetings

If you wish you may attend a faculty or board meeting. You should seek advice at the office of the faculty whose meeting you wish to attend.

Award of the University Medal

The University may award a bronze medal to undergraduate students who have achieved highly distinguished merit throughout their degree course.

Identification of Subjects by Numbers

For information concerning the identifying number of each subject taught in each faculty as well as the full list of identifying numbers and subjects taught in the University, turn to the first page of the section **Subject Descriptions.** This list is also published in the Calendar.

Textbook Lists

Textbook lists are issued early in the year and are available from School and Faculty offices for re-enrolling students and from the Unisearch House Enrolment Centre for first year students.

Textbook Costs and Course-Related Costs

Students should allow quite a substantial sum for textbooks. This can vary from $250 to $600 per year depending on the course taken. These figures are based on the cost of new books. The Students' Union operates a secondhand bookshop. Information about special equipment costs, accommodation charges and cost of subsistence on excursions, field work, etc, and for hospital residence (medical students) is available from individual schools.

Co-operative Bookshop

Membership is open to all students, on initial payment of a fee of $12, refundable after 2 years.

General Studies Program

Almost all undergraduates in faculties other than Arts and Law are required to complete a General Studies program. The Department of General Studies within the Board of Studies in General Education publishes its own Handbook which is available free of charge. All enquiries about General Studies should be made to the General Studies Office, Room G56, Morven Brown Building, phone 2436.

Student Services and Activities

Accommodation

Residential Colleges

There are seven residential colleges on campus. Each college offers accommodation in a distinctive environment which varies from college to college, as do facilities and fees. A brief description of each college is given below, and further information may be obtained directly from the individual colleges. In addition to basic residence fees, most colleges make minor additional charges for such items as registration fees, caution money or power charges. Intending students should lodge applications before the end of October in the year prior to the one in which they seek admission. Most colleges require a personal interview as part of the application procedure.

The Kensington Colleges

The Kensington Colleges comprise Basser College, Goldstein College and Philip Baxter College. They house 450 men and women students, as well as tutorial and administrative staff members. Some aspects of traditional College life are maintained in an atmosphere which emphasises co-operation and mutual respect. Apply in writing to the Master, PO Box 24, Kensington, NSW 2033.

International House

International House accommodates 154 male and female students from Australia and up to thirty other countries. Preference is given to more senior undergraduates and graduate students. Eight tutors are available to help students. Apply in writing to the Warden, International House, PO Box 1, Kensington, NSW 2033.

New College

New College is an Anglican college and it provides accommodation (with all meals) for 220 graduates and undergraduates, without regard to race, religion, or sex. The College has its own resident tutors, and a Senior Resident Academic Fellow, who sponsors a wide range of activities and encourages inter-disciplinary discussion. Apply to the Master, New College, Anzac Parade, Kensington 2033 (telephone 662 6066).

Shalom College

Shalom College is a Jewish residential college. It provides accommodation for 86 men and women students. Non-resident membership is available to students who wish to avail themselves of the Kosher dining room and tutorial facilities. Fees are payable on a session basis. Conferences are catered for, particularly with Kosher requirements. Rates are available on application. Apply in writing to the Master, Shalom College, the University of New South Wales, PO Box 1, Kensington, NSW 2033.

Warrane College

Warrane College provides accommodation for 200 men and is open to students of all ages, backgrounds and beliefs. The College offers a comprehensive tutorial program along with a wide range of activities, professional orientation and opportunities to meet members of the University staff informally. Non-resident membership is available to male students who wish to participate in College activities and to make use of its facilities. The general spiritual care of the College has been entrusted to Opus Dei. Enquiries: The Master, Warrane College, PO Box 123, Kensington 2033. Telephone (02) 662 6199.

Creston Residence

Creston Residence offers accommodation to 25 undergraduate and graduate women students. Activities and tutorials are open to non-resident students. The spiritual activities offered at Creston are entrusted to the Women's Section of Opus Dei. Enquiries: 36 High Street, Randwick 2031. Telephone (02) 398 5693.

Other Accommodation

Off-campus Accommodation

Students requiring other than College accommodation may contact the Housing Officer in the Chancellery, Room 148E for assistance in obtaining suitable accommodation in the way of rooms with cooking facilities, flats, houses, share flats, etc. Extensive listings of all varieties of housing are kept up-to-date throughout the year and during vacations. Accommodation in the immediate vicinity of the University is not usually easy to find at short notice, and is expensive.

No appointment is necessary but there may be some delay in February and March. The Housing staff are always happy to discuss any aspect of accommodation.

Special pamphlets on accommodation, lists of estate agents and hints on house-hunting are available on request.

Associations, Clubs and Societies

The Sports Association

The Sports Association is a student organization within the University which caters for a variety of sports for both men and women. In December 1952 the University Council approved the establishment of the Sports Association, which then consisted of five clubs. As the University has grown the Association has expanded, and it now includes thirty-seven clubs.

The Association office is situated on the 3rd floor, Squarehouse, E4, lower campus, and can be contacted on extension 4880. The control of the Association is vested in the General Committee which includes delegates from all the clubs.

Membership is compulsory for all registered students, and the annual fee is as set out later, in **Rules and Procedures, Enrolment Procedures and Fees Schedules,** section **15. Fees.** Membership is also open to all members of staff and graduates of the University on payment of a fee as prescribed in the By-laws of the Association. All members are invited to take part in any of the activities arranged by the Association, and to make use of the University's sporting and recreational facilities.

The Association is affiliated with the Australian Universities Sports Association (AUSA) which is the controlling body for sport in all Australian universities.

School and Faculty Associations

Many schools and faculties have special clubs with interests in particular subject fields. Enquire at the relevant Faculty or School Office for information.

Australian Armed Services

The University maintains links with the Royal Australian Navy, the Australian Army Reserve and the Royal Australian Air Force, and opportunities exist for student participation in their activities.

Chaplaincy Centre

The University Chapel

The University provides a small chapel for the use of all faiths. In its temporary housing it is located in Hut E15a near the Chemistry Building. The chapel is available for services of worship by arrangement with the full-time chaplains. At other times it is available for private meditation to all members of the University.

Chaplaincy Service

A Chaplaincy Service is available within the University of New South Wales for the benefit of students and staff.

The service offers fellowship, personal counselling and guidance, together with leadership and biblical and doctrinal studies and in worship. The chaplains maintain close liaison with student religious societies.

The chaplains are located in Hut E15a at the foot of Basser steps, which also contains the temporary chapel.

Student Services

The Student Services staff, located on the first floor of the Chancellery, will help those students who have problems and need advice but who do not seem to be provided for by the other organizations and services mentioned. As well as dealing with those enquiries and with off-campus housing and student loan matters, the staff is especially concerned with the problems of physically handicapped and disabled students, overseas students, and aboriginal students.

All enquiries should be made either at Room 148E or by telephoning extension 3114 (general enquiries).

Sport and Recreation Section

The Sport and Recreation Section seeks ways to encourage students and staff to include exercise as an essential part of their daily lives. It does this through Sports Clubs on a competitive basis and by offering physical recreation on a more casual basis to the University community.

The Section serves the Sports Association and its thirty-seven constituent clubs and is responsible for the continuing management of the Physical Education and Recreation Centre at which recreational programs are available for both students and staff.

It makes bookings for use of sporting facilities including tennis courts and playing fields. This section is located on the 3rd Floor, Squarehouse, E4, lower campus. The various services may be contacted by phone on the following extensions: Recreation Program 4884; Grounds Bookings 4878; Tennis Bookings 4877; Sports Association 4880.

Physical Education and Recreation Centre

The Sport and Recreation Section provides a recreational program for students and staff at the Physical Education and Recreation Centre. The Centre consists of eight squash courts, seven tennis courts, a main building, and a 50-metre indoor heated swimming pool. The main building has a large gymnasium and practice rooms for fencing, table tennis, judo, weight-lifting, karate and jazz ballet, also a physical fitness testing room. The recreational program includes intramurals, teaching/coaching, camping. The Centre is located on the lower campus adjacent to High Street. The Supervisor at PERC may be contacted on extension 4884.

Student Counselling and Research Unit

The Student Counselling and Research Unit provides counselling services to students, prospective students, parents and other concerned persons.

The unit is located in the huts near the foot of Basser Steps (access from College Road or Engineering Road).

Appointments are offered throughout the academic year and during recesses between 8 am to 5 pm on week days (up to 7 pm on some evenings). A 'walk-in' service for short interviews is available between 9 am and 5 pm. Appointments may be made by phoning extension 5418 between 8.30 am and 5.30 pm.

Counsellors offer assistance in planning, decision-making, problem solving, social and emotional development, and dealing with grievances. Group programs on such topics as study, tutorial and examination skills, stress management, communicating, and self-confidence are offered each session. Brochures are available from the receptionist.

Careers and Employment Section

The Careers and Employment Section provides careers advice and assistance in finding employment.

Assistance with careers and permanent employment opportunities includes: the regular mailing of a *Job Vacancy Bulletin* to registered students and graduates, a Library, and a Campus Interview Program in which final year students have the opportunity to speak to employers regarding employment prospects.

Assistance is also provided in obtaining course-related employment during long vacations as required by undergraduates in Engineering and Applied Science.

The Section is located in Undercroft Room LG05 in the Chancellery.

For further information, telephone as follows: careers and employment assistance 3122 or 3123; long vacation industrial training 3124.

Student Health Unit

A student health clinic and first aid centre is situated within the University. The medical service although therapeutic is not intended to replace private or community health services. Thus, where chronic or continuing conditions are revealed or suspected the student may be referred to a private practitioner or to an appropriate hospital. The health service is not responsible for fees incurred in these instances. The service is confidential and students are encouraged to attend for advice on matters pertaining to health.

The service is available to all enrolled students by appointment, free of charge, between 9 am and 5 pm Mondays to Fridays. For staff members, immunizations are available, and first aid service in the case of injury or illness on the campus.

The centre is located in Hut E15b on the northern side of the campus in College Road at the foot of the Basser Steps.

Appointments may be made by calling at the centre or by telephoning extension 5425, 5426 or 5427 during the above hours.

The Family Planning Association of NSW conducts clinics at the Student Health Unit and at the adjacent Prince of Wales Hospital which are available for both staff and students. Appointments may be made for the Student Health Unit clinic by telephoning 588 2833 or for the Prince of Wales Hospital clinics by telephoning 399 0111.

The Students' Union

The Students' Union was formed in 1952 as an organization, duly recognized by the University Council, to represent the student body and to provide a central organization for the administration of student activities. In the words of its constitution 'The Students' Union is formed for the purpose of advancing the interests of University men and women, facilitating their general scientific and technical education, and fostering a University spirit among them'.

The Students' Union affords a recognized means of communication between the student body and the University administration, and represents its members in all matters affecting their interests. It aims to promote the cultural, educational and recreational life of the University and to encourage a permanent interest among graduates in the life and progress of student activities within the University. The Students' Union also makes representations to government and other bodies outside the University on behalf of its members.

Membership of the Students' Union is compulsory for all registered students of the University; the annual subscription for full-time and part-time students is set out later, in **Rules and Procedures, Enrolment and Procedures and Fees Schedules**, section **15. Fees.** All alumni of the University are eligible for Life Membership.

The Students' Union is governed by a Council consisting in the main of elected student representatives from the various faculties of the University. There are also representatives of the University Council, Life Members, the Staff Association and the Sports Association. The Council is elected annually.

The Students' Union has three full-time officers who are elected each year by popular ballot. They are the President, who is mainly the political figure-head of the Union; the Secretary/Treasurer, who organizes the smooth operation of the SU offices, keeps the membership rolls up to date, and oversees the financial operations; and the Women's Officer who represents women on campus and formulates, maintains and co-ordinates the Students' Union policy on women's affairs.

Other officers are the Education Vice-President, who works towards the implementation of Students' Union education policy; the Education Officer concerned with helping students with problems relating to TEAS, Show-Cause and other matters relevant to their courses; the Vice-President who ensures the efficient running of CASOC: and the Director of Overseas Students who deals with specific problems these students may encounter while in Australia.

The activities in which the Students' Union is involved include:

1. Publication of the Student Paper *Tharunka.*

2. Production of the student video program *Campuswide.*

3. A free legal service run by a qualified lawyer employed by the Students' Union Council.

4. The Secondhand Bookshop for cheap texts.

5. A child care centre, *House at Pooh Corner.*

6. CASOC (Clubs and Societies on Campus) which provides money from the SU for affiliated clubs and societies on campus.

7. A video service with access for students to equipment and advice.

8. A noticeboard for casual job vacancies.

9. Organization of orientation for new students.

The SU has two offices on campus. One is located at the back of the Library Lawn (between the Chancellery and the Morven Brown Building), where the S.U. President, Education Vice-President, Education Officer, Clubs and Societies Secretary and Postgraduate Officer are available to discuss student problems. The other is on the Second Floor of the Squarehouse (above the bar) at the bottom end of campus, where the Secretary/Treasurer, Women's Officer, Overseas Student Director, the full-time Solicitor, *Tharunka* and *Campuswide* provide information and student services.

The University Library

The University libraries are mostly situated on the upper campus. The library buildings house the Undergraduate Library on Level 3, the Social Sciences and Humanities Library on Level 4, the Physical Sciences Library on Level 7 and the Law Library on Level 8. The Biomedical Library is in the western end of the Mathews Building and is closely associated with libraries in the teaching hospitals of the University.

For details consult **Faculty Information** in the relevant Faculty Handbook.

There are also library services at other centres:

The Water Research Library situated at Manly Vale (telephone 948 0261) which is closely associated with the Physical Sciences Library.

The library at the Royal Military College, Duntroon, ACT, serving the Faculty of Military Studies.

Each library provides reference and lending services to staff and students and each of the libraries on the Kensington campus is open throughout the year during the day and evening periods. The exact hours of opening vary during the course of the academic year.

Staff and students normally use a machine-readable identification card to borrow from the University libraries.

The University Union

The University Union provides the facilities students, staff and graduates require in their daily University life and thus an opportunity for them to know and understand one another through associations outside the lecture room, the library and other places of work.

The Union is housed in three buildings near the entrance to the Kensington Campus from Anzac Parade. These are the Roundhouse, the Blockhouse and the Squarehouse. Membership of the Union is compuslory for all registered students and is open to all members of staff and graduates of the University.

The control of the Union is vested in the Board of Management whose Chief Executive Officer is the Warden.

The Union operates a licensed Bar and twelve Food Service points on the campus, providing services ranging from take-away snacks and cafeteria-type meals to an à la carte restaurant operation.

Shops run directly by the Union are the Logo Shop (University-crested gifts, mementos and clothing) and three news-agency outlets which also sell stationery, drawing materials and calculator supplies. Other Union facilities include banking, credit union, hairdressing and optical dispensing. There is also a beauty salon, a delicatessen, a clothing shop and pharmaceutical, dental, computing and travel services.

Shower, meeting, games, music practice, reading, craft and dark rooms are provided as well as a Student Resource Area where photocopying, screen printing, stencil cutting and typewriter services are available.

The Union's cultural activities program encompasses creative leisure classes, lunch hour concerts and films, market days and exhibitions.

Further information on Union programs, activities and services is provided in the Annual Union Handbook and in the Creative Leisure Classes and Activities brochures published each session.

Financial Assistance to Students

Tertiary Education Assistance Scheme

Under this scheme, which is financed by the Commonwealth Government, assistance is available for full-time study in approved courses, to students who are not bonded and who are permanent residents of Australia, subject to a means test on a non-competitive basis. The allowances paid are unlikely to be sufficient, even at the maximum rate, for all the living expenses of a student. Family help and/or income from vacation or spare-time work would also be needed.

Students in the following types of university courses are eligible for assistance:

- Undergraduate and graduate bachelor degree courses
- Graduate diplomas
- Approved combined bachelor degree courses
- Masters qualifying courses (one year)

The rates of allowance and conditions for eligibility are set out in a booklet obtainable from the Commonwealth Department of Education.

It is most important that students advise the TEAS office if at any time they change or discontinue their study programs, as their eligibility for benefits might be affected.

Other Financial Assistance

In addition to the Tertiary Education Assistance Scheme financed by the Australian Government the following forms of assistance are available:

1. *Deferment of Payment of Fees* Deferments may be granted for a short period, usually one month, without the imposition of a late fee penalty, provided the deferment is requested prior to the due date for fee payments.

2. *Short Term Cash Loans* Donations from various sources have made funds available for urgent cash loans not exceeding $100. These loans are normally repayable within one month.

3. Early in 1973 the Commonwealth Government made funds available to the University to provide loans to students in financial difficulty. The loans are to provide for living allowances and other approved expenses associated with attendance at university. Students are required to enter into a formal agreement with the University to repay the loan. The University is unable to provide from the fund amounts large enough for all or even a major part of the living expenses of a student.

From the same source students who are in extremely difficult financial circumstances may apply for assistance by way of a non-repayable grant. In order to qualify for a grant a student must generally show that the financial difficulty has arisen from exceptional misfortune. Grants are rarely made.

The University has also been the recipient of generous donations from the Arthur T. George Foundation, started by Sir Arthur George and his family, for the endowment of a student loan fund.

In all cases assistance is limited to students with reasonable academic records and whose financial circumstances warrant assistance.

Enquiries about all forms of financial assistance should be made at the office of the Deputy Registrar (Student Services), Room 148E, the Chancellery.

Financial Assistance to Aboriginal Students

Financial assistance is available to help Aboriginal students from the Commonwealth Government's Aboriginal Study Grant Scheme. Furthermore, the University may assist Aboriginal students with loans to meet some essential living expenses.

The University has also received a generous bequest from the estate of the late Alice Brooks Gange for the education of Australian aborigines within the University. The University is engaged in consultations with groups and individuals for advice on the most effective ways of using the funds and has established a committee to advise the Vice-Chancellor in the matter.

All enquiries relating to these matters should be made at the office of the Deputy Registrar (Student Services), Room 148E, the Chancellery.

Rules and Procedures

The University, in common with other large organizations, has established rules and procedures which are designed for the benefit of all members of the University. In some cases there are penalties (eg fines or exclusion from examinations) for non-compliance. Any student who, after carefully reading the rules set out in the following pages, requires further information on their application should seek further advice, in the first instance, at the Enquiry Counter in the North Wing of the Chancellery Building.

General Conduct

The University has not considered it necessary to formulate a detailed code of rules relating to the general conduct of students. Enrolment as a student of the University, however, involves an undertaking to observe the regulations, by-laws and rules of the University, and to pay due regard to any instructions given by any officer of the University.

Appeals

Section 5(c) of Chapter III of the By-laws provides that 'Any person affected by a decision of any member of the Professorial Board (other than the Vice-Chancellor) in respect of breach of discipline or misconduct may appeal to the Vice-Chancellor, and in the case of disciplinary action by the Vice-Chancellor, whether on appeal or otherwise, to the Council'.

Admission and Enrolment

The Student Enquiry Counter, located near the Cashier in the Chancellery on the upper campus, provides information for students on admission requirements, undergraduate and graduate courses and enrolment procedures. Faculty handbooks and the Calendar may be purchased from the Cashier. The Enquiry Counter is open from 9 am to 1 pm and 2 pm to 5 pm, Monday to Friday. During enrolment it is also open on some evenings.

Information may be obtained here about admission to first year undergraduate courses, special admission, admission with advanced standing and admission on overseas qualifications. Applications are also received from students who wish to transfer from one course to another, resume their studies after an absence of twelve months or more, or seek any concession in relation to a course in which they are enrolled.

Applications for admission to undergraduate courses from students who do not satisfy the requirements for admission (see section on **Admission Requirements**) are referred by the Admissions Section to the Admissions Committee of the Professorial Board.

It is essential that the closing dates for lodgement of applications are adhered to. For further details see the section on **Enrolment Procedures and Fees.**

Students wishing to enrol as higher degree candidates should first consult the Head of the School in which they wish to study. An application is then lodged on a standard form and the Postgraduate Section, after obtaining a recommendation from the Head of School, refers the application to the appropriate Faculty or Board of Studies Higher Degree Committee.

An Adviser for Prospective Students, Mrs Fay Lindsay, is located in the Chancellery, and is available for personal interview with those who require additional information about the University.

First Year Entry

Those seeking entry to first year courses in one or more of nineteen tertiary institutions in the State including all universities are required to lodge a single application form with the Universities and Colleges Admissions Centre (GPO Box 7049, Sydney 2001). On the application form provision is made for applicants to indicate preferences for courses available in any one of the six universities and the other tertiary institutions. Students are notified individually of the result of their applications and provided with information regarding the procedures to be followed in order to accept the offer of a place at this university. Enrolment is completed at the Enrolment Bureau, Unisearch House, 221 Anzac Parade, Kensington.

Deferment of First Year Enrolment

Students proceeding directly from school to University who have received an offer of a place may request deferment of enrolment for one year and will usually receive permission providing they do not enrol at another tertiary institution in that year.

Enrolment Procedures and Fees Schedules 1985

1. Introduction

All students, except those enrolling in graduate research degree courses (see sections **5.** and **6.** below), must lodge an authorized enrolment form with the Cashier either on the day the enrolling officer signs the form or on the day any required General Studies electives are approved.

All students, except those enrolling in graduate research degree courses and those exempted as set out in section **17.** below, should on that day also either pay the required fees or lodge an enrolment voucher or other appropriate authority.

Such vouchers and authorities are generally issued by the NSW Department of Education and the NSW Public Service. They are not always issued in time and students who expect to receive an enrolment voucher or other appropriate authority but have not done so should pay the student activities fees and arrange a refund later. Such vouchers and authorities are not the responsibility of the University and their late receipt is not to be assumed as automatically exempting a student from the requirements of enrolling and paying fees.

If a student is unable to pay the fees the enrolment form must still be lodged with the Cashier and the student will be issued with a 'nil' receipt. The student is then indebted to the University and must pay the fees by the end of the second week of the session for which enrolment is being effected.

Penalties apply if fees are paid after the time allowed (see section **16.** below) unless the student has obtained an extension of time in which to pay fees from the Admissions Office, the Chancellery. Such an application must be made before the fee is due. Payment may be made through the mail, in which case it is important that the student registration number be given accurately. Cash should not be sent through the mail.

2. New Undergraduate Enrolments

Persons who are applying for entry in 1985 must lodge an application for selection with the Universities and Colleges Admissions Centre, GPO Box 7049, Sydney 2001, by 2 October 1984.

Those who are selected will be required to complete enrolment at a specified time before the start of Session 1. Compulsory student activities fees should be paid on the day.

In special circumstances, however, and provided class places are still available, students may be allowed to complete enrolment after the prescribed time.

Application forms and details of the application procedures may be obtained from the Student Enquiries Counter, Ground Floor, North Wing of the Chancellery Building.

3. Re-enrolment

See also sections 4., 6. and 7. below.

Students who are continuing courses (or returning after approved leave of absence) should enrol through the appropriate school in accordance with the procedures set out in the current *Enrolment Procedures* booklet, available from the Student Enquiries Counter in the Chancellery and from School offices. Those who have completed part of a course and have been absent without leave need to apply for entry through the Universities and Colleges Admissions Centre, GPO Box 7049, Sydney 2001, by 2 October 1984.

4. Restrictions Upon Re-enrolling

Students who in 1984 have infringed the rules governing re-enrolment should not attempt to re-enrol in 1985 but should follow the written instructions they will receive from the Registrar.

5. New Research Students

Students enrolling for the first time in graduate research degree courses will receive an enrolment form by post. They have two weeks from the date of offer of registration in which to lodge the enrolment form with the Cashier. Completion of enrolment after this time will incur a penalty (see section **16.** below).

6. Re-enrolling Research Students

Students undertaking purely research degree programs (course codes **0-2999**) will be re-enrolled automatically each year and sent an account for any fees due.

7. Submission of Project Report

Students registered for formal masters degree programs (course codes 8000-9999) who at the commencement of Session 1 have completed all the work for a degree or diploma except for the submission of the relevant thesis or project report are required to re-enrol by the end of the second week of Session 1. Completion of enrolment after then will incur a penalty (see section **16.** below).

Information about possible student activities fees exemption is set out in section **17.** (10) below.

8. Enrolments by Miscellaneous Students

Enrolments by Miscellaneous students are governed by the following rules:

(1) Enrolment in a particular subject or subjects as a miscellaneous student — ie as a student not proceeding to a degree or diploma — may be permitted provided that in every case the Head of School offering the subject considers that the student will benefit from the enrolment and provided also that accommodation is available and that the enrolment does not prevent a place in that subject being available to a student proceeding to a degree or diploma.

(2) A student who is under exclusion from any subject in the University may not be permitted to be enrolled as a miscellaneous student in that subject.

(3) A student who is under exclusion from any course in the University may not be permitted to enrol in any subject which forms a compulsory component of the course from which the student is excluded.

(4) A student who is subsequently admitted to a course of the University for which any subjects completed as a miscellaneous student form a part may receive standing for those subjects.

(5) There are quota restrictions on the number of students allowed to enrol as miscellaneous, irrespective of whether they have approval from the Head of School. Applicants with written Head of School approval may be permitted to enrol providing there are places available in the quotas.

9. Final Dates for Completion of Enrolment

No enrolments for courses extending over the whole year or for Session 1 only will be accepted from new students after the end of the second week of Session 1 (15 March 1985) except with the express approval of the Deputy Registrar (Student Services) and the Heads of the Schools concerned; no later year enrolments for courses extending over the whole year or for Session 1 only will be accepted after the end of the fourth week of Session 1 (29 March 1985) except with the express approval of the Deputy Registrar (Student Services) and the Heads of the Schools concerned. No enrolments for courses in Session 2 only will be accepted after the end of the second week of Session 2 (2 August 1985) except with the express approval of the Deputy Registrar (Student Services) and the Heads of the Schools concerned.

10. University of New South Wales and University Union Membership Card

All students enrolled in degree or diploma courses or as miscellaneous students, except those exempt from University Union fees under provisions of section **17.** below, are issued with a University of New South Wales and University Union Membership Card. This card must be carried during attendance at the University and shown on official request.

The number appearing on the front of the card above the student's name is the student registration number used in the University's records. This number should be quoted in all correspondence.

The card must be presented when borrowing from the University libraries, when applying for travel concessions, and when notifying a change of address. It must also be presented when paying fees on re-enrolment each year when it will be made valid for the year and returned. Failure to present the card could result in inconvenience in completing re-enrolment.

Life members of the University Union and those exempt from payment of University Union fees, if enrolled in degree or diploma courses or miscellaneous students use the University's fees receipt in place of the card when applying for travel concessions and when notifying a change of address. The University Library issues a library borrowing card on production of the fees receipt.

A student who loses a card must notify the University Union as soon as possible.

New students are issued with cards on enrolment if eligible.

New graduate students should complete an application for a card when they enrol unless they already possess one from previous study at the University. The card can be collected from the second floor of the University Union Blockhouse approximately three weeks after enrolment. The fees receipt may be used as necessary until the card is available.

11. Payment of Fees

The fees and charges which are payable include those charges raised to finance the expenses incurred in operating activities such as the University Union, the Students' Union, the Sports Association, and the Physical Education and Recreation Centre. Penalty payments are also incurred if a student fails to complete procedures as required. Charges may also be payable, sometimes in the form of a deposit, for the hiring of kits of equipment in certain subjects. Accommodation charges, costs of subsistence on excursions, field work, etc, and for hospital residence (medical students) are payable in appropriate circumstances.

12. Assisted Students

Scholarship holders and sponsored students who have not received an enrolment voucher or appropriate letter of authority from their sponsor at the time when they are enrolling should complete their enrolment by paying their own fees.

A refund of fees will be made when the enrolment voucher or letter of authority is subsequently lodged with the Cashier.

Those unable to pay their own fees in these circumstances can apply for an extension of time in which to pay. Such an application must be made before the fees are due.

13. Extension of Time

Students who are unable to pay fees by the due date may apply for an extension of time, which may be granted in extenuating circumstances. Such applications must be made before the due date.

14. Failure to Pay Fees and Other Debts

Students who fail to pay prescribed fees or charges or are otherwise indebted to the University and who fail either to make a satisfactory settlement of indebtedness upon receipt of due notice or to receive a special exemption ceases to be entitled to the use of University facilities. Such students are not permitted to register for a further session, to attend classes or examinations, or to be granted any official credentials. In the case of students enrolled for Session 1 only or for both Sessions 1 and 2 this disbarment applies if any portion of fees is outstanding after the end of the eighth week of Session 1 (26 April 1985). In the case of students enrolled for Session 2 only this disbarment applies if any portion of fees is outstanding after the end of the sixth week of Session 2 (30 August 1985).

In special cases the Registrar may grant exemption from the disqualification referred to in the preceding paragraph upon receipt of a written statement setting out all relevant circumstances.

15. Fees

Fees and penalties quoted are current at the time of publication but may be amended by the University without notice.

University Union Entrance Fee

Payable on first enrolment $38

Students enrolling for only one session must pay the full University Union entrance fee.

Student Activities Fees

All students (with the exceptions set out in section **17.** below) are required to pay the following fees if enrolling for a program involving two sessions. Those enrolling for only one session will pay the full University Union Entrance Fee, if applicable, and one-half of any other fees due.

Students who consider themselves eligible for life membership of the University Union, the Sports Association, or the Students' Union, should make enquiries about the matter at the offices of those bodies.

Students often seek exemption from some or all of the student activities fees for reasons other than those set out in section **17.** below. It is stressed that the fees charged are a contribution by students towards services and amenities for the University community (both now and in the future) and exemption from them cannot be claimed because a student is unable or unwilling to make use of some of those services or amenities.

Student Activities Fees are adjusted annually by a system of indexation and those set out below are current in 1984 and are therefore subject to an increase in 1985.

University Union annual subscription $108

Sports Association annual subscription $23

Students' Union Annual Subscription

Students enrolling in full-time courses $32

Students enrolling in part-time courses or as miscellaneous students $26

Miscellaneous Fund annual fee $38

This fee is used to finance expenses generally of a capital nature relating to student activities and amenities. Funds are allocated for projects recommended by the Student Affairs Committee and approved by the University Council.

Special Examination Fees

Examinations conducted in special circumstances for each subject $20

Review of examination results for each subject $20

Other Charges

In addition to the fees outlined above and depending on the subject being taken, students may be required to make a payment for equipment; money so paid is, in general, refunded if the equipment is returned in satisfactory condition.

16. Penalties

(1) Failure to lodge enrolment form according to enrolment procedure $20

(2) Payment of fees after end of second week of session $20

(3) Payment of fees after end of fourth week of session $40

Penalties (1) and (2) or (1) and (3) may accumulate.

17. Exemptions — fees

Students often seek exemption from the fees for reasons other than those set out below. It is stressed that the fees charged are a contribution by students towards services and amenities for the University community (both now and in the future) and exemption from them cannot be claimed because a student is unable or unwilling to make use of some of those services or amenities.

(1) Life members of the University Union, the Sports Association, and Students' Union are exempt from the relevant fee or fees.

Students who consider themselves eligible for life membership of the University Union, the Sports Association, or the Students' Union, should make enquiries about the matter at the offices of those bodies, not at the office of the Deputy Registrar (Student Services) or at the Cashier's office.

(2) Students enrolled in courses classified as *External* are exempt from all Student Activities Fees and the University Union Entrance Fee.

(3) Students enrolled in courses at the W. S. and L. B. Robinson University College and in the Faculty of Military Studies are exempt from the Student Activities Fees and the University Union Entrance Fee in section **15.** above but shall pay such other fees and charges as the Council may from time to time determine.

(4) University Union fees and subscriptions may be waived by the Deputy Registrar (Student Services) for students enrolled in graduate courses in which the formal academic requirements are undertaken at a part of the University away from the Kensington campus.

(5) Students who while enrolled at and attending another university (or other tertiary institution as approved by the Vice-Chancellor) in a degree or diploma course are given approval to enrol at the University of New South Wales but only as miscellaneous students for subjects to be credited towards the degrees or diplomas for which they are enrolled elsewhere are exempt from all Student Activities Fees and the University Union Entrance Fee.

Institutions approved are: Australian Film and Television School, New South Wales Institute of Technology, Sydney College of Advanced Education and Sydney College of Chiropractic.

(6) Undergraduate students of a recognized university outside Australia who attend the University of New South Wales with the permission of the dean of the appropriate faculty and of the head of the appropriate school or department to take part as miscellaneous students in an academic program relevant to their regular studies and approved by the authorities of their own institution are exempt from all Student Activities Fees and the University Union Entrance Fee.

(7) Graduate students not in attendance at the University and who are enrolling in a project only other than for the first time, are exempt from all Student Activities Fees.

(8) Graduate students resubmitting a thesis or project only are exempt from all Student Activities Fees.

(9) All Student Activities Fees, for one or more sessions, may be waived by the Deputy Registrar (Student Services) for students who are given formal permission to pursue their studies at another institution for one or more sessions.

(10) Graduate students who have completed all the work for a qualification at the commencement of session, except for the submission of the relevant thesis or project report, may be exempted from the payment of Student Activities Fees by the Deputy Registrar (Student Services) on production of an appropriate statement signed by the relevant Supervisor or Head of School.

(11) Students enrolled in a session or sessions devoted entirely to training or experience away from the campus and its associated laboratories, hospitals, centres, institutes, and field stations are exempt from all Student Activities Fees for that session or sessions.

(12) Students whose registration is cancelled or suspended by the University shall receive refunds of fees paid in accordance with the provisions of section **18.** (5) below except that a refund of one half of the fees shall be made if such cancellation or suspension takes place between the end of the fourth week of Session 1 and the end of the fourth week of Session 2.

18. Variations in Enrolment (including Withdrawal)

(1) Students wishing to vary an enrolment program must make application on the form available from the appropriate Course Authority.

(2) Students withdrawing from courses (and see also information about withdrawal from subjects below) are required to notify the Registrar in writing. In some cases such students will be entitled to fee refunds (see below).

(3) Enrolment in additional subjects

Applications for enrolment in additional subjects must be submitted by:

29 March 1985 for Session 1 only and whole year subjects;
16 August 1985 for Session 2 only subjects.

(4) Withdrawal from subjects

Applications to withdraw from subjects may be submitted throughout the year but applications lodged after the following dates will result in students being regarded as having failed the subjects concerned, except in special circumstances:

(a) for one session subjects, the end of the seventh week of that session (19 April or 13 September)

(b) for whole year subjects, the end of the second week of Session 2 (2 August).

(5) Withdrawal from Course – Refunds – Student Activities Fees

Whether or not a student's withdrawal entails academic penalties (covered in item (4) above) there are rules governing Student Activities Fees refunds in the case of complete withdrawal from a course as follows:

(a) If notice of withdrawal from a course is received by the Student Records and Scholarships Office before the first day of Session 1, a refund of all Student Activities Fees paid will be made.

(b) If notice of withdrawal is received on or after the first day of Session 1, a partial refund of the University Union Entrance Fee will be made on the following basis: any person who has paid the entrance fee in any year and who withdraws from membership of the University Union after the commencement of Session 1 in the same year, or who does not renew membership in the immediately succeeding year may on written application to the Warden receive a refund of half the entrance fee paid.

(c) If the notice of withdrawal is given before the end of the fourth week of Session 1 (29 March 1985) a full refund of Student Activities Fees paid will be made; if notice is given before the end of the seventh week of Session 1 (19 April 1985) a refund of three-quarters of the Student Activities Fees paid will be made; if notice is given before the beginning of Session 2 (22 July 1985) a refund of one-half of the Student Activities Fees paid will be made; if notice is given before the end of the seventh week of Session 2 (13 September 1985) a refund of one-quarter of Student Activities Fees paid will be made; thereafter no refund will be made except that provided for in (d) below.

(d) If a student's enrolment in any year is for one session only and the student gives notice of withdrawal prior to the end of the fourth week of that session (29 March or 16 August 1985) a full refund of Student Activities Fees paid will be made; if notice is given before the end of the seventh week of that session (19 April or 13 September 1985) a refund of one-half of the Student Activities Fees paid will be made; thereafter no refund will be made.

(e) The refunds mentioned in (c) and (d) above may be granted by the Deputy Registrar (Student Services) to a student unable to notify the Student Records and Scholarships Office in writing by the times required provided evidence is supplied that the student has ceased attendance by those times.

(6) Acknowledgements

The Student Records and Scholarships Office will acknowledge each application for a variation in enrolment (including withdrawals from subjects) as follows:

(a) variations lodged before the Friday of the seventh week of each session (19 April or 13 September) will be incorporated in the *Confirmation of Enrolment Program* notice forwarded to students on 29 April or 23 September as appropriate

(b) variations lodged after those dates will be acknowledged by letter

(c) withdrawals from a course are acknowledged individually whenever they are lodged.

(7) It is emphasized that failure to attend for any assessment procedure, or to lodge any material stipulated as part of an assessment procedure, in any subject in which a student is enrolled will be regarded as failure in that assessment procedure unless written approval to withdraw from the subject without failure has been obtained from the Student Records and Scholarships Office.

19. Exemption – Membership

The Registrar is empowered to grant exemption from membership of any or all of the University Union, the Students' Union and the Sports Association to students who have a genuine conscientious objection to such membership, subject to payment of the prescribed fees to the Miscellaneous Fund.

Leave of Absence

Leave of absence from an undergraduate course of study may be granted to students other than those in the first year of a course. Leave of absence has generally been restricted to one year but in special circumstances two years have been granted.

To apply for such leave of absence, a letter should be submitted to the Registrar immediately following the release of annual examination results and must include the student's full name, registration number, the course and stage in which enrolled in the previous year and, most important, the reason *why* leave is being sought. The letter advising the result of the application will provide details about how to re-enrol.

Students who withdraw from the first year of their course *are not* granted leave of absence and must again apply for a place through the Universities and Colleges Admissions Centre.

Course Transfers

Students wishing to transfer from one course to another must complete and submit an application form, obtainable from the office of the Admissions Section, the Chancellery, by Friday 11 January 1985.

Students whose applications to transfer are successful, and who are *transferring from one school to another* are required to comply with the enrolment procedure laid down for new students with advanced standing. *Students transferring* from one course to another *within the same school* are required to attend the appropriate enrolment session for the course to which they have approval to transfer.

Students must present the approval to transfer to the enrolling officer, and those who have not received advice regarding their application to transfer before the date on which they are required to enrol should check with the office of the Admissions Section.

Students should also advise the enrolling officer in the school in which they were enrolled in 1984 of their intention to transfer.

Admission with Advanced Standing

Any persons who make application to register as a candidate for any degree or other award granted by the University may be admitted to the course of study leading to such degree or award with such standing on the basis of previous attainments as may be determined by the Professorial Board provided that:

1. the Board shall not grant such standing under these rules as is inconsistent with the rules governing progression to such degree or award as are operative at the time the application is determined;

2. where students transfer from another university such students shall not in general be granted standing in this University which is superior to what they have in the University from which they transfer;

3. the standing granted by the Board in the case of any application based on any degree/s or other awards already held by the applicants, shall not be such as will permit them to qualify for the degree or award for which they seek to register without completing the courses of instruction and passing the examinations in at least those subjects comprising the later half of the course, save that where such a program of studies would involve them repeating courses of instruction in which the Board deems them to have already qualified, the Board may prescribe an alternative program of studies in lieu thereof;

4. the standing granted by the Board in the case of any application based on partial completion of the requirements for any degree or other award of another institution shall not be such as will permit the applicants to qualify for the degree or award for which they seek to register by satisfactory completion of a program of study deemed by the Board to be less than that required of students in full-time attendance in the final year of the course in which the applicants seek to register;

5. the standing granted by the Board in the case of any application based on the partial completion of the requirements for any degree or other award of the University may be such as to give full credit in the course to which the applicants seek to transfer for work done in the course from which they transfer.

Where the identity between the requirements for any award of the University already held and that of any other award of the University is such that the requirements outstanding for the second award are less than half the requirements of that award, students who merely complete such outstanding requirements shall not thereby be entitled to receive the second award but shall be entitled to receive a statement over the hand of the Registrar in appropriate terms.

Resumption of Courses

Students who have had a leave of absence for twelve months and wish to resume their course should follow the instructions about re-enrolling given in the letter granting leave of absence. If these instructions are not fully understood or have been lost, students should contact the office of the Admissions Section before November in the year preceding the one in which they wish to resume their course.

If students have not obtained leave of absence from their course and have not been enrolled in the course over the past twelve months or more, they should apply for admission to the course through the Universities and Colleges Admissions Centre before 1 October in the year preceding that in which they wish to resume studies.

Examinations

Examinations are held in June/July and in November/December.

Timetables

Provisional timetables indicating the dates and times of examinations are posted on the University noticeboards in May and October. Students must advise the Examinations Section (the Chancellery) of any clash in examinations.

Final timetables indicating the dates, times, locations, and authorized aids are available for students two weeks before the end of each session.

Misreading of the timetable is not an acceptable excuse for failure to attend any examination.

Assessment of Course Progress

In the assessment of a student's progress in a course, consideration may be given to work in laboratory and class exercises and to any term or other tests given throughout the year as well as to the results of written examinations.

Examination Results

Grading of Passes

Passes are graded as follows:

High Distinction	an outstanding performance
Distinction	a superior performance
Credit	a good performance
Pass	an acceptable level of performance
Satisfactory	satisfactory completion of a subject for which graded passes are not available

Pass Conceded

A pass conceded may be granted provided that the overall performance is considered to warrant such a concession. A pass conceded in a subject will allow progression to another subject for which the former subject is a prerequisite.

Pass Terminating

A pass terminating may be granted provided that the overall performance is considered to warrant such a concession. A pass terminating does not allow progression to another subject for which the former subject is a prerequisite.

Availability of Results

Final examination results will be posted to a student's term address, or vacation address if requested. Forms requesting that results be posted to a vacation address and change of address forms are obtainable at the Student Enquiry Counter, the Chancellery. Forms can be accepted up to Friday 28 June for Session 1 results and Friday 29 November for Session 2 and whole year results. Results are also posted on School noticeboards and in the University Library. Results on noticeboards are listed *by Student Registration Number.*

No examination results are given by telephone.

Review of Results

A student may make application to the Registrar for the review of a result. The application form, accompanied by an appropriate fee, must be submitted not later than fifteen working days after the date of issue of the *Notification of Result of Assessment* form.

In reviewing a result, the subject authorities shall ensure that all components of the assessment have been assessed and a mark assigned.

A review of a result is not a detailed reassessment of a student's standard of knowledge and understanding of, and skills in, the subject. It is rather a search for arithmetic error in arriving at the composite mark and for gross and obvious error in assignment of marks in components of the final composite mark.

When a change in grade is recommended, the application fee will be refunded by the Registrar.

Special Consideration

Students who believe that their performance in a subject, either during session or in an examination, has been adversely affected by sickness or any other reason should inform the Registrar and ask for special consideration in the determination of their standing.

Such requests should be made as soon as practicable after the occurrence and in any event no more than seven days after the final examination in a subject.

When submitting a request for special consideration students should provide all possible supporting evidence (eg medical certificates) together with their registration number and enrolment details.

Physical Disabilities

Students suffering from a physical disability which puts them at a disadvantage in written examinations should advise Student Records (Ground Floor, the Chancellery) immediately their disability is known. If necessary, special arrangements will be made to meet the student's requirements.

Students who are permanently disabled and need the Examinations Section to make special arrangements for their examinations, should contact Student Records as soon as the final timetable becomes available.

Use of Electronic Calculators

Where the use of electronic calculators has been approved by a faculty or school, examiners may permit their use in examinations. Authorized electronic calculators are battery operated with the minimum operations of addition, subtraction, multiplication and division and are of a type in common use by university students. They are not provided by the University, although some schools may make them available in special circumstances.

Examinations Held Away from the Campus

Except in the case of students enrolled on external courses, examinations will not be permitted away from the campus unless the candidate is engaged on *compulsory industrial training*. Candidates must advise the Officer-in-charge, Examinations Section, immediately the details of the industrial training are known. Special forms for this purpose are available at the Student Enquiry Counter in the north wing of the Chancellery.

Arrival at Examinations

Examination Rooms will be open to students twenty-five minutes before the commencement of the examination. Candidates are requested to be in their places at least fifteen minutes before the commencement to hear announcements.

Reading the Examination Paper

The examination paper will be available for reading ten minutes before the instruction is given to commence writing.

Use of Linguistic Dictionaries

The answers in all examinations and in all work submitted must be in English unless otherwise directed. Students may apply for permission to use standard linguistic dictionaries in the presentation of written work for assessment. Such applications should be made in writing to the Registrar not later than 14 days prior to the need to use the linguistic dictionary.

Academic Misconduct

Students are reminded that the University regards academic misconduct as a very serious matter. Students found guilty of academic misconduct are usually excluded from the University for two years. Because of the circumstances in individual cases the period of exclusion can range from one session to permanent exclusion from the University.

The following are some of the actions which have resulted in students being found guilty of academic misconduct in recent years: use of unauthorized aids in an examination; submitting work for assessment knowing it to be the work of another person; improperly obtaining prior knowledge of an examination paper and using that knowledge in the examination; failing to acknowledge the source of material in an assignment.

Conduct of Examinations

Examinations are conducted in accordance with the following rules and procedure:

1. Candidates are required to obey any instruction given by an examination supervisor for the proper conduct of the examination.

2. Candidates are required to be in their places in the examination room not less than fifteen minutes before the time for commencement.

3. No bag, writing paper, blotting paper, manuscript or book, other than a specified aid, is to be brought into the examination room.

4. Candidates shall not be admitted to an examination after thirty minutes from the time of commencement of the examination.

5. Candidates shall not be permitted to leave the examination room before the expiry of thirty minutes from the time the examination commences.

6. Candidates shall not be re-admitted to the examination room after they have left it unless, during the full period of their absence, they have been under approved supervision.

7. Candidates shall not by any improper means obtain, or endeavour to obtain, assistance in their work, give, or endeavour to give, assistance to any other candidate, or commit any breach of good order.

8. All answers must be in English unless otherwise stated. Foreign students who have the written approval of the Registrar may use standard linguistic dictionaries.

9. Smoking is not permitted during the course of examinations.

10. A candidate who commits any infringement of the rules governing examinations is liable to disqualification at the particular examination, to immediate expulsion from the examination room and to such further penalty as may be determined in accordance with the By-laws.

Writing in Examinations

Candidates are permitted to take pens, pencils and erasers into the examination room but are advised that all answers must be written in ink. Except where expressly required, pencils may be used only for drawing, sketching or graphical work.

Acknowledgement of Sources

Students are expected to acknowledge the source of ideas and expressions used in submitted work. To provide adequate documentation is not only an indication of academic honesty but also a courtesy enabling the marker to consult sources with ease. Failure to do so may constitute plagiarism, which is subject to a charge of academic misconduct.

Further Assessment

In special circumstances further assessment including assessment or further assessment on medical or compassionate grounds may be granted.

Further assessment may be given by the subject authority at his or her discretion at any time prior to the meeting of the relevant faculty assessment committee (normally the fourth week of the Midyear Recess and the second week of December). Further assessment may also be awarded at the faculty assessment committee and students affected may need to be free to undertake that further assessment in the last week in the Midyear Recess and in the period up to the end of the second week in January; students should consult their subject authority for details of further assessment immediately their results are known.

Restrictions upon Student Re-enrolling

The University Council has adopted the following rules governing re-enrolment with the object of requiring students with a record of failure to show cause why they should be allowed to re-enrol and retain valuable class places.

First Year Rule

1. Students enrolled in the first year of any undergraduate course of study in the University shall be required to show cause why the should be allowed to continue the course if they do not pass the minimum number of subjects, units or credits prescribed for this purpose by the relevant faculty or board of studies.

The prescribed minimum for each undergraduate course may be found in **Schedule A** below; the schedule may be varied from time to time by the Professorial Board.

Repeated Failure Rule

2. Students shall be required to show cause why they should be allowed to repeat a subject which they have failed more than once. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

General Rule

3. (1) Students shall be required to show cause why they should be allowed to repeat a subject they have failed if the assessment committee of the faculty or board of studies so decides on the basis of previous failures in that subject or in a related subject. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

(2) Students shall be required to show cause why they should be allowed to continue their course if the assessment committee of the faculty or board of studies so decides on the basis of their academic record.

The Session-Unit System

4. (1) Students who infringe the provisions of Rules **1.** or **2.** at the end of Session 1 of any year will be allowed to repeat the subject(s) (if offered) and/or continue the course in Session 2 of that year, subject to the rules of progression in the course.

(2) Such students will be required to show cause at the end of the year, except that students who infringe Rule **2.** at the end of Session 1, and repeat the subjects in question in Session 2, and pass them, will not be required to show cause on account of any such subjects.

Exemption from Rules by Faculties

5. (1) A faculty or board of studies assessment committee may, in special circumstances, exempt students from some or all of the provisions of Rules **1.** and **2.**

(2) Such students will not be required to show cause under such provisions and will be notified accordingly by the Registrar.

Showing Cause

6. (1) Students wishing to show cause must apply for special permission to re-enrol. Application should be made on the form available from the Registrar and must be lodged with the Registrar by the dates published annually by the Registrar. A late application may be accepted at the discretion of the University.

(2) Each application shall be considered by the Admissions and Re-enrolment Committee of the relevant faculty or board of studies which shall determine whether the cause shown is adequate to justify the granting of permission to re-enrol.

Appeal

7. (1) Students who are excluded by the Admissions and Re-enrolment Committee from a course and/or subject under the provisions of the Rules will have their applications to re-enrol reconsidered automatically by the Re-enrolment Committee of the Professorial Board.

(2) Students whose exclusion is upheld by the Re-enrolment Committee may appeal to an Appeal Committee constituted by Council for this purpose with the following membership:

A Pro-Vice-Chancellor, nominated by the Vice-Chancellor who shall be Chairman.

The Chairman of the Professsional Board, or if its chairman is unable to serve, a member of the Professorial Board, nominated by the Chairman of the Professorial Board, or when the Chairman of the Professorial Board is unable to make a nomination, nominated by the Vice-Chairman.

One of the category of members of the Council elected by the graduates of the University, nominated by the Vice-Chancellor.

The decision of the Committee shall be final.

(3) The notification to students of a decision which has been upheld by the Re-enrolment Committee of the Professorial Board to excude them from re-enrolling in a course and/or subject shall indicate that they may appeal against that decision to the Appeal Committee. The appeal must be lodged with the Registrar within fourteen days of the date of notification of exclusion; in special circumstances a late appeal may be accepted at the discretion of the chairman of the Appeal Committee. In lodging such an appeal with the Registrar students should provide a complete statement of all grounds on which the appeal is based.

(4) The Appeal Committee shall determine appeals after consideration of each appellant's academic record, application for special permission to re-enrol, and stated grounds of appeal. In particular circumstances, the Appeal Committee may require students to appear in person.

Exclusion

8. (1) Students who are required to show cause under the provisions of Rules **1.** or **3.** and either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Committee on appeal) shall be excluded, for a period not in excess of two years, from re-enrolling in the subjects and courses on account of which they were required to show cause. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

(2) Students required to show cause under the provisions of Rule **2.** who either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Committee on appeal) shall be excluded, for a period not in excess of two years, from re-enrolling in any subject they have failed twice. Where the subjects failed are prescribed as part of a course they shall also be excluded from that course. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

Re-admission after Exclusion

9. (1) Excluded students may apply for re-admission after the period of exclusion has expired.

(2) (a) Applications for re-admission to a course should be made to the Universities and Colleges Admissions Centre before the closing date for normal applications in the year prior to that in which re-admission is sought. Such applications will be considered by the Admissions and Re-enrolment Committee of the relevant faculty or board of studies.

(b) Applications for re-admission to a subject should be made to the Registrar before 30 November in the year prior to that in which re-admission is sought. Such applications will be considered by the relevant subject authority.

(3) Applications should include evidence that the circumstances which were deemed to operate against satisfactory performance at the time of exclusion are no longer operative or are reduced in intensity and/or evidence of action taken (including enrolment in course/s) to improve capacity to resume studies.

(4) Students whose applications for re-admission to a course or subject are unsuccessful (see **9.** (2) (a), (b) respectively) will be invited to appeal to the Re-Enrolment Committee of the Professorial Board. The decision of the Re-Enrolment Committee will be final.

10. Students who fail a subject at the examinations in any year or session and re-enrol in the same course in the following year or session must include in their programs of studies for that year or session the subject which they failed. This requirement will not be applicable if the subject is not offered the following year or session, is not a compulsory component of a particular course, or if there is some other cause which is acceptable to the Professorial Board, for not immediately repeating the failed subject.

Restrictions and Definitions

11. (1) These rules do not apply to students enrolled in programs leading to a higher degree or graduate diploma.

(2) A subject is defined as a unit of instruction identified by a distinctive subject number.

Schedule A

(See First Year Rule **1.** above)

Where the minimum requirement is half the program, this is defined as half the sum of the unit values of all the subjects in a student's program.

Faculty/Board of Studies	Minimum Requirement	Course	Unit Values (UV)
Applied Science	Half the program	3000-3220 4190-4220	One-session subjects: UV 1 Two-session subjects: UV 2
Architecture	Half the program	3270, 3275, 3330	Elective subjects: UV 0 All other subjects: appropriate UV corresponding to credit points*
		3320	All subjects: UV equal to the allocated hours*
		3360, 3380	Elective subjects: UV 0 All other subjects: UV equal to the allocated hours*
Arts	18 Level I credit points	3400-3420	
Biological Sciences	4 units	3430	Science subjects: appropriate UV* Arts subjects: 6 credit points = UV 1 12 credit points = UV 2
Commerce	Three subjects	3490-3595 FT in both sessions	
	Two subjects	3490-3595 PT in either session	
Engineering	Half the program including Physics I or Mathematics I	3610, 3660, 3680, 3700	5.061: UV 0 One-session subjects: UV 1 Two-session subjects: UV 2
	Half the program including Mechanics of Solids or Mathematics I	3620, 3730	All subjects: UV equal to the allocated hours*
	Half the program including Physics I or Mathematics I	3640, 3720	One-session subjects: UV 1 Two-session subjects: UV 2
	Half the program	3740-3760	One-session subjects: UV 1 Two-session subjects: UV 2
Law	Half the program	4710-4790	One-session subjects: UV 1 90.741: UVO All other two-session subjects: UV 2
Medicine	Half the program	3800	80.010: UV 3 81.001: UV 3 81.002: UV 6 70.001: UV 4 One General Studies elective: UV 1
Military Studies	Half the program	BA, BSc	All subjects: UV 1
		BE	All subjects: appropriate weighted mark*
Professional Studies	Half the program	4030, 4040	All subjects: UV 1
		4070-4080	All subjects: appropriate UV* One General Studies elective: UV1
Science	Half the program	3910, 3950	All subjects: appropriate UV* One General Studies elective: UV 1
Science and Mathematics	2 units	3970	All subjects: appropriate UV* One General Studies elective: UV 1

*For details see the appropriate Faculty Handbook.

Admission to Degree or Diploma

Students whose current program will enable them to complete all requirements for the degree or diploma, including industrial training where necessary, should lodge with the Registrar the form *Application for Admission to Degree/ Diploma* and return it to the Registrar by the second Monday in May for the October ceremonies, and the first Tuesday in October for all other ceremonies. The forms are available from the Student Enquiry Counter in the north wing of the Chancellery.

Students who have indicated on their enrolment form that they are potential graduands are forwarded an application form with their *Confirmation of Enrolment Program* notice in September (or, in the case of students who expect to satisfy requirements at the end of Session 1, with the form issued in April). Students who do not complete an application form will not graduate; students who do not return their application form by the due date will graduate at a later series of ceremonies.

Students enrolled in courses **3400, 3910** and **3970** who have completed an application form to graduate at the pass level and who then decide to proceed to an honours year should advise the Registrar, in writing before 1 September for those completing requirements at the end of Session 1, or before

*For details see the appropriate Faculty Handbook.

28 February for those completing requirements at the end of Session 2.

A list of graduands in Medicine who have applied for their degree is published in *The Sydney Morning Herald* in January.

A list of graduands other than Medicine who have applied for their degree/diploma and who expect to graduate in October is published in *The Sydney Morning Herald* on the second Wednesday in September.

A list of graduands other than Medicine who have applied for their degree/diploma and who expect to graduate in April/May the following year is published in *The Sydney Morning Herald* on the second Wednesday in March.

Students who are potential graduands and who wish to notify the Registrar of a change of address should submit an addition form *Final Year Students' Graduation: Change of Address*.

Attendance at Classes

Students are expected to be regular and punctual in attendance at all classes in the subjects in which they are enrolled. All applications for exemption from attendance at classes of any kind must be made in writing to the Registrar.

In the case of illness or of absence for some other unavoidable cause students may be excused by the Registrar for non-attendance at classes for a period of not more than one month or, on the recommendation of the Dean of the appropriate faculty, for a longer period.

Absence from Classes

Explanations of absences from classes, or requests for permission to be absent from forthcoming classes, should be addressed to the Registrar and, where applicable, should be accompanied by a medical certificate. If examinations or other forms of assessment have been missed, this should be stated in the application.

If students attend less than eighty per cent of their possible classes they may be refused final assessment.

Student Records

Confirmation of Enrolment Program notices are sent to all students on 29 April and 23 September. It is not necessary to return these forms unless any of the information recorded is incorrect. If amendments need to be made, students should contact the appropriate course office.

Release of Information to Third Parties

The University treats results of assessment and information it receives from a student as confidential and will not reveal such information to third parties without the permission of the student except at the discretion of senior officers in circumstances considered of benefit to the student and when it is either impossible or impracticable to gain the student's prior permission. This happens rarely. This policy is considered so important that it often involves officers of the University in very difficult situations, for example, when they must refuse to reveal the address of a student to parents or other relatives.

In spite of the policy, all students should be aware that students' addresses are eagerly sought by various commercial agents and that subterfuges of various kinds can be used to obtain them. From time to time, for example, people claiming to be from the University telephone students or their families and ask for information (usually another student's address) which is often given, unsuspectingly. There is evidence that this is a technique used by some commercial agents.

It would be generally helpful if students (and their families and friends) are cautious in revealing information, making it a practice to ask the name, position, and telephone extension of any caller claiming to be from the University and, if suspicious, returning the call to the extension given.

Change of Address

The Student Records and Scholarships Office of the Registrar's Division should be notified as soon as possible of any change of address. Failure to do this could lead to important correspondence (including results of assessment) going astray. The University cannot accept responsibility if official communications fail to reach students who have not given notice of their change of address. *Change of Address Advice* forms are available at Faculty and School offices and from the Student Enquiry Counter in the north wing of the Chancellery.

All communications from the University will be sent to the Session or Term address except when arrangements are made otherwise in the case of results of assessment (see **Examinations: Availability of Results**, earlier in this section). *Change of Address Advice* forms will be accepted up to Friday 29 November, except for final-year students wishing to change their *Application for Admission for Degree/Diploma* form. Changes to this form will be accepted up to a date four weeks before the student's graduation ceremony.

Ownership of Students' Work

The University reserves the right to retain at its own discretion the original or one copy of any drawings, models, designs, plans and specifications, essays, theses or other work executed by students as part of their courses, or submitted for any award or competition conducted by the University.

Notices

Official University notices are displayed on the noticeboards and students are expected to be acquainted with the notices which concern them. These boards are in the Biological Sciences Building, the Mathews Building, the Chancellery (lower ground floor), Central Lecture Block, Dalton Building (Chemistry), Main Building (Physics and Mining) and in the Western Grounds Area.

Parking within the University Grounds

A limited amount of parking is available on campus. Copies of the University's parking rules may be obtained on application to Room 240, the Chancellery.

Academic Dress

Information about the University's academic dress requirements may be obtained from the Alumni and Ceremonials Section, Room 148E, the Chancellery (phone extension 3111).

Further Information

Lost Property

All enquiries concerning lost property should be made to the Superintendent (Patrol and Cleaning Services) on extension 3460 or to the Lost Property Office at the Union.

The Calendar

Please consult the Calendar for a more detailed account of the information contained in this section.

Introduction to the Sciences Handbook

This handbook has been designed to assist understanding of the academic activities of three inter-related groups within the university, namely the Board of Studies in Science and Mathematics, the Faculty of Biological Sciences and the Faculty of Science. The Board is responsible for the undergraduate studies of students majoring in disciplines associated with the two faculties and several schools from other faculties. The regulations governing the award of the degree of Bachelor of Science form a substantial part of the handbook. Other parts include details of the Science component of the combined degrees, Science/Law, Science/Civil Engineering, Science/Electrical Engineering, Science/Aeronautical Engineering, Science/Industrial Engineering, Science/Mechanical Engineering, Science/Naval Architecture, Science/Medicine, Science/Optometry, and of the two concurrent courses in Mathematics Education and Science Education.

Several specialist courses of study, also leading to the award of the degree of Bachelor of Science, are offered by the two faculties and the regulations covering these are given under the separate faculty sections. In addition the two faculties make available facilities to proceed to higher degrees and the conditions under which these awards are made are listed under the sections devoted to graduate study.

In the last part of the handbook there are brief statements of the syllabuses for units prescribed in the various regulations.

Faculty Information

Who to Contact

If you require advice about enrolment, degree requirements, progression within courses or any other general matters related to the Board, contact one of the following:

Ms Karenne Irvine, Administrative Assistant

Dr B. J. Burn, Co-ordinator of Studies in Science and Mathematics
Room 211, Plaza Level, Mathews Building

For information regarding particular courses, advice may be obtained from staff members listed in the Introduction to each of the sections related to the Board, the Faculty of Biological Sciences and the Faculty of Science, later in this handbook.

Important: As changes may be made to information provided in this handbook, students should frequently consult the noticeboard of the Board of Studies in Science and Mathematics and the official noticeboards of the University.

Enrolment Procedures

- **Faculty of Biological Sciences**
- **Faculty of Science**
- **Board of Studies in Science and Mathematics**

All students re-enrolling in 1985 or enrolling in graduate courses should obtain a copy of the free booklet ***Enrolment Procedures 1985*** available from Course Administration Offices and the Admissions Office. This booklet provides detailed information on enrolment procedures and fees, enrolment timetables by Faculty and course, enrolment in miscellaneous subjects, locations and hours of Cashiers and late enrolments.

The subject timetable for the Science and Mathematics Course (Course 3970) is available in late October/early November from the Science and Mathematics Course Office, Room 211, Mathews Building. All re-enrolling students should collect one of these timetables along with a preliminary enrolment form (SM85). The preliminary enrolment form is to be completed and returned to the Science and Mathematics Office by the end of the first week in January.

Sciences Library Facilities

Although any of the University Libraries may meet specific needs, staff and students of the Faculty of Biological Sciences are served mainly by the Biomedical and Undergraduate Libraries while those of the Faculty of Science are served mainly by the Physical Sciences and Undergraduate Libraries.

The Biomedical Library

This library is situated on Levels 2, 3 and 4 of the Mathews Building Annexe. It aims to serve the specialized reference and research needs of staff, graduate students and undergraduate students in the Biological Sciences.

Trained staff are available at all times in the Biomedical Library to assist staff and students in making best use of the library.

Biomedical Librarian — George Franki

The Physical Sciences Library

This library, situated on Levels 6 and 7 of the Library tower, caters for the information needs of staff, graduate students and senior undergraduate students in the pure and applied sciences, engineering and architecture. Details of the books, serials and microforms in the Physical Sciences Library are included in the microfiche monograph and serials catalogues, and the items themselves are identified by the prefix 'P'.

Serials with the prefix 'PJ' are not for loan but self-service photocopying facilities are available on Level 7.

This Library provides reference, reader assistance and reader education services and also, where appropriate, interlibrary loan and literature-searching services.

Trained staff are always available on Level 7 to assist readers with their enquiries.

Physical Sciences Librarian — Marian Bate

The Undergraduate Library

This library caters for the library needs of first and second year students and other groups where large numbers require mass teaching.

It provides a reader education program and reader assistance service aimed at teaching students the basic principles of finding information.

Services of particular interest to undergraduates and academic staff are:

- **The Open Reserve Section,** housing books and other material which are required reading.
- **The Audio Visual Section,** containing cassette tapes, mainly lectures and other spoken word material. The Audio Visual Section has wired study carrels and cassette players for student use.

Undergraduate Librarian — Pat Howard

Student Clubs and Societies

Students have the opportunity of joining a wide range of clubs and societies. Many of these are affiliated with the Students' Union. There are numerous religious, social and cultural clubs and also many sporting clubs which are affiliated with the Sports Association.

Clubs and societies seeking to use the name of the University in their title, or seeking University recognition, must submit their constitutions either to the Students' Union or the Sports Association if they wish to be affiliated with either of these bodies, or to the Registrar for approval by the University Council.

The Psychological Society

The Psychological Society aims to provide activities both educational and social for students of psychology, and, more generally, to act as an intermediary body between students of different years, and staff.

The Society organizes a variety of activities including staff-student functions, informal discussions, film showings, and occasional talks and seminars. An activities fee enables the Society to meet any of the finances needed to support its functions.

Statistical Society of Australia: New South Wales Branch

The Branch offers student membership to undergraduates who are following a recognized course of study which includes Statistics. The subscription for a student member is $15 per annum with a $4 rebate if paid before 1 March.

The Branch holds about four general meetings each year at the end of which two talks, one theoretical and the other applied, are given on the one topic. The Branch conducts a Research Section, and membership of this group is open to members of the Branch free of charge. Each year the Branch also conducts a symposium for the study and discussion of particular statistical techniques or of statistical methods in a specialized field; symposia are open to members at reduced rates.

Members of the Branch receive *The Australian Journal of Statistics*, which is published three times a year by the Statistical Society of Australia, together with the Society's *Newsletter.*

Applications and requests for further information should be sent to the Hon. Secretary, Dr R. L. Sandland, C.S.I.R.O.-D.M.S., P.O. Box 218, Lindfield, NSW 2070.

Undergraduate Study
in
Science and Mathematics

Board of Studies in Science and Mathematics

Introduction

The Science and Mathematics Course (3970) leads to the Bachelor of Science Degree on the completion of a three year program or a four year program chosen from specific programs approved by the Board of Studies in Science and Mathematics.

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.

All students in the Science and Mathematics Course must enrol in two units of first year Mathematics; either Mathematics I or Higher Mathematics I or General Mathematics. Care must be taken in making the choice as, in general, General Mathematics considerably limits the choice of units in following years.

Some Schools do not offer a full range of Level III units in the evening. The Schools concerned are marked below with ‡.

Students seeking *general advice* should contact the Board of Studies in Science and Mathematics Office (Room 211, Mathews Building, map reference F23) and for *advice in specific disciplines* should contact the representative of the relevant School as listed below:

First Year Biology Unit	Dr R. J. King
‡ School of Anatomy	Dr B. W. Freeman (Year 2 and Year 3) Professor F. W. D. Rost (Year 4)
‡ School of Applied Geology	Mr G. J. Baldwin
‡ School of Biochemistry	Professor B. V. Milborrow
‡ School of Biotechnology	Dr N. W. Dunn
‡ School of Botany	Dr R. J. King
‡ School of Chemistry	Executive Assistant to Head of School
‡ School of Community Medicine	Dr A. E. Stark
‡ School of Electrical Engineering and Computer Science	Mr L. C. Hill
‡ School of Geography	Dr J. Dodson
‡ School of History and Philosophy of Science	Dr D. Miller (Session 1) Dr D. R. Oldroyd (Session 2)
School of Mathematics	Associate Professor A. H. Low (Year 1) Miss M. Potter
‡ Marine Science	Dr P. Dixon

School of Mechanical and Industrial Engineering	Mr K. Kjorrefjord
‡ School of Metallurgy	Dr P. G. McDougall
‡ School of Microbiology	Dr E. H. Hegarty
‡ School of Philosophy	Professor C. L. Hamblin
‡ School of Physics	Dr G. J. Russell (Year 1) Dr J. R. Hanscomb
‡ School of Physiology and Pharmacology	Dr B. S. Nail *or* Associate Professor M. J. Rowe
‡ School of Psychology	Dr K. R. Llewellyn Mr T. J. Clulow
‡ School of Zoology	Dr Patricia Dixon

Board of Studies in Science and Mathematics

The Board of Studies in Science and Mathematics includes all members of the Faculty of Biological Sciences* and the Faculty of Science* and some members of specific Schools in other faculties contributing to the Science and Mathematics Course: Applied Geology, Chemical Engineering and Industrial Chemistry, Geography, Metallurgy (Applied Science); History and Philosophy of Science, Philosophy (Arts); Accountancy, Economics (Commerce); Electrical Engineering and Computer Science, Mechanical and Industrial Engineering, Surveying (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine); Education (Professional Studies); and the Department of General Studies (Board of Studies in General Education).

The Dean is the Dean of the Faculty of Science, Professor V. T. Buchwald.

The Chairman is Professor A. J. Wicken.

The Co-ordinator of Studies in Science and Mathematics is Dr B. J. Burn. The Administrative Assistant is Ms Karenne Irvine.

‡See text of Introduction, on previous page.
*See Staff, listed later in this handbook.

Board of Studies in Science and Mathematics

3970 Science and Mathematics Course

The Science and Mathematics Course, which leads to the Bachelor of Science degree, is administered by the Board of Studies in Science and Mathematics and 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.

Aims of the Science and Mathematics Course

The main aims of the Science and Mathematics Course, diverse and not necessarily exclusive, may be summarized as providing opportunities to students to prepare themselves for careers in:

- research
- technology
- science and mathematics education
- areas of management or public policy involving the use of science or mathematics.

Objectives of the Science and Mathematics Course

The important general objectives of most programs in the Science and Mathematics Course are:

1. To develop and sustain an interest in and knowledge of Science and Mathematics.

2. To develop a working knowledge of scientific methods of investigation and a favourable attitude towards them.

3. To 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. To develop an appreciation of scientific criteria and a concern for objectivity and precision.

5. To develop confidence and skill in formulating problems and in treating both qualitative and quantitative data.

6. To develop the ability and disposition to think logically, to communicate clearly by written and oral means, and to read critically and with understanding.

7. To develop the habit of seeking and recognizing relationships between phenomena, principles, theories, conceptual frameworks and problems.

8. To 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. To provide opportunities for the development of students' motivations and social maturity, and an awareness of their own capabilities in relation to a choice of career which will be fruitful to themselves and to society.

There is a wide range of programs in single and multi-disciplinary areas leading to a three year degree or a four year degree.

The Structure of the Science and Mathematics Course

The Science and Mathematics Course consists of a number of individual programs, based on units ranked as Level I, Level II, Level II/III, Level III and Level IV with a unit size varying from 56-84 hours.

The terms Levels I, II, III do not necessarily refer to the years in which the unit must be studied. Units at the various levels may be taken in other years provided the prerequisites are met. Level II/III units have only Level I prerequisites.

The Bachelor of Science degree is awarded on completion of

- **a three year program**

or

- **a four year program**

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.

- A student must select and be enrolled in one of the prescribed programs.
- A student may not undertake more than 8 Science units in any one year unless approval is given by the Co-ordinator or the Dean of the Board of Studies in Science and Mathematics.
- With the approval of the Dean, a student may change from one selected program to another. 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 211 (Mathews Building, map reference F23).
- The programs listed are made up of a sequence of units. Where a choice of units is indicated within a program care must be taken to satisfy the requirements, such as pre-requisites and co-requisites.
- 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. In exceptional circumstances, on the recommendation of the head of the appropriate school, the Board of Studies in Science and Mathematics may waive or vary a particular prerequisite, co-requisite or exclusion.
- A single major is a program specifying only 4 Level III units in a discipline.
- A double major is a program specifying 4 Level III units of each of 2 disciplines or 8 Level III units in a single discipline.
- Upon sufficient cause being shown in a particular case or cases, the Board of Studies in Science and Mathematics may vary any of these rules.

The three year program

The three year program leading to the award of the pass degree consists of:

1. at least 23 units at Level I, II, II/III, III as specified in an individual program with the following requirements:

(1) *not less than* eight *nor more than* ten units may be from Level I;

(2) two of the Level I units must be 10.001 Mathematics I, 10.001 Higher Mathematics I or 10.021B and 10.021C†;

(3) *not less than* four units from Level III or as specified individual programs.

2. General Studies electives as specified in an individual program.

- In order to graduate a student must pass all the units specified in the program of his/her choice.

The four year program

The four year program, leading to an Honours Class I, II/1, II/2, III or pass degree consists of:

1. at least 23 units at Level I, II, II/III, III as specified in an individual program, with the following requirements:

(1) *not less than* eight *nor more than* ten units may be from Level I;

(2) two of the Level I units must be 10.001 Mathematics I, 10.011 Higher Mathematics I or 10.021B and 10.021C.

(3) *not less than* eight units from Level III or as specified in an individual program.

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.

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 Table 3;
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 at the end of Year 3.

- In order to graduate a student must pass all the units specified in the program of his/her choice.

A person on whom the pass degree of Bachelor of Science of the University has been conferred may be admitted by the Board of Studies in Science and Mathematics, on the recommendation of the relevant Heads of Schools, to candidature for an honours degree conversion program with credit for all units completed, if during his or her studies for the pass degree, he or she has satisfied the prerequisites for proceeding to honours level laid down by the School or Schools concerned.

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 (Course 3970) 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, such students 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 degree(s) or other award held by applicants, should not be such as will permit the applicants to qualify for the science degree, without completing the course of instruction and passing examinations in at least those subjects comprising the latter half of the 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 and mathematics 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 (Course 3970).

(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 (Course 3970) for work done in the course from which the students transfer.

Programs

Students are advised that it is not possible to complete their studies by attendance at evening classes alone.

Each program has a four-digit identifying number.

Most programs have been 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. Some programs are designed as an integrated four year program leading to the award of the honours degree. A few programs are set out as Years 1, 2 and 3 and lead to the pass degree only.

Students wishing to take a double major are warned that due to timetabling difficulties it may take longer than three years to complete degree requirements.

To progress through a program a student must meet all the prerequisites and co-requisites as detailed in Tables 1, 2 and 3.

The range of programs has been designed to cover a wide variety of needs in the various areas of science and mathematics:

Anatomy	*see program* **7000**
Biochemistry	*see program* **4100**
Biology	Biology is taught in Year 1 as a single discipline but in later years as specific subjects: biological technology, biochemistry, botany, entomology, genetics, immunology, microbiology and zoology.

Biotechnology	*see program* **4200**
Botany	*see program* **4300**
Chemistry	*see program* **0200**
Community Medicine	**units** *available in some programs* **(the identifying number is 79)**
Computer Science	*see program* **0600**
Genetics	*see program* **6840**
Geography	*see program* **2700**
Geology	*see programs* **2500, 2503**
History and Philosophy of Science	*see program* **6200**
Information Systems	*see program* **1400**
Marine Science	*see programs* **6831, 6832, 6833, 6834**
Mathematics	*see programs* **1000, 1006, 1061, 6810**
Metallurgy	**units** *available in some programs* **(the identifying number is 4)**
Microbiology	*see program* **4400**
Pharmacology	*see program* **7300**
Philosophy	**units** *available in some programs* **(the identifying number is 52)**
Physics	*see programs* **0100, 0161, 2503**
Physiology	*see program* **7300**
Psychology	*see program* **1200**
Zoology	*see program* **4500**

In addition to Course **3970** 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), **4070** (Mathematics/Education), **4080** (Science/Education), **4770** (Science/Law).

Physics

The study programs offered by the School of Physics reflect the importance of Physics in science and technology at both the fundamental and at the applied levels. Thus within the Board of Studies in Science and Mathematics, professional training in Physics is provided by programs 0100 and 0161 while in areas such as Engineering a number of courses are available in which Physics is combined as a major study.

These features are summarized in the following table:

Professional Training in Physics

Program
0100 Physics
Including:
Theoretical Physics
Applied Physics
Biophysics
Physics/Geology
0161 Physics/Computer Science

Physics in other Courses

Courses
3170 Textile Physics
3611 Aeronautical Engineering with Physics
3661 Industrial Engineering with Physics
3681 Mechanical Engineering with Physics
3701 Naval Architecture with Physics
3725 Electrical Engineering with Physics
3730 Civil Engineering with Physics and Mathematics
4770 Law with Physics
5801, 5802, 5803, 5805 Education with Physics

Professional Training

Program 0161 (Physics/Computer Science) has been carefully structured to include not only the basic units of Physics but also those Mathematics and Computer Science units necessary to meet the specific aims of the program. Only minor variations from this program can be considered.

On the other hand, program 0100 (Physics) offers greater flexibility in the choice of units particularly in the case of the student who intends to take out the BSc Pass degree after 3 years. Also for those students who intend to proceed to Year 4 there is provision for specialization leading to Honours in either Physics, Theoretical Physics, Applied Physics, Physics/Geology or Biophysics.

Students should seek guidance from the School of Physics in the choice of units. The following information relating to this program should be particularly noted:

Program 0100

1. It is suggested that the units chosen in Year 1 might comprise 6.611, 1.061, 2.121, 2.131.

2. Students wishing to proceed to Year 4 (Honours) must complete at least 7 Level III units. These will normally be taken from the Physics units on offer (unless the student is specializing in Biophysics or in Geology) and include at least *one* of 1.0533, 1.0543, 1.133, 1.763 for students majoring in Physics or in Applied Physics.

3. Students wishing to major in Applied Physics and/or intending to proceed to Applied Physics Honours are required to select from certain specified units in Year 3. These are units of a more applied nature eg 1.133 Electronics. Suggested units are available on enquiry from the School.

4. For the study of Theoretical Physics, additional mathematics units are specified. Thus in Year 2 students are required to include unit 10.111A (or 10.121A) and in Year 3, unit 10.412D (or 10.422D). A choice from certain Theoretical Physics units is also specified in Year 3. A sample program is available from the School of Physics.

5. Arrangements exist to enable a joint major in Physics/Geology. Students are expected to include 2 units of Geology in Year 2 and 4 units of Geology in Year 3. The possibility of joint majors in other subjects eg Mathematics or Chemistry exists.

6. Biophysics may be studied to pass degree or to honours degree standard. In Year 1 the Chemistry units 2.121 and 2.131 must be taken together with Biology 17.031 and 17.041. A sample program of study for Years 2 and 3 is available from the School of Physics. This program will normally entail study of Physiology, Chemistry and Biology units in addition to Physics.

7. In certain circumstances unit 1.002 may be deferred to Year 3.

The subject descriptions of the units may be found in another section of this handbook. A study of these will show that it is possible to gain experience in a wide variety of areas representative of this School's interest. Thus in additon to Theoretical Physics, Biophysics and Applied Physics as mentioned above, specialization is possible in the areas of solid state physics, optics, lasers and their applications, astrophysics etc.

Physics in other Courses
The previous page lists those courses which have been arranged with other schools. Several of these can lead to honours in Physics (eg 3725, 5801) so it must not be thought that the only avenue to specialization in Physics is via the professional programs 0100, etc.

Students should also bear in mind that prerequisites and corequisites can be waived in certain cases, eg when it is judged that an equivalent study has been undertaken in some other combinations of units. The possibility also exists of relaxing the requirements of programs to allow a student to select a unit in which he or she has a special interest but which is not a recommended one in the program.

0100
Physics**

Year 1
1.001
10.001 *or* 10.011*
Choose 4 Level I units from:**
1. Table 1 *and/or*
2. Table 2 for program 0100

Year 2
1.002, 1.012, 1.022, 1.032
10.1113*, 10.1114*, 10.2111*, 10.2112*
Choose 2 Level II units from:**
1. Table 1 *and/or*
2. Table 2 for program 0100
1 General Studies elective

Year 3†
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043
Choose at least 3 units from:**
1. Table 1 *and/or*
2. Table 2 for program 0100
1 General Studies elective

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

Year 4 (Honours)
Choose one of 1.104, 1.304, 1.504, 1.604, 68.430

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

**Students should read carefully the above description relating to program 0100 and seek advice from the School of Physics regarding the choice of units. An incorrect choice of units could exclude a student from the study of certain areas of Physics and/or prevent the combination of Physics with other disciplines.

†See footnote to program 6200.

0161
Physics/Computer Science

Year 1††
1.001, 1.061
6.611
10.001 *or* 10.011*
Choose 2 Level I units from Table I**

Year 2
1.012, 1.022, 1.032
6.621, 6.641
10.1113*, 10.1114*, 10.2111*, 10.2112*
Choose 1 unit from 1.062, 6.631†, 10.111A*
1 General Studies elective

For Year 3, Year 4 and footnotes, see overleaf

Program 0161 continued

Year 3
1.002, 1.0133, 1.023, 1.0333
Choose 2 further Level III Physics units
Choose 1 Level III Computer Science unit
Choose 2 units from:**
1. 1.062, 6.631†, 10.212A*, 10.412D*, 10.612
2. Level III Physics units
3. Level III Computer Science units
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 6 Level III units.

Year 4 (Honours)**
Choose one of 1.104, 1.304, 1.504

*See footnote to program 0100.

**Students intending to proceed to Year 4 are required to choose appropriate units. This choice is determined by the requirements of program 0100. Students are required to consult the School of Physics.

†The unit 6.631 must be taken in Year 2 or Year 3, but students should bear in mind that this unit is a prerequisite for 6.632 and 6.613.

††Quota restrictions apply to most Level III Computer Science units. Students wishing to take these units should in Year 1 apply for entry to the Computing quota. Advice should be obtained from the office of the Board of Studies in Science and Mathematics.

Geophysics

See program 2503

Recommended Double Majors

0125 Physics/Geology
0162 Physics and Science Policy Studies (See program 6200 for further details)

Chemistry

The study program 0200 offered by the School of Chemistry enables students to undertake professional training in chemistry both at fundamental, applied, and industrial level or to combine the study of chemistry with another discipline eg biochemistry, biotechnology, geology or computer science (other co-majors are possible) by suitable choice of units. In arranging a co-major with another subject the requirements of each relevant School must be considered (see individual school programs).

The School is divided into four departments (Physical, Organic, Inorganic and Nuclear, and Analytical) and a First Year Teaching unit. Each department contributes to first year teaching and offers specialty courses in its own area for the Science and Mathematics programs, Pure and Applied Chemistry and servicing to other faculties.

Students wishing to undertake the maximum number of chemistry units should follow the pattern set out for the program in the Faculty of Science called Pure and Applied Chemistry (course 3910) and described later in this Handbook. This involves a minimum of 15 chemistry units and is referred to as a double major in terms of the Science and Mathematics course. It is designed for specialization in chemistry and should be selected by students who wish to devote their studies at Level III almost entirely to chemical topics.

Suitable choice of units makes it possible to study chemistry as a co-major with another branch of science (eg geology, biochemistry, computer science, biotechnology, physiology) to an advanced level. A combination of Level III chemistry and mathematics units provides a useful basis for later specialization in X-ray crystallography or theoretical chemistry whilst a combination of Level III chemistry and geology units is suitable for those who wish to specialize later in geochemistry. Level III chemistry and physiology units could form the basis of later specialized studies of the chemical function of the control systems in the animal body.

Co-major of chemistry with biochemistry or computer science is also possible and thus the choice and direction of Honours and graduate work is widened.

The chemistry program is open to all students who have satisfied the requirement for entry into the Science and Mathematics course. However, those who have not studied sufficient science at school (see prerequisites under subject number) may be required to study a special introductory unit (2.111) before enrolling in the Level I Chemistry units (2.121, 2.131, 2.141) specified. The Level I subject 2.141 is designed specifically for students intending to major in Chemistry. It covers the same material, at a similar level to that in 2.121 and 2.131, but is a full year subject and the order of treatment of the topics is different.

The Chemistry program has a first year of study which includes chemistry, physics and mathematics, in common with many other programs, and an elective. It is in the choice of this elective that special care has to be given as an incorrect choice could exclude the combination of chemistry with another selected discipline at Level II or III, (eg omission

of biology units would preclude taking biochemistry at Level II). Advice from the course advisors should be sought on this point. Refer also to the course outline on Pure and Applied Chemistry later in this Handbook.

The chemistry program leads to study at the Honours level (Level IV) and to graduate studies in chemistry. The usual introduction to research in Chemistry is in Level IV and at this level the student devotes the major part of the time to research under the direction of a member of staff as supervisor. A small proportion of the time is taken up with formal course work. The Honours year (or its equivalent in qualifying studies) may be followed by a higher research degree. Further information about graduate courses is included in this handbook and in a booklet: *Postgraduate Studies and Research in the School of Chemistry.*

0200 Chemistry**

Year 1
1.001
2.141 *or* 2.121 & 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
Choose 2 Level I units from Table 1

Year 2*
2.002A, 2.002B, 2.042C, 2.002D
Choose 3 units from Table 1
2 General Studies electives

Year 3†
Choose 4 Level III Chemistry units**
Choose 4 units from Table 1

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

Year 4 (Honours)
2.004

*Students wishing to do a co-major of Chemistry with Geology or Biotechnology may apply for a variation of the specified units to the Programs Committee of the Board of Studies in Science and Mathematics.

**Students should read carefully the above description relating to program 0200 and seek advice from the School of Chemistry regarding the choice of units.

†See footnote to program 6200.

Recommended Double Majors

0225 Chemistry/Geology
0241 Chemistry/Biochemistry
0242 Chemistry/Biotechnology
0262 Chemistry/Science Policy Studies
(See program 6200 for further details)
7302 Chemistry/Physiology

Metallurgy and Materials Science

Undergraduate courses in metallurgy involve a general training in basic sciences and engineering. These fundamental principles are then extended to cover studies of metals and their extraction, refining, working, fabrication and use as engineering materials. The professional courses BSc Metallurgy (Course **3120**), BE Metallurgical Process Engineering (Course **3180**) and the part-time BSc(Tech) (Course **3130**) are offered in the Faculty of Applied Science.

Formal programs in metallurgy are not available in the Science and Mathematics course. However selected subjects from the professional metallurgy courses may be taken as units in conjunction with other majors in the Science and Mathematics course and these are listed in Table 1. These would provide, for example, a suitable background for teaching specialization in engineering science at secondary schools.

Metallurgy subjects are also offered in the Physical Metallurgy and Chemistry major in the combined course for BE/BSc in Civil Engineering (Course **3670**) and in the Materials Science major in the combined courses for BE/BSc in Mechanical Engineering (Course **3681**), Aeronautical Engineering (Course **3611**) and Naval Architecture (Course **3701**). These courses are described in the Faculty of Engineering Handbook.

Students seeking further information on metallurgy subjects or metallurgy as a career should contact the Head of the School of Metallurgy or consult the Faculty of Applied Science Handbook.

Computer Science

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. 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.

Graduates who major in Computer Science frequently find employment where the requirement is for an expert knowledge of computer systems rather than extensive experience in a particular application area. Potential employers include the computer manufacturers, consulting companies, specialist companies marketing computer hardware and software services, and many large organizations with major computing establishments.

All Science students with the appropriate Mathematics prerequisites have entry into all Year 1 and Year 2 Computer Science units. Resources limit the number of students who may enter most Year 3 Computer Science units but other subjects are proposed which will allow computer applications majors to complete an appropriate course of study.

Entry to a Computer Science major is *either* by direct selection at university entry *or* by competitive entry at the end of Year 1 or Year 2. Students who wish to compete at the end of their first year for a place in Computer Science (program 0600 — Computer Science), enrol in their first year in program 6806. Students in program 6806 may also have the alternative of entering program 1400 (Information Systems) at the end of their first year. Acceptance into programs 0600, or 1400 is based on academic performance in Year 1 or Year 2.

Science/Law students may enrol directly into Year 1 of the Course 4770 Computer Science program. To progress into Year 2 of this program, these students must, at the end of Year 1, compete with students in Course 3970.

Students majoring in other disciplines may undertake all Level I and Level II and one of the Level III Computer Science units and thus undertake a substantial amount of Computing. Programs available are Physics/Computer Science (0161); Chemistry/Computer Science (0261) and Mathematics with Computer Science (1061). Students with very good academic records may be able to enrol in further Computer Science units by special permission from the Head of the Department of Computer Science.

There are many ways to study Computer Science and computer applications at this University, apart from the Science and Mathematics Course. Students may major in Computer Science as part of the 5 year combined degree programs in Electrical Engingeering, Aeronautical Engineering, Industrial Engineering, Mechanical Engineering and Naval Architecture which leads to the award of the two degrees of BE and

BSc (see under Courses 3725, 3611, 3661, 3681 and 3701 respectively and the Faculty of Engineering Handbook). Students may also major in Computer Science in the combined Science/Law degree course. A major sequence in Computer Science is also available in the Bachelor of Arts course (see the Faculty of Arts Handbook). Other courses and subjects which include computing and computing applications are available in other Schools, for example students may major in Computers and Information Systems in the Bachelor of Commerce degree course: see the Faculty of Commerce Handbook.

0600
Computer Science*

Year 1*
6.611
10.001 *or* 10.011
Choose 5 Level I units from:**
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 0600

Year 2
6.621, 6.631, 6.641
Choose 5 units from:**
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 0600
1 General Studies elective

Year 3
Choose 4 Level III Computer Science units
Choose 3 units from:**
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 0600
1 General Studies elective

Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units including 6.613, 6.632, 6.642 & 6.643.

Year 4 (Honours)
6.606

*In Year 1 students who have not gained direct entry to this program must enrol in program 6806. Enrolment in Year 2 is based on academic performance in Year 1.

**The program may include up to 8 units other than Computer Science units that are not in Table 1. Subjects chosen from the BA degree course are restricted to those offered by the following schools: Drama, Economics, English, French, German, History, Political Science, Russian, Sociology, Spanish and Latin American Studies. History and Philosophy of Science and Philosophy subjects are available in Table 1. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273. (6 BA degree credit points at Level I or 4 credit points at Upper Level are equivalent to 1 unit.)

Computer Science/Physics

See program 0161 Physics/Computer Science

Computer Science/Mathematics/ Statistics

See program 1061 Mathematics or Statistics/ Computer Science

See also

1400 Information Systems

Mathematics

The School of Mathematics is divided into Departments of Pure Mathematics, Applied Mathematics, Theoretical and Applied Mechanics, and Statistics. The School provides courses at the Pass and Honours levels based on the above departments and in specified interdisciplinary programs such as Mathematics of Management, Applied Mathematics (Economic Optimization). There is considerable overlap of interests and interaction between the departments; students in general will take units from more than one department.

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 more concerned with the problems themselves than with the sources from which they arise. Courses in the Department of Pure Mathematics are designed to provide the necessary equipment for those who intend to use 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 and Theoretical Mechanics are concerned with the understanding of scientific phenomena by the construction, analysis, and interpretation of mathematical models. Problems may originate not only in the physical and engineering sciences, but also in the social, computing, biological, economic and management sciences.

The major interests of the Department of Applied Mathematics are:

1. Optimization and control theory, with special attention to social science applications (control of economic systems, resource allocation, etc)
2. Numerical analysis and computer-related mathematics
3. Modern theoretical physics

The department offers complete training to graduate research level in areas **1.** and **2.**; it provides some undergraduate training in area **3.** in collaboration with other Schools, and accepts higher degree candidates in that area.

The Department of Theoretical and Applied Mechanics is interested in mathematical techniques and applications of mathematics to problems in classical and engineering science. There is also some emphasis on the environmental sciences, such as meteorology and oceanography.

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. The department has strong interest in the areas of applied statistics, stochastic processes, biometry, inference, design of experiments, sequential analysis, discrete distributions, nonparametrics and statistical computing.

Programs of study

Program 1000 (Mathematics)

Within this program it is possible to major in Pure Mathematics, Applied Mathematics or to undertake a General Mathematics major with a mixture of Pure and Applied Mathematics and possibly some Statistics; it is also possible by extending the program to four years to undertake Honours in Pure Mathematics or Applied Mathematics. Students wishing to major or undertake Honours in Statistics should consult program 1006.

Pure Mathematics major

Any completed 1000 program will be deemed to be a major in Pure Mathematics if it has included four units (total value) of units and half units listed in Table 1 as Pure Mathematics Level III or Higher Pure Mathematics Level III.

Pure Mathematics Honours

Honours in Pure Mathematics are obtained by completing 10.123, the prerequisites for which are 10.122B and the six Higher Pure Mathematics Level III half units offered in the previous year. Since the twelve Higher Pure Mathematics Level III half units are offered in alternate years (six each year) and included as part of 10.123 it is essential that all six should be taken in one year immediately before preceding to 10.123. As the normal prerequisites for third year higher units are first and second year higher units students intending to do Honours in Pure Mathematics should take all the Year 1 and Year 2 units specified in program 1000 at higher level.

Applied Mathematics major

Any completed 1000 program will be deemed to be a major in Applied Mathematics if it has included four units (total value) of units and half units listed in Table 1 as Level III Applied Mathematics or Theoretical Mechanics (or their higher equivalent). When selecting optional units in program 1000, the following choice of mathematics courses (or their higher equivalent) are strongly recommended.

Year 2: At least two of 10.2113, 10.2115, 10.4111, 10.4112.

Year 3: At least three of 10.212A, 10.212L, 10.212M, 10.222C, 10.412A, 10.412B, 10.412D.

In addition, Applied Mathematics students are expected to select relevant units from other disciplines according to the particular applications of mathematics in which they are interested. The following choices are recommended in first year.

1. Applied mathematics for physical and engineering sciences or for theoretical oceanography and fluid mechanics: *either* 1.001 *or* 5.006 *or both* 5.010 *and* 5.020. Note that these are the prerequisites for 10.4111 *and* 10.4112.
2. Applied mathematics for economic or management sciences: 14.501, 14.511, 15.001, 15.011. Note that if 14.501 and 14.511 are chosen then all four must be taken in first year and permission must be obtained through the Board of Studies office as there is a quota. For further details see program 6810.

3. Applied mathematics for social or biological sciences, choose at least two of the following groups:
a. 17.031 *and* 17.041,
b. 12.100,
c. 1.001,
d. 2.141 *or both* 2.121 *and* 2.131.
4. Applied mathematics for computational methods or computer science: 6.611, 10.081.

Applied Mathematics Honours
A student interested in taking an Honours degree in Applied Mathematics is expected to enrol in 10.011 in first year and is required to complete at least one Level II and at least three Level III Higher Applied Mathematics or Theoretical Mechanics units (total value) and to complete, at Level IV, *either* 10.223 *or* 10.423.

Students are advised to attempt the Level II Mathematics units in program 1000 at the Higher level, and to select optional units according to the recommendations above for an Applied Mathematics major. Students should obtain a copy of recommended programs for Applied Mathematics from the School of Mathematics office before entering Year 2, and they are strongly encouraged to consult a staff member in Applied Mathematics regarding appropriate courses of study.

Program 1006 (Statistics)
Statistics Major
The completed 3 year program 1006 (Statistics) will be deemed to be a major in Statistics.

Statistics Honours
Honours in Statistics are obtained by completing 10.323, the prerequisite for which is the completion of 3 years of program 1006 (Statistics) with all corresponding Higher Statistics Level II and Level III units and preferably all Higher Mathematics Level I, II and III units.

Program 1061 (Mathematics or Statistics/Computer Science) will be of particular interest to students who wish to combine a Mathematics (or Statistics) major with a substantial amount of computing.

Program 6810 (Mathematics of Management) 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 is intended to train mathematicians with an interest in the application of mathematics to management science. The mathematics content is very solid indeed, amounting to a full mathematics degree. A student completing this course with a good record is 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.

Mathematics/Computer Science

See 0610 Computer Science/ Mathematics

1000 Mathematics***
Students intending to proceed to the Honours year should take Higher Mathematics subjects throughout.

Year 1
10.001 *or* 10.011
Choose 6 Level I units from:*
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000

Year 2
10.111A, 10.1113, 10.1114, 10.2111, 10.2112
Choose 1 further Level II *or* III Mathematics unit
Choose 4 units from:*
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000
1 General Studies elective

Year 3
Choose 4 Level III Mathematics units (not 10.312F or 10.612)
Choose 3 units from:*
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 6 Level III units.**

Year 4 (Honours)
10.123 *or* 10.223*

*Not more than 8 units of this program may be from subjects not in Table 1. The BA degree subjects are limited to those offered by the following schools: Drama, Economics, English, French, German, History, Political Science, Russian, Sociology, Spanish and Latin American Studies. History and Philosophy of Science and Philosophy subjects are available in Table 1. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273. (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 unit.)
**Students proposing to take Honours in Pure Mathematics must have 4 Higher Level III Pure Mathematics units and students proposing to take Honours in Applied Mathematics must have 4 Higher Level III Applied Mathematics or Theoretical Mechanics units.
***Students should read carefully the above description relating to program 1000 and seek advice from the School of Mathematics regarding the choice of units.

1006
Statistics

Students intending to proceed to the Honours year should take Higher Mathematics subjects throughout.

Year 1††
10.001 *or* 10.011
Choose 6 units from:*
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000

Year 2
10.111A, 10.1113, 10.1114, 10.2112, 10.311A, 10.311B, 10.3111, 10.3112
Choose 2½ units from:*
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000
1 General Studies elective

Year 3
Choose 4 units from 10.312A, 10.312B, 10.312C, 10.312D, 10.312E
Choose 3 Level III Mathematics *and/or* Computer Science units
1 General Studies elective

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

Year 4 (Honours)
10.323

*See footnote to program 0100.
††See footnote to program 0161

1061
Mathematics or Statistics/Computer Science

Students intending to proceed to the Honours year should take Higher Mathematics subjects throughout.

Year 1††
6.611
10.001 *or* 10.011
Choose 5 Level I units from:
1. Table 1 *and/or*
2. The BA course *and/or*
3. Table 2 for program 1000

Year 2
10.111A, 10.1113, 10.1114, 10.2112
6.621, 6.641
Either
a. 10.2111, 10.211E
2 units from:
1. 6.631 *and/or*
2. Mathematics *and/or*
3. 14.602, 14.603
or
b. 10.311A, 10.311B, 10.3111, 10.3112,
½ unit from Table 1
1 General Studies elective

Year 3
Continue the strand chosen in Year 2:
Either
a. 6.646
10.612
3 Level III Mathematics units
2 units from Table 1
or
b. 5 Level III Statistics units including 10.312F
1 Computer Science unit
1 unit from Table 1
1 General Studies elective

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

Year 4 (Honours)
10.123* *or* 10.223* *or* 10.323*

*The requirements for entry to the Honours year are as for programs 1000 and 1006.
††See footnote to program 0161.

Mathematics/Marine Science (Physical Oceanography)

See program 6831

Recommended Double Majors

0610 Mathematics or Statistics/Computer Science
1025 Mathematics/Geology

Psychology

Modern 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.

Program 1200 in the Science and Mathematics course leads to a major in Psychology after 3 years and to Honours after 4 years. Choice of support subjects will depend upon which facet of Psychology is of interest to the student. Suitable supporting subjects range from Anatomy, Physiology, Genetics of Behaviour to History and Philosophy of Science and Philosophy. If necessary students may contact the School for advice.

There is also a four year full-time professional science degree course (Course **3430**) which is described in detail later in this handbook (see **Faculty of Biological Sciences**).

Students who wish to obtain qualifications that will allow them to practise psychology need to complete one of the above four year honours programs. The present minimum qualifications for membership of the Australian Psychological Society (the professorial body of Australian psychologists) require 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.

1200 Psychology

Year 1
10.001 *or* 10.011 *or* 10.021B & 10.021C
12.100
Choose 4 Level I units from:
1. Table 1 *and/or*
2. Table 2 for program 1200

Year 2*
12.200
Choose 2 units from:
12.201, 12.202, 12.204, 12.205
Choose 5 units from Table 1 (no more than 1 from Level II Psychology)
1 General Studies elective

Year 3*
Choose 4 Level III Psychology units
Choose 3 units from Table 1
1 General Studies elective

Year 4 (Honours)
12.403 *or* 12.404

*Students intending to proceed to honours in Psychology must take 12.200, 12.201 and 12.202 in Year 2, together with 4 other units from Table 1 (a total of 7 units in Year 2). In Year 3 students must take 8 Level III Psychology units including 12.300, 12.305 and either 12.304 or 12.322 from Group A for 12.404 in Year 4. Additionally, students intending to take 12.403 in Year 4 are required to also include 12.301 from Group B.

Recommended Double Majors

1270 Psychology/Anatomy
7312 Psychology/Physiology

Information Systems

The Information Systems program is intended to develop students' conceptual and disciplinary skills in the application of computing technology to the business and government environment. After an introductory first year students study systems design, database, communications and commercial programming in parallel with computer science, mathematics and management accounting units. An honours year is available for well qualified students — this specializes in advanced information systems and data management topics.

1400 Information Systems

Year 1*
6.611
10.001 *or* 10.011
Choose 5 Level I units from:
1. Table 1 *and/or*
2. Table 2 for program 1400

Year 2
6.621, 6.641
14.501, 14.511, 14.602, 14.603
10.331 *or* 10.311A
Choose 1 unit from:
1. Table 1 *or*
2. Table 2 for program 1400
1 General Studies elective

Year 3
14.522, 14.605, 14.607, 14.608
Choose 3 units including at least one at Level III from:
1. Table 1 *and/or*
2. Table 2 for program 1400 *and/or*
3. 14.611
1 General Studies elective

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

Year 4 (Honours)
14.794, 14.853, 14.857, 14.886, 14.887, 14.891
If 14.611 has not previously been taken this unit should replace 14.857.

*In Year 1 students must enrol in program 6806. Enrolment in Year 2 is based on academic performance in Year 1.

Geology and Geophysics

Programs in Geology and Geophysics are offered to the Board of Studies in Science and Mathematics by the School of Applied Geology. The School is part of the Faculty of Applied Science and is dedicated to teaching and research in resource geology as well as in the fundamentals of the science.

Geology is the study of the nature and evolution of the earth. 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 geologic 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, ie activities that are fundamental to the well-being of modern 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
After June 1986, the Australasian Institute of Mining and Metallurgy requires that its corporate members, including professional geologists, shall have completed a four year course. Students wishing to enter the geology profession should preferably undertake the four year Course 3000 Applied Geology in the Faculty of Applied Science that is specifically designed to meet the needs of a professional geologist. However, an identical course of study is available in the Science Faculty program 2500 by taking the three year program with a double major in Applied Geology and by achieving a standard that enables progression to the Year 4 program and graduation with Honours. Training of a professional geologist demands a thorough understanding of basic geological principles; accordingly, in the early part of the course students receive instruction in fundamental geological subjects. As with other science based disciplines, appropriate standards in Physics, Chemistry and Mathematics are also required. As the course progresses, increasing emphasis is placed on practical applications of geological principles to mineral and energy exploration and development and to engineering and environmental geology. Mineral and energy exploration techniques including geochemical and geophysical methods are also studied. 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 specialized research project.

Geophysics
Professional geophysicists work closely with geologists and, appropriately, studies of both disciplines are undertaken in the one school. Fundamental and applied geophysics are

taught to geology students in program 2500 (and Course 3000), but students who intend to become professional geophysicists should take program 2503.

Single Major in Geology
Because Geology is a natural companion to other sciences, such as Chemistry (in Geochemistry), Botany and Zoology (in Palaeontology) and Geography, and of widespread interest to science in general, program 2500 is organized so that a single major in Geology may be acquired. Selected students who have completed such studies may undertake an honours degree that includes geological topics. Students interested in a combination of geology with another science should consult the School of Applied Geology about recommended programs. Those who are specifically interested in combining Geology with Zoology and/or Botany should carefully read the following section.

Geology with Zoology and Botany
Geology and the Biological Sciences meet in a common field of study (Palaeontology) concerned with the evolution and environmental controls on the growth of ancient life forms. Palaeontologists may have an applied function, providing geologists with essential information about the relative ages and depositional environments of sedimentary rocks, particularly the strata with a potential to yield fossil fuels. Students intending to pursue this combination should take the subjects designated in footnote (*) to program 2500.

Geology in Marine Science
Students interested in marine sciences should consider program 6833 which is concerned with geological aspects of the marine environment.

Programs in Geology are also offered in the Combined Science/Civil Engineering course **3730**, the Science Education course **4080** and the Combined Science/Law Course **4770**.

2500 Geology

Year 1
1.001*
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011
or both 10.021B & 10.021C
25.110, 25.120

Year 2
25.211, 25.212, 25.221
Choose at least 4½* units from:
1. 25.223, 25.2261 (compulsory for Double Major) *and*
2. Table 1 other than units offered by Applied Geology
1 General Studies elective

Year 3
25.311, 25.312
Choose at least 2 Applied Geology units from:
25.314, 25.3162, 25.321, 25.324, 25.325, 25.3261, 25.3271, 25.333 (Double Majors in Applied Geology must take all of these subjects)
Choose further units from Table 1 to give a total of 23 for the complete program*
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
Either
a. 25.434
or
b. for Double Major:
25.410, 25.4101, 25.420
Choose one of the following sub-strands
25.412, 25.414, 25.415, 25.931

*Carefully read the description of program 2500 and seek advice from the School of Applied Geology about the choice of units. Students following a combination of Applied Geology with Zoology and/or Botany are permitted in Year 1 to substitute the two Biology units, 17.031 & 17.041, for 1.001. In Year 2 they should take 43.111, 45.101, 45.201, 45.301 and 1 unit chosen from 17.012, 43.131 *and either* 43.112† *or* 43.162†; in Year 3 25.324, *either* 25.321 *or* 25.325, 45.302 and 2 units chosen from 43.152, *either* 43.162† *or* 43.112†, 43.172, 45.112, 45.121, 45.402.
†These subjects are offered in alternate years. 43.112 requires the waiving of co-requisite 43.101.

2503 Geophysics

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011
25.110, 25.120

Year 2
1.002, 1.012, 1.022, 1.032
10.2111, 10.2112
25.5212, 25.223, 25.2261
2 General Studies electives

Year 3
25.3162, 25.333, 25.9311, 25.9312,
25.9313, 25.9314, 25.9321
Choose 2 units from 1.062 and Level III Physics
Choose 2 units from:
1. Table 1 *and/or*
2. Table 2 for program 2503
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
25.434

Recommended Double Majors

0125 Geology/Physics
0225 Geology/Chemistry
1025 Geology/Mathematics
2543 Geology/Botany and Zoology
2725 Geology/Geography

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.

Program 2700 comprises a three-year structured sequence of substantive subjects in physical and human Geography, with particular emphasis on studies of the natural environment, as well as a grounding in basic analytical skills and techniques (eg statistical methods and computing, remote sensing and air photo interpretation, field and laboratory techniques) required for problem-solving and application. Because of its essentially interdisciplinary nature, a training in Geography is increasingly recognized as a relevant qualification for employment in a wide range of planning and conservation-related fields.

Considerable flexibility exists in program 2700 for students to combine subjects in Geography with those from cognate disciplines to suit individual interests and career aspirations. Studies in Geography with a co-major in other sciences, especially Geology and Botany, are encouraged. Details of particular courses of study and subject combinations offered within the program are available from the School Office.

2700 Geography

Year 1
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
27.819 *and either* 27.111 *or* 27.818
Choose further Level I units from Table 1 to make a total of 8

Year 2
Choose 3 Level II Geography units
Choose 5 units from Table 1
1 General Studies elective

Year 3
Choose 4 Level III Geography units
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
27.844

Recommended Double Majors

2725 Geography/Geology
2743 Geography/Botany

Biochemistry

Biochemistry is the study of the chemistry of living organisms and is a key subject in biological studies. Initially the approaches of chemistry were applied to biological systems but now Biochemistry has achieved its own techniques, approaches and body of knowledge and its ideas pervade the whole of biology. It, however, retains a molecular basis and is an ideal study for those interested in understanding and appreciating biological processes at the molecular rather than descriptive level. Biochemistry also represents a fundamental component of medical science and has an important role in many aspects of modern medicine.

Study of Biochemistry begins at Level II (41.101 Biochemistry) building on a base of Level I Chemistry and Biology. The material in this double unit introduces the basic concepts of the subject, describes biological molecules, and their interconversions in cells and tissues. It is followed by the single unit 41.111 Biochemical Control that illustrates and amplifies the molecular control of cellular processes with particular emphasis on enzymes, hormones and nucleic acids.

At Level III further double units (41.102A Biochemistry of Macromolecules and 41.102B Physiological Biochemistry) and single units (41.102C Plant Biochemistry and 41.102E Molecular Biology of Higher Organisms) are offered at a more advanced level.

In Year 4, the Honours Course in Biochemistry (41.103 Biochemistry Honours) offers the opportunity for those students who have obtained above average results to carry out a research project under supervision and to receive training in the latest research techniques.

Program 4100 Biochemistry

The program outlined below leads to a single major in Biochemistry and also provides for a considerable choice of units offered by other Schools. It can be used as a framework to lead to co-majors with other disciplines, for example, microbiology, chemistry, physiology, biotechnology, zoology, botany or anatomy; other co-majors are possible. In arranging co-majors, the programs of the two relevant Schools should be consulted, especially if there is a possibility of proceeding to Year 4 (Honours). Program 4100 also can be followed to achieve a single major in biochemistry supported by one or two minor sequences — for example biochemistry with some chemistry and some microbiology or biochemistry with some physiology and some anatomy. The program also permits 6 Level III units of biochemistry to be taken rather than the minimum of 4 units. All of these combinations can serve as prerequisites for an Honours Year in biochemistry provided that passes are obtained in a total of 8 Level III units including above average results in Biochemistry.

4100
Biochemistry

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1*

Year 2
2.002B
41.101, 41.111
Choose 3 or 4 units from Table 1
1 General Studies elective

Year 3†
41.102A
Choose at least 2 units from: 41.102B, 41.102C, 41.102E
Choose further units from Table 1 to give a total of 23 for the complete program
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
41.103

*Recommended are units offered by the School of Physics and the Department of Computer Science. Also recommended is 68.451.
†See footnote to program 6200.

Recommended Double Majors

0241 Biochemistry/Chemistry
4142 Biochemistry/Biotechnology
4143 Biochemistry/Botany
4144 Biochemistry/Microbiology
4145 Biochemistry/Zoology
4162 Biochemistry/Science Policy Studies
(for further details see program 6200)

Biotechnology

Biotechnology employs a body of multidisciplinary expertise directed towards the utilization and recycling of natural resources by controlled biological action, usually in a reactor. Its study provides an appreciation of the capabilities of biological systems and the skills required to maximize these capabilities on the industrial scale. Particular attention is given to: the selection of the appropriate systems and their maximization by genetic and/or enzyme tailoring; the design of biological reactors and their ancillary equipment; optimization and control of the processes. It is by these means that products are manufactured at ensured standards of quality. The products include certain foods and beverages, baker's yeast, antibiotics, steroids, vaccines, enzymes, amino acids, nucleotides, vitamins, organic acids, alcohols, metals, plant growth regulators and insecticides. Specific mammalian proteins, such as insulin and growth hormone, are also produced by microorganisms which have been genetically engineered to contain the appropriate mammalian gene.

Students wishing to undertake training in biotechnology may do so by combining such training with a major in another relevant discipline, preferably biochemistry, microbiology or chemistry. The fourth (Honours) year includes further formal training as well as research in biotechnology.

Alternatively, students with no previous training in biotechnology may undertake the biotechnology honours year, provided they have the necessary background training in biochemistry and microbiology; in such cases the Level III biotechnology units constitute the formal component.

4200
Biotechnology

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or*10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level 1 units from Table 1

Year 2
41.101
Choose at least one of: 42.101, 44.101
Choose additional units from Table 1 to make a total of 7
2 General Studies electives

Year 3
42.102A, 42.102B
Choose 4 Level III units from a single discipline* in Table 1
Choose 2 units from Table 1
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
42.103

*Recommended disciplines are Biochemistry, Chemistry, Microbiology.

Recommended Double Majors

0242 Biotechnology/Chemistry
4142 Biotechnology/Biochemistry
4244 Biotechnology/Microbiology

Botany

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

Botany may be taken as a major or a minor study in the Science and Mathematics Course (3970).

4300 Botany

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1

Year 2
43.111
Choose at least one of the following: 17.012, 43.131, 43.121
Choose additional units from Table 1 to make a total of 8
1 General Studies elective

Year 3
Choose 4 Level III Botany units
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 7 Level III units.

Year 4 (Honours)
43.103

Recommended Double Majors

2543 Botany and Zoology/Geology
2743 Botany/Geography
4143 Botany/Biochemistry
4344 Botany/Microbiology
4345 Botany/Zoology

Microbiology

The discipline of microbiology encompasses the scientific study of the smallest forms of life, namely bacteria, viruses, algae, fungi and protozoa. Microorganisms are probably best known as agents of disease in man, in other animals and in plants. Other microorganisms cause food spoilage, as well as serious deterioration in textiles and structural materials. Not all microorganisms are harmful. We depend on microorganisms for the recycling of organic wastes, for the maintenance of soil fertility, and for the production of foods, beverages, pharmaceuticals (especially antibiotics), and other industrially important materials.

The program in Microbiology requires students to take basic courses in Chemistry, Mathematics and Biology in Year 1, as well as 41.101 Biochemistry in Year 2.

4400 Microbiology*

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1

Year 2
41.101
44.101, 44.121
Choose 4 units from Table 1
1 General Studies elective

Year 3
44.102, 44.112
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
44.103

1. Those students interested in a specialist career in Microbiology should also choose 44.122 and 44.132 in Year 3. Students wishing to include 44.122 (Immunology) in their program are strongly advised to take 70.011A (Histology) in Year 2. **2.** Many students combine a major in Microbiology with a major in Biochemistry or Biotechnology. **3.** Students should note that Mycology is an aspect of Microbiology which is taught in the School of Botany in units 43.131 and 43.132.

Recommended Double Majors

4144 Microbiology/Biochemistry
4244 Microbiology/Biotechnology
4344 Microbiology/Botany

Zoology

Zoology is built on the foundation of the first year units Biology A and B, Mathematics and Chemistry. Students are urged to consider the inclusion of Biological Laboratory Computing amongst their Level I units.

In their second year all Zoology students study Biometry, Invertebrate Zoology, Vertebrate Zoology and General Ecology plus two Level II units of either Biochemistry or Chemistry or Mathematics or Physics. Other units are then chosen to make a total of seven or eight for the year. The areas from which these units are chosen will depend mainly on the student's interests. Examples of some of the units which are often chosen are Flowering Plants. Introductory Microbiology, Control Mechanisms, Organic Chemistry, Analytical Chemistry, Physiology and Mathematics. The choice of optional units is important because it determines which units may be included in the third year. Students are urged to seek advice from the school's student advisors at the end of Year 1 and Year 2.

A major in Zoology requires the study of at least 4 Level III Zoology units, three of which must be selected from Evolutionary Theory, Insects, Comparative Physiology and Animal Behaviour. The choice of other units in third year depends on students' interests. For instance those interested in Entomology would probably include Economic Zoology amongst their units; those interested in Ecology might include Population & Community Ecology, Marine Ecology and Vertebrate Zoogeography & Evolution; those interested in Animal Physiology would probably include Ecological Physiology. The additional units may be either chosen from those offered by the School of Zoology or by other schools. In all, seven or eight units are studied in third year to make a total of at least 23 units, as required by the regulations of the Science and Mathematics Course.

It is possible to study other disciplines as a co-major with Zoology eg Botany, Biochemistry, Mathematics, Marine Science, Anatomy, Physiology, Geography, Geology. In general, students completing a co-major with Zoology must satisfy the requirements of the Zoology program but some minor variations may be permitted when students include 4 Level III units from both Zoology and the co-major discipline. Students should consult the School about these prior to enrolment in Year 2.

For students who achieve above average results in their studies a fourth year (Honours) is available. The Honours year is made up of formal course work on Concepts in Biology plus a research project.

4500 Zoology

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1

Year 2
17.012
45.101, 45.201, 45.301
Choose 2 units from Table 1 from 1 of the following schools: Biochemistry, Chemistry, Physics, Mathematics
Choose 2 units from Table 1
1 General Studies elective

Year 3
Choose 3 units from 45.121, 45.122, 45.142, 45.402
Choose 1 further Level III Zoology unit
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units

Year 4 (Honours)
45.103

Recommended Double Majors

2543 Zoology and Botany/Geology
4145 Zoology/Biochemistry
4345 Zoology/Botany
4509 Zoology/Mathematics
4570 Zoology/Anatomy
7345 Zoology/Physiology

History and Philosophy of Science

Students may take units within the School of History and Philosophy of Science leading to the award of pass or honours degrees in History and Philosophy of Science, or to the award of an honours degree in Science Studies.

Units in HPS are quite different from ordinary science subjects. They involve thinking *about* science, from historical, philosophical and sociological perspectives. They consider the historical development of the various sciences, but not merely as the series of intellectual steps leading to the present state of scientific knowledge. Rather, the history of science is seen in relation to cultural history and to forces of social change, and to the parallel development of philosophical thought.

Philosophical problems engendered by science are also discussed, and considerable attention is given to the social structure of science and the ways in which science and technology fit into modern society, both in industrial and developing countries.

Units in the sequence leading to honours in Science Studies are intended for students wishing to qualify themselves as science policy advisers. Training is provided therefore in both social studies of science and science policy theory and practice.

Broadly speaking, students wishing to make their careers in areas related to HPS or Science Policy (for example, museum work, science journalism, tertiary teaching, government administration, etc) will need to pursue their studies at graduate level, but there are some career opportunities for those who have bachelor degrees only.

Some students may wish to take a small number of HPS subjects, where their programs allow sufficient flexibility, as complements to their usual experimentally-based science subjects.

The School of History and Philosophy of Science offers a course-work program leading to the degree of Master of Science and Society, and research degrees at the Master and Doctoral level may also be undertaken. Interested students should enquire at the School.

The Pass Degree
The program offered by the School of History and Philosophy of Science gives students a wide range of options from which to choose in studying the historical, philosophical and social aspects of science and technology. Students intending to complete the pass degree are required to take eight HPS units, of which three are prescribed and five are elective. The remaining units in this program may be chosen from those listed in Table I, which allows sufficient flexibility for the completion of a second major in a scientific discipline, if this is desired. Students wishing to enquire about such a double major within program 6200 are invited to contact the School of HPS and the relevant second School for further information. It should be noted that students who undertake a double major combining program 6200 with one of the programs 0100 (Physics), 0200 (Chemistry) or 4100 (Biochemistry), and who include the Science Studies sequence

(62.052, 62.062, 62.072, 62.082) may replace 1 General Studies elective with a science unit.

The Honours Degree
Students intending to proceed to an honours degree in HPS may choose from two alternative fourth year programs: 62.014 History and Philosophy of Science Honours, focusing on the intellectual history of science and the philosophy of science; or 62.024 Science Studies Honours, focusing on the social history of science and science policy studies. For entry to 62.014 a student must complete the first three years of program 6200 with marks that result in an average of Credit or better in the eight HPS units included. For entry to 62.024 a student must complete a more specialized sequence within program 6200, as prescribed in the footnote to that program, again with an average result of Credit or better in the eight HPS units included. In either case, the three-year program leading to honours entry offers sufficient scope for the completion of a second major in a scientific field, if this is desired. Such a double major is particularly appropriate for a program leading to honours-level work in science policy studies; however all students intending to complete an honours degree within program 6200 are invited to contact the School of HPS and the relevant second School for further information regarding combined major sequences.

6200
History and Philosophy of Science/Science Studies

Year 1
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
62.110 *or* 62.211
Choose 5 Level I units from Table 1

Year 2
62.022, 62.032
Choose 1 additional HPS unit*
Choose 5 units from Table 1
*1 General Studies elective***

Year 3†
Choose 4 HPS units*
Choose 3 units from Table 1
*1 General Studies elective***
Students proposing to proceed to Year 4 (Honours) must complete 7 Level III units.

Year 4 (Honours)
Either 62.014 or 62.024*

*Students intending to proceed to 62.024 (Science Studies Honours) must complete 62.052, 62.062, 62.072 and 62.082 by the end of Year 3.
**26.251, and 26.2506 may not be included in this program.
†Students who undertake a double major combining this program with one of the programs 0100 (Physics), 0200 (Chemistry) or 4100 (Biochemistry), and who include the Science Studies sequence (62.052, 62.062, 62.072, 62.082) may replace 1 General Studies elective with a Science unit.

Recommended Double Majors

0162 Science Policy Studies/Physics*
0262 Science Policy Studies/Chemistry*
4162 Science Policy Studies/Biochemistry*
6225 History and Philosophy of Science/Geology
6243 History and Philosophy of Science/Botany
6245 History and Philosophy of Science/Zoology
6270 History and Philosophy of Science/Anatomy

*See footnote to program 6200.

Board of Studies in Science and Mathematics

6801
For Anatomy Programs

Year 1
10.001 *or* 10.011
or
10.021B and 10.021C
Choose 6 appropriate Level I units from Table 1

Enrolment in Year 2 of program 7000 is based on academic performance in Year 1. Students should select the units specified in the program they wish to pursue in Year 2.

Students may obtain advice from the Office of the Board of Studies in Science and Mathematics in the Mathews Building.

6806
For Computer Science Programs

Year 1
10.001 *or* 10.011
6.611
Choose 5 units from:
1. Table 1 *&/or*
2. The BA course** *&/or*
3. Table 2 for program 6806**

**In Year 1 students must enrol in program 6806. Enrolment in Year 2 of program 0600 and 1400 is based on academic performance in Year 1.
Students may obtain advice from the office of the Board of Studies in Science and Mathematics in the Mathews Building.

6810
Mathematics of Management*†

Year 1
10.001 *or* 10.011**
14.501, 14.511
15.001, 15.011
Choose 2 Level I units from:
1. Table 1 *or*
2. Table 2 for program 6810

Year 2
10.111A, 10.1113, 10.1114, 10.2111, 10.2112
10.2113, 10.2115, 10.311A
14.522, 14.602
Choose 1 unit from: 14.542, 14.603, 14.613, 15.042
1 General Studies elective

Year 3
14.583
Choose 2 units from: 10.212A, 10.412D, 10.212L, 10.212M, 10.311B, 10.312A
Choose 2 further Level III Mathematics units
Choose 1 unit from: 14.605, 14.607, 14.608, 14.614, 14.615
Choose 1 unit from:
1. Table 1 *or*
2. Table 2 for program 6810
1 General Studies elective

*Enrolment in this program requires the approval of the Chairman of the Board of Studies in Science and Mathematics and the head of the School of Accountancy.
**Throughout this program Mathematics subjects can be replaced by the corresponding Higher Mathematics subject.
†For details see preamble to Mathematics programs.

Marine Science

The Marine Science programs are designed to provide opportunities for students to specialize in selected areas of marine science, yet ensure that they receive an adequate exposure to other pertinent disciplines within this broad field. The programs have been constructed from subjects currently available in the faculties of Science, Biological Sciences and Applied Science. Introductory Marine Science is a subject common to all these programs, and unique to them, having been designed for and offered only in Marine Science programs.

All students in the Marine Science programs must select *one major sequence* from the following options: 6831 Physical Oceanography; 6832 Biological Oceanography, 6833 Earth Science Oceanography and 6834 Environmental Chemistry. In addition, all students must select *two minor sequences* from the Physical, Biological, Earth Science, and Chemical minor sequences offered. A minor sequence in the same area as that selected for the major sequence is excluded.

Physical Oceanography includes units of basic and advanced Mathematics and Physics, as well as units in 10.412A Dynamical and Physical Oceanography and 10.4112 Hydrodynamics.

Biological Oceanography includes basic Mathematics, Chemistry and Biology as well as advanced courses in 43.111 Flowering Plants, 45.201 Invertebrate Zoology, 43.172 Phycology and Marine Botany, 45.112 Marine Ecology and 44.101 Introductory Microbiology. Further options include 17.012 General Ecology, 10.331 Statistics and 41.101 Biochemistry.

Earth Science Oceanography consists of basic Geology and Mathematics, and advanced units in Geology and Geography leading to 25.631 Marine Geology, 25.632 Estuarine Geology, 25.6341 Marine Mineral Deposits, 25.6342 Exploration & Seismic Methods and 25.622 Hydrological and Coastal Surveying.

Environmental Chemistry includes basic Chemistry and Mathematics, and 2.002A Physical Chemistry, 2.002D Analytical Chemistry, 2.043A Environmental Chemistry and 2.003D Instrumental Analysis.

All programs offer some optional units to allow students a degree of freedom of choice of subjects. A fourth (Honours) year in Marine Science is available in all programs.

6831 Marine Science (Physical Oceanography)

Year 1
1.001
1.041 *or* 6.611
10.001 *or* 10.011
Choose 2 units from 1 of the strands:
1. 2.141 *or both* 2.121 *and* 2.131 *or*
2. 17.031, 17.041 *or*
3. 25.110, 25.120
10.081 or choose 1 further unit from the above strands

Year 2
10.1113, 10.1114, 10.2111, 10.2112
10.4111 *or* 1.002
68.302
Continue the strand chosen in Year 1:
1. 2.002A *or*
2. at least 1 unit from: 17.012, 45.152, 43.111 *or*
3. 25.621
Choose additional units from Table 1 to give a total of 8
1 General Studies elective

Year 3
10.4112 *or* 10.4212
10.412A
10.412D *or* 10.422D
25.6342
68.313
Choose 3 units from: 1.022, 1.032, 1.3533, 1.062, 1.133, 10.212A, 10.412B, 10.422A, 10.331, 10.422B, 10.4129, 10.4331
45.112 *or* 25.631 *or* 25.632 *or* 2.043A *or* 43.172 *or* 25.635
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units including 10.422A.

Year 4 (Honours)
68.304

6832 Marine Science (Biological Oceanography)

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and 10.021C*
17.031, 17.041
Choose 2 units from 1 of the strands:
1. 1.001 *or* 1.021 *or*
2. 25.110, 25.120

Year 2
2.002A
43.111
44.101
41.101 *or* 45.201
68.302
Choose 1 unit from the subjects related to the strand chosen in Year 1:

1. 10.031 *or* 10.331 *or* 10.301 *or*
2. 25.622
Choose units from: 17.012, 41.101, 44.121, 45.101, 45.201, 45.301 to give a total of 8
1 General Studies elective

Year 3
43.172
45.112
Choose 2 Level III units from Table 1 which may include the subjects corresponding to the strand chosen in Years 1 and 2:
1. 68.313, 10.032 *or*
2. 25.632
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
68.304

6833
Marine Science (Earth Science Oceanography)

Year 1
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
25.110, 25.120
Choose 4 units from 2 of the strands:
1. 1.001 *or* 1.021 *and/or*
2. 17.031, 17.041 *and/or*
3. 2.141 *or both* 2.121 *and* 2.131

Year 2
68.302
25.621, 25.622
Continue both of the strands chosen in Year 1:
1. 10.031 *or* 10.331 *or* 10.301 *and/or*
2. At least 1 unit from: 17.012, 43.111, 45.201 *and/or*
3. 2.002A
Choose additional units from Table 1 to give a total of 8
1 General Studies elective

Year 3
25.631, 25.632, 25.6341, 25.6342, 25.635*
Choose 2 Level III units from Table 1 which may include the subjects corresponding to the strands chosen in Years 1 and 2:
1. 68.313, 10.032 *and/or*
2. 43.172, 45.112 *and/or*
3. 2.043A
Choose 1 unit from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
68.304

*If 25.635 is not available, choose some other appropriate unit in consultation with the Course Authority.

6834
Marine Science (Environmental Chemistry)

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011
Choose 4 units from 2 of the strands:
1. 1.001 *and/or*
2. 17.031, 17.041 *and/or*
3. 25.110, 25.120

Year 2
2.002A, 2.002D
68.302
Continue both of the strands chosen in Year 1:
1. 10.031 *or* 10.331 *and/or*
2. At least 1 unit from: 17.012, 43.111, 45.201 *and/or*
3. 25.622
Choose additional units from Table 1 to give a total of 8
1 General Studies elective

Year 3
2.043A, 2.003D
Choose 2 Level III units from Table 1 which may include the subjects corresponding to the strands chosen in Years 1 and 2:
1. 68.313, 10.032 *and/or*
2. 43.172, 45.112 *and/or*
3. None
Choose 3 units from Table 1
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 8 Level III units.

Year 4 (Honours)
68.304

Genetics

The Genetics program is designed to provide students with a firm foundation of genetical knowledge and also to give them experience in pertinent related areas.

Because the subject matter of Genetics ranges from the structure of viruses to the co-evolution of populations, students are encouraged to choose between three sequences: molecular and microbial, population and ecological, and classical and organismal. The three groups of subjects in second year correspond to these sequences; the combination of subjects chosen then will determine the choices available in Year 3.

The choice of Year 1 subjects available include Physics, Psychology, Geography, and units in the laboratory applications of computers. Experience with laboratory computers is an asset in many areas of genetics, and 68.451 is therefore strongly recommended as a year 1 subject.

Entry into a fourth (Honours) year is available, for above-average students, upon application to the Genetics Program Committee.

6840 Genetics

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1

Year 2
41.101
9.801
44.101
Choose 1 unit from: 43.111, 43.131, 44.121, 45.201, 45.301, 45.402
Choose 1 unit from: 10.331, 45.101
Choose 2 units from one of the following groups:
1. 2.002B; 41.111
2. 6.611; 17.012; 68.601
3. 43.111 *or* 43.131; 45.201 *or* 45.402; 45.301 *or* 9.801; 62.104; 68.601
2 General Studies electives

Year 3
Choose 8 units from: 6.621, 6.646, 9.802, 9.811, 41.102A, 41.102E, 42.102A, 42.102C, 43.112, 44.102, 44.122, 45.121, 68.602, 79.201, 79.202, 79.302
Students proposing to proceed to Year 4 (Honours) must complete 7 Level III units.

Year 4 (Honours)
68.404

6870 Hydrographic Studies

Hydrographic studies includes units of basic Surveying, basic and advanced Mathematics, as well as units in Geology and Geography. The program has been constructed to provide an opportunity for students to specialize in those areas of marine science applicable to coastal and hydrological surveying and yet still provide an adequate exposure to other pertinent disciplines. This program is of particular relevance to students wishing to proceed to the Hydrographic Branch of the RAN.

Year 1
1.001
2.121
10.001 *or* 10.011 *or both* 10.021B *or* 10.021C
25.601 *or both* 25.110 *and* 25.120
Choose one of: 2.131 *or* 6.611

Year 2
10.031
25.621, 25.622
29.001, 29.002, 29.191
Choose 2 appropriate Geography units*
Choose 1 Level II unit from Table 1 *or* 68.302**
1 General Studies elective

Year 3
10.331
25.631, 25.632, 25.6341, 25.6342, 25.635 *or* appropriate Applied Geology unit*
68.313
2 Level II *or* Level III units from Table 1
1 General Studies elective

*Consult with Royal Australian Navy Advisor or Course Authority.
**Students who have not taken 25.601 are strongly recommended to take 68.302 from Table 2.

Anatomy

Entry to Anatomy programs is limited to a quota of approximately 80. Students in Year 1 must enrol in Program 6801, and apply in October for entry to Anatomy the following year. Selection is determined by academic merit, based on a weighted aggregate of marks obtained in Year 1. Allowance is made for the relative difficulty of first year units in Mathematics and Physics, the more difficult subjects being given a greater weight. Introductory Chemistry is included in the aggregate even though not counting for a degree. The quota does not apply to the Science/Medicine course (course 3820).

Anatomy subjects are, in general, only available to students who have been admitted to the Anatomy quota. However, students in programs 4402 (Immunology) and 6840 (Genetics) may take 70.011A, 70.304, and 70.3041.

Students enrolled in programs for which Anatomy or Histology is relevant (eg Biochemistry, Physiology, Psychology) and who wish to study one or more Anatomy units should consult the Head of School.

A major in Anatomy may suitably be combined with a major in Biochemistry (70.304 or 70.3041 recommended), Physiology (note relevance of Neuroanatomy 1 and 2 to Neurophysiology), or Psychology (take Neuroanatomy 1 and 2). Owing to timetabling difficulties, the double major with Biochemistry may be impossible to complete in the minimum time.

7000 Anatomy

Year 1*
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 4 Level I units from Table 1
Apply for entry to the Anatomy quota for following year

Year 2
70.011A, 70.011C
Choose 5 or 6 units from:
1. Table 1 *and/or*
2. Anatomy units in Table 2 (70.011B is recommended)
1 General Studies elective

Year 3
Choose at least 4 Level III Anatomy units
Choose further units from Table 1 to give a total of 23 for the complete program
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 6 Level III units.

Year 4 (Honours)
70.013

*In Year 1 students must enrol in program 6801. Enrolment in Year 2 is based on academic performance in Year 1.

Recommended Double Majors

1270 Anatomy/Psychology
4170 Anatomy/Biochemistry
4570 Anatomy/Zoology
6270 Anatomy/History and Philosophy of Science
7073 Anatomy/Physiology

Physiology and Pharmacology

Physiology, the study of the processes and mechanisms which serve and control the various functions of the body, begins at the second year level with the full year subject Physiology 1A (the core subject for students who intend to proceed to the study of Physiology at a higher level), or Physiology 1B.

Prior to commencing these subjects, students are required to have satisfactorily completed Level I courses in Mathematics, Cell Biology and Chemistry, as a background in these subjects is considered essential to an understanding of how the body functions. In addition, Physiology 1A students are normally required to enrol concurrently in the second year level, Session 1 subject, Biochemistry.

Physiology 2 is a major (third year level) subject in Physiology and in this subject various systems of the body are treated in considerable detail. Progression to this full year subject normally requires the satisfactory completion of Physiology 1A (rather than 1B), and of both of the Level II Biochemistry subjects. Physiology 2 provides the 4 units at third year level required for a degree with a single major in Physiology. Alternatively it may be undertaken concurrently with a Level III subject offered by other schools in allied disciplines, such as Chemistry, Psychology, Zoology, Biochemistry or Anatomy, to form a program leading to the award of a degree with a double major. Students who wish to take Physiology as a major subject should follow Strand **1.** of the program 7300.

The School also offers the third year level subject Pharmacology, which includes a study of the uptake, distribution and excretion of drugs within the body, and of mechanisms by which drugs, and various endogenous chemicals, alter body function. This 2 unit subject is normally taken concurrently with Physiology 2, or with Level III Biochemistry or Chemistry subjects. Pharmacology is also a full year subject. Students who wish to form a major subject with Pharmacology should follow Strand **2.**

Physiology 2 and Pharmacology are the most advanced undergraduate courses offered by the School which are conducted by way of formal lectures, tutorials and laboratory practical classes. Selected students who have satisfactorily completed one of these subjects may be permitted to enrol in a further year of study of either Physiology or Pharmacology which normally leads to their being awarded their degree with Honours.

The Honours year program, as presently conducted in this School, requires the student to complete a full year research project on a specific topic under the supervision of a member of staff, and to submit a thesis based on this work. The level of honours awarded is determined on the basis of the thesis, and on course work activities such as the preparation of literature reviews, and participation in seminar programs.

7300
Physiology and Pharmacology

Year 1
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B *and* 10.021C
17.031, 17.041
Choose 2 Level I units from Table 1

Year 2*
Either
1. 41.101, 41.111, 73.111
or
2. 73.111 *or* 73.121; *and* choose 3 Level II units (should normally include prerequisite subjects for one of the Pharmacology co-requisite subjects shown for year 3)
Choose 3 units from Table 1
1 General Studies elective

Year 3
Continue the strand chosen in Year 2:
Either
1. 73.012
or
2. 73.022
and either
2 Level III Chemistry units
or
41.102A *and* 41.102B
or
73.012

Choose further units from Table 1 to give a total of 23 for the complete program.
1 General Studies elective
Students proposing to proceed to Year 4 (Honours) must complete 7 Level III units.

Year 4 (Honours)
73.013
73.023

*For an explanation of the division into strands **1.** and **2.** refer to the preamble.

Recommended Double Majors

4173 Physiology/Biochemistry
7073 Physiology/Anatomy
7302 Physiology/Chemistry
7312 Physiology/Psychology
7345 Physiology/Zoology

3611
Combined Science/ Aeronautical Engineering Course
3661
Combined Science/ Industrial Engineering Course
3681
Combined Science/ Mechanical Engineering Course
3701
Combined Science/ Naval Architecture Course

These combined courses of five years full time study enable a student in the School of Mechanical and Industrial Engineering to qualify for the award of the two degrees of Bachelor of Engineering and Bachelor of Science (BE BSc). The courses enable such combined degree students to major in the areas of computer science, materials science, mathematics, physics or statistics in addition to studying their chosen engineering speciality. The course is administered by the Faculty of Engineering.

All students who are accepted into the first year 'science compatible' course in the School of Mechanical and Industrial Engineering may enrol directly into these combined degree courses. Continued enrolment in Year 2 requires a pass at first attempt in all subjects of Year 1 and students who fail to achieve this will automatically be disenrolled from these courses and be enrolled in their respectivé engineering programs (**3610, 3660, 3680** or **3700**). Alternatively, students may transfer into Year 2 of these courses, provided they have obtained a clear pass in the Year 1 'science compatible' course.

Normally, students enrolled in these BE BSc courses will be awarded their degrees at the conclusion of five years study. However, it is possible for students to take out the Science degree prior to the Engineering degree provided they have: **1.** completed the requirements for Years 1, 2 and 3, **2.** completed the General Studies requirements for the Science degrée, and **3.** obtained approval from the Board of Studies in Science and Mathematics.

Students may also undertake an additional honours year in Science and Mathematics and automatically re-enter the combined Science/Engineering course without having to re-apply for admission. To undertake such an honours year in Science and Mathematics, permission is to be obtained, at the end of Year 3, both from the Head of the School in which the honours year is to be undertaken and from the Head of the School of Mechanical and Industrial Engineering.

Students who commence the course and do not complete the Engineering component may take out a BSc degree on completion of one of the approved programs in the Science and Mathematics course. Similarly, students not wishing to complete the BSc degree course may revert to their respective Engineering programs (**3610, 3660, 3680** or **3700**) with appropriate credit for subjects satisfactorily completed.

Having completed the first three years as outlined below, students in Years 4 and 5 do Year 3 and Year 4 of their respective Engineering programs (**3610, 3660, 3680** or **3700**), except that significant repetition of subject material is not allowed. Instead, students are required to substitute either an appropriate Technical Elective or an appropriate Level II or III subject from Table 1 or Table 2, or in exceptional circumstances, some other equivalent subject with the permission of the School of Mechanical and Industrial Engineering. For more details of these combined courses, refer to the Faculty of Engineering Handbook.

Year 1
1.001
2.951 **3.** (*or* 2.121)
5.010, 5.020 (5.0201 **1.** *and* 5.421**15.**), 5.030, 5.0303, 5.061, 5.0721
10.001 (*or* 10.011)

Year 2
5.300 **1.**, 5.422 **5.**
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214)
10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212)
18.020
} **4.**
Choose 4 units from Table 1 or Table 2 for course 3681 **2.**

For later Years, see overleaf

Year 3
5.043, 5.122, 5.622
Choose 5 units from Table 1 or Table 2 for course 3681 [2].
1 General Studies elective [6].

Years 4 and 5
Years 3 and 4 of respective Engineering programs 3610, 3660, 3680, 3700

Subject selections which satisfy the specific requirements for the various majors are summarized below. Provided co- and prerequisites are satisfied, there is scope for some subjects to be taken either in Year 2 or Year 3.

Computer Science Majors [13].

Year 2
5.0201, 5.300, 5.422
6.621, 6.631 [7], 6.641
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212), 10.331
18.020

Year 3
1.002 *or* 1.012 *or* 1.022 *or* 2.002A
5.043, 5.122, 5.622
4 Level III units from Table 1 and Table 2 offerings of School of Electrical Engineering and Computer Science for course 3681 [8].
1 General Studies elective [6].

Materials Science Majors

Year 2
2.002A
4.402, 4.522 [9].
5.300, 5.4221
18.020
and either **Option 1.:**
2.002B, 2.131
4.512 *or* 4.802 (recommended)
10.022
or **Option 2.:**
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212)
1 unit from [10.]: 1.022, 1.982, 2.131, 4.512, 4.802, 10.1114 (*or* 10.1214)

Year 3
4.703
5.043, 5.122, 5.622
10.331
1 General Studies elective [6].
and either **Option 1.:**
4.433
48.403
or **Option 2.:**
3½ appropriate Level II or III units from Schools of Physics, Chemistry or Metallurgy offerings in Table 1 or in Table 2 for course 3681 [14].

Mathematics Majors

Year 2
Same Year 2 as for Computer Science or Materials Science (3 units of Level II mathematics option) *or* Physics *or* Statistics majors
or
1.002 *or* 1.012 *or* 1.022 *or* 2.002A
5.300, 5.422
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212)
3 units from 10.1115, 10.1116, 10.2113 (*or* 10.2213), 10.2115 (*or* 10.2215), 10.4112 (*or* 10.4212), 10.4111 (*or* 10.4211) *or* from any other appropriate Level II units from Table 1 or Table 2 for course 3681
18.020

Year 3

5.043, 5.122, 5.622
10.331 [12].
4 Level III units from School of Mathematics offerings in Table 1
1 General Studies elective [6].

Physics Majors

Year 2
1.002, 1.012, 1.022, 1.032
5.300, 5.422
10.111A, (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212)
18.020

Year 3
1.0133 [11.], 1.023, 1.0333 [11.], 1.043 [11.]
1 Level III unit from School of Physics offerings in Table 1
5.043, 5.122, 5.622
10.331
1 General Studies elective [6].

Statistics Majors

Year 2
1.002 *or* 1.012 *or* 1.022 *or* 2.002A
5.300, 5.422
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212), 10.311A (*or* 10.321A), 10.311B (*or* 10.321B), 10.3111 (*or* 10.3211), 10.3112 (*or* 10.3212)
18.020

Year 3
5.043, 5.122, 5.622
4 Level III units from Statistics offerings in Table 1
1 Level II or III unit from School of Mathematics *or* School of Physics offerings in Table 1
1 General Studies elective [6].

Notes

1. Students planning to take higher level Computer Science subjects should take 6.611 Computing I or 8.360 Computing instead of 5.0201 Engineering Dynamics IA in Year 1; they must then take 5.0201 prior to taking 5.300.

2. The following considerations pertain to the choice of optional units in Years 2 and 3:
(1) They include no more than 1 Level I unit.
(2) They include at least 4 Level III units which satisfy the relevant major requirements.
(3) They include no more than 1 unit from Schools other than Chemistry, Electrical Engineering and Computer Science, Mathematics, Metallurgy and Physics.
(4) They include at least 1 Level II unit from the Schools of Chemistry or Physics.
(5) They include 10.331 Statistics *or* 10.311B Basic Inference.
(6) 4.502 Mechanical Metallurgy and 4.512 Mechanical Properties of Solids are deemed to have reduced unit values of 1 and ½ respectively.

3. Students are recommended to choose 2.951 unless they wish to pursue studies requiring 2.121. The prerequisite of 2.121 for 2.002A Physical Chemistry may be waived on application to the Head of the School of Chemistry. Materials Science (Option 1.) majors must choose 2.121.

4. Materials Science majors may omit 10.1114 Complex Analysis or substitute 10.022 Engineering Mathematics 2 for the mathematics subjects. The balance of the units must then be made up from units from the Schools of Chemistry, Metallurgy or Physics offerings in Table 1 or Table 2 for course 3681.

5. If 4.402 Physical Metallurgy I or 4.422 Metallurgical Phases II is taken, students should take 5.4221 instead of 5.422.

6. Anticipated. Actual General Studies requirements correspond to whatever is required in Year 2 of the normal Mechanical and Industrial Engineering degree course.

7. Students intending to major in Computing Science and planning to take 6.647 Business Information Systems may substitute 14.501 Accounting and Financial Management IA instead of 6.631 Computing 2B.

8. 6.646 Computer Applications is excluded for students in course 3661 who should substitute a Level III unit from Table 2 offerings of School of Electrical Engineering and Computer Science.

9. Provided 5.4221 is taken concurrently with 4.522, the prerequisite requirement of 4.512 for 4.522 and the corequisite requirement of 4.502 for 4.402 are assumed to be satisfied.

10. Materials Science majors who took 2.121 Chemistry 1A in Year 1 must take 2.131 Chemistry 1B. Those who took 2.951 Chemistry 1ME and wish to keep open the option of majoring in mathematics should include 10.1114 (or 10.1214) Complex Analysis in their selection; otherwise they are advised to select 1.022 Modern Physics or 1.982 Solid State Physics.

11. Under special circumstances, and with permission of the School of Physics, a student may substitute alternative Physics Level III offerings of equivalent unit value.

12. Students who followed the Year 2 for Computer Science majors should substitute 1.002 or 1.012 or 1.022 or 2.002A; those that followed the Year 2 for Statistics majors should substitute 1 Level II or III unit from the Schools of Physics or Mathematics offerings in Table 1.

13. Quota restrictions apply to certain Computer Science Level III units and application must be made in writing to the Head of the School of Electrical Engineering and Computer Science before the end of Session 2 in the preceding year. Prospective Computer Science majors should aim for a creditable academic attainment (65%) over Years 1 and 2.

14. These must include either 4.403 Physical Metallurgy 2 or 4.433 Physical Metallurgy 2C. The latter is recommended together with either 2.003A Physical Chemistry or 1.023 Statistical Mechanics (for which the prerequisite of 1.012 is waived provided students have passed 2.002A).

15. Recommended. Students may substitute 8.171 Mechanics of Solids.

Undergraduate Study
Board of Studies in Science and Mathematics
and the Faculty of Engineering

3725
Combined Science/ Electrical Engineering Course

Students in Electrical Engineering who maintain a creditable performance may qualify for the award of two degrees in five years of combined full-time study in which the requirements of the degrees have been merged. Students wishing to enrol in a combined course may do so only on the recommendation of the Head of School of Electrical Engineering and Computer Science and with the approval of the Faculty of Engineering and the Board of Studies in Science and Mathematics. Students wishing to enrol in, transfer into, or continue in a combined course shall have complied with all the requirements for prerequisite study, sequencing and academic attainment (a creditable performance, ie 65%).

Students who commence a course but subsequently do not wish to proceed with both areas of study, or who fail to maintain a creditable performance, revert to a single degree program with appropriate credit for subjects completed. Tertiary Education Assistance Scheme (TEAS) support is available for the five years of the combined degree programs.

Students may transfer into a combined course after partially completing the requirements for either degree provided suitable subjects have been studied. However, the choice of subjects and the time taken to complete the program can be seriously affected by this. Thus, students considering course **3725** should contact the Electrical Engineering School before completing their Year 2 enrolment. Application for transfer to a combined course must be made in writing to the Head of School by 9 January 1985.

Having completed Years 1 and 2 of course **3640** students in their third year complete a specific course of study consisting of four Level III Science units chosen from related disciplines, the appropriate General Studies electives and no less than four other Level II or Level III units, and otherwise accord with the rules of course **3970** leading to a major in Computer Science, Mathematics or Physics.

Students wishing to gain a degree at honours level in Science as part of their combined degree program shall meet all the relevant requirements of the Board of Studies in Science and Mathematics and of the School concerned. Such students may enrol for the honours year only on the recommendation of the Head of the School of Electrical Engineering and Computer Science and with the approval of the Head of the appropriate Science School, the Faculty of Engineering and the Board of Studies in Science and Mathematics.

In Years 4 and 5 the students do Year 3 and Year 4 of course **3640**. Depending on the program followed in their year of Science they may have already completed parts of the normal third and fourth year programs of the Electrical Engineering course, and they will be required to omit these from their program and to include an equivalent amount of other subjects chosen with the approval of the Head of the School.

Year 1
1.961
2.121
5.006
6.010
6.611
10.001
1 General Studies elective

Year 2†
1.972, 1.982
6.021A, 6.021B, 6.021C, 6.021D, 6.021E
10.111A, 10.1113, 10.1114, 10.2111, 10.2112
1 General Studies elective

Year 3†*

Either

Computer Science

1 General Studies elective

Choose at least 8 Level II or Level III units including at least 4 Computer Science units at Level III, the balance to be chosen from Level III Computer Science units and other Level II or Level III units in Table 1 or Table 2 for program 0601

or

Mathematics

1 General Studies elective

Choose at least 5 Mathematics units, 4 of which are Level III
Choose at least 3 Level II or Level III units from Table 1 or Table 2 for program 1001

or

Physics

1 General Studies elective

Choose 7 Level II or Level III units from Table 1 of which four must be Level III Physics units, chosen to include 1.0133, 1.0143, 1.023 and 1.0333

Year 4

From Electrical Engineering course, modified as required by Head of School

Year 5

From Electrical Engineering course

†Students intending to major in Computer Science should include 6.641 in their Year 2 enrolment. Students intending to major in Physics are required to take unit 1.992 in Year 2.

*For Year 3 refer to course 3970 and to this Handbook.

Undergraduate Study
Board of Studies in Science and Mathematics
and the Faculty of Engineering

3730 Programs in the Combined Science/ Civil Engineering Course

For details of the combined Science/Civil Engineering Course refer to the Faculty of Engineering Handbook.

Approval may be given to change the programs listed below to allow for timetabling and the student's academic interests. For any changes to subjects in italic print you should consult the Science and Mathematics Course Office, Room 211, Mathews Building.

Physical Metallurgy and Chemistry

Year 1
1.981*
2.121
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
2.002A, 2.042C, 2.131
4.402, 4.512
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.022
1 General Studies elective†

Year 3
4.403, 4.703
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571
10.381
29.441, 29.491
1 General Studies elective†

Year 4
2.003A, 2.003C, 2.013C
4.522
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 General Studies elective†

Year 5
1 Technical elective†
Choose 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.2741, 8.2742, 8.401, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054

*** *** † See footnotes at end of Course outline.

Geography and Environmental Chemistry

Year 1
1.981*
2.121
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
2.002A, 2.002D, 2.042C, 2.131
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.022
27.111

Year 3
2.043A
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571
10.381
27.172
29.441, 29.491
1 General Studies elective†

Year 4
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
27.133, 27.1711, 27.1712
At least 2 units chosen from:
27.143, 27.183, 27.153, 27.862, 27.863
2 General Studies electives†

Year 5
1 Technical elective†
Choose 2 units from Table 1 in the Combined Sciences Handbook at Levell II or higher
8.001, 8.191, 8.2741, 8.2742, 8.401, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054

Note: All material not in italic typeface refers to the BE degree component of the combined course.
* ** *** †See footnotes at end of Course outline.

Physics with Mathematics

Year 1
1.001
2.991**
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
1.012, 1.022, 1.032
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.1113, 10.1114*, 10.2111*, 10.2112**
2 General Studies electives†

Year 3
1.002, 1.023, 1.043
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571
*10.111A**, 10.381
29.441, 29.491

Year 4
1.0333
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 General Studies elective†
Choose 2 Level II or Level III Mathematics units from Table 1
Choose 1 unit from:
1.133, 1.3233, 1.0533, 1.0133, 1.0143

Year 5
8.001, 8.191, 8.2741, 8.2742, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054, 8.401
1 Technical elective†
Choose 1 or 2 units from Table 1 at Level II or higher

Note: All material not in italic typeface refers to the BE degree component of this combined course.
** *** †See footnotes at end of Course outline.
*See footnote to program 0100.

Mathematics

Year 1
1.981*
2.991**
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.111A or 10.121A,
10.1113 or 10.1213,
10.1114 or 10.1214,
10.2111 or 10.2211,
10.2112 or 10.2212
1 General Studies elective†
Choose either **1.** *or* **2.**:
1. *10.311A or 10.321A,*
10.311B or 10.321B,
10.3111 or 10.3211,
10.3112 or 10.3212,
2. *Choose 3 units from:*
10.4111 or 10.4211,
10.4112 or 10.4212,
10.331
10.2113 (or 10.2213), 10.2115†† (or 10.2215††)
(10.1111 & 10.1112)

Year 3
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571, 29.441, 29.491
10.381
1 General Studies elective†
Choose 4 units from Mathematics from Table 1 of the Combined Sciences Handbook (at least one must be Level III)

Year 4
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 General Studies elective†
Choose 3 Level III (not Level IIIIII) Mathematics units from Table 1 in the Combined Sciences Handbook

Year 5
8.001, 8.191, 8.2741, 8.2742, 8.401, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054
1 Technical elective†
Choose 1 or 2 units from Tables 1 or 3 in the Combined Sciences Handbook at Level II or higher.

Note: All material not in italic typeface refers to the BE degree component of this combined degree course.
* ** *** †See footnotes at end of Course outline.
††If already taken, 10.2114 or 10.2214 are acceptable in place of 10.2115 or 10.2215 respectively.

Geology with some Mathematics

Year 1
1.981*
2.121
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
2.131
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.111A or 10.121A,
10.1113 or 10.1213,
10.1114 or 10.1214,
10.2111 or 10.2211,
10.2112 or 10.2212
25.110, 25.120
2 General Studies electives†

Year 3
2.042C
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571
10.381
25.211, 25.221, 25.212
29.441, 29.491
1 General Studies elective†

Year 4
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
Choose four units from the following:
25.311, 25.312, 25.314, 25.321, 25.324, 25.325, 25.3261, 25.3271

Year 5
1 Technical elective†
Choose 1 or 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.2741, 8.2742, 8.401, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054

Note: All material not in italic typeface refers to the BE degree component of this combined degree course.
* ** *** †See footnotes at end of Course outline.

Computing with some Mathematics

Year 1
1.981*
2.991**
8.1110, 8.1120, 8.1130, 8.1140
8.1210, 8.1410, 8.1610
10.001***
25.5112

Year 2
6.621, 6.631, 6.641
8.172, 8.1811, 8.1812, 8.2721, 8.2722
10.111A or 10.121A,
10.1113 or 10.1213,
10.1114 or 10.1214
2 General Studies electives†

Year 3
6.642, 6.643
8.173, 8.174, 8.1821, 8.1822, 8.311, 8.312, 8.362, 8.400, 8.571
10.381
10.2111 or 10.2211,
10.2112 or 10.2212
29.441, 29.491
Choose 1 Level II or Level III Mathematics unit from Table 1 in the Combined Sciences Handbook

Year 4
6.646, 6.647
One of 6.613, 6.632, 6.633
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 General Studies elective†
Choose 1 Level II or Level III Mathematics unit from Table 1 in the Combined Sciences Handbook

Year 5
1 Technical elective†
Choose 1 or 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.2741, 8.2742, 8.401, 8.583, 8.673, 8.674, 8.051, 8.052, 8.053, 8.054

Footnotes to Course 3730 Programs
Note: All material not in italics typeface refers to the BE degree component of this combined course.
*Students are advised to attempt 1.981 Physics 1CE but if timetabling difficulties arise or other exceptional circumstances prevail permission will be given to attempt 1.001 Physics I. On successful completion of one of these latter subjects together with 2.991 Chemistry 1CE students will be exempted from one technical elective.
**Students who have not satisfied the science prerequisite for 2.991 Chemistry 1CE: 2 unit Science (Chemistry or Physics) or 4 unit Science (multistrand) at HSC Exam in the percentile range 31-100) are to enrol in 2.111 Introductory Chemistry and 2.991 Chemistry 1CE.
***Students who have achieved a certain standard may attempt 10.011 Higher Mathematics 1.
†The combined degree program requires completion of one technical elective, and three General Studies Electives (56 hours each). Students who have completed General Studies Electives on the old basis (42 hours) will be informed of their General Studies requirements by the School. The technical electives are listed after Stage 7 in Course 3620. The choice of the technical elective must be approved by the Head of the School of Civil Engineering.

Undergraduate Study
Board of Studies in Science and Mathematics
and the Faculty of Medicine

3820 Combined Science and Medicine Course (BSc MB BS)

A limited number of places (up to 12) are available in this course, and these are open only to students who have been accepted into the Faculty of Medicine.

For further details refer to the Faculty of Medicine Handbook. Below are programs for Years 1, 2 and 3 and the optional honours Year only; subsequent years (3, 4 and 5 of the Medical Course) are detailed in the Faculty of Medicine Handbook. Students must major in either Anatomy, Biochemistry, Physiology, Psychology, or any two of these, as well as satisfactorily completing a core course. Students majoring in Biochemistry must decide accordingly before enrolment in Year 2; other majors can be decided before enrolment in Year 3. Subjects chosen each year must be approved by the Course Controller prior to enrolment.

Year 1
1.001 *or* 1.011
2.121 & 2.131 *or* 2.141
10.001 *or* 10.011 *or* 10.021B & 10.021C
17.031, 17.041
1 General Studies elective††

Year 2
41.101
41.111*
70.011A, 70.011C
73.111
80.014**
1 General Studies elective††

Note: Students not majoring in Anatomy commonly take an additional Anatomy unit in Session 2. This may be *either* 70.012B, 70.011A, *or* 70.304 (listed in approximate order of likely usefulness).

Year 3
There are 10 options, as set forth immediately below. The columns represent the primary choice (major in Anatomy, Biochemistry or Physiology); the rows represent the secondary choices (single or double major). Elective units may be selected from Table 1 and/or from the Anatomy units in Table 2.

	Anatomy Major	Biochemistry Major	Physiology Major
Core Units	General Studies elective 80.014** 4 Level III Anatomy units†	General Studies elective 80.014** 41.102A 41.102B	General Studies elective 80.014** 73.012
Single Major	together with: 73.012F 3 Elective units	together with: 2 Level III Anatomy units† 73.012F 1 Elective unit	together with: 2 Level III Anatomy units† 2 Elective units
Double Major with Anatomy	3 Level III Anatomy units† (makes total of 7)	4 Level III Anatomy units†	4 Level III Anatomy units†
Double Major with Biochemistry	41.102A 41.102B	(double major not available)	41.102A 41.102B
Double Major with Physiology	73.012	73.012	(double major not available)

Year 4
Students may join Year 3 of the Medical Course, or apply to take Honours and proceed to the Medical Course the following year. For honours courses, see Table 3.

*Students majoring in Biochemistry should take 2.002B Organic Chemistry instead of 41.111 Biochemical Control. For students majoring in Biochemistry, 2.002B is accepted in lieu of 41.111 as a prerequisite for 73.012 Physiology 2.
**80.014 Human Behaviour is offered in even numbered years only and is taken in either Years 2 or 3.
†For Anatomy units see Table 2.
††Enrolment in General Studies may be deferred until later years but two electives must be satisfactorily completed for a BSc degree, and three electives for the MB BS degrees. Students are strongly advised to complete these requirements during the first three years, before entering the Medical Course, otherwise there will be timetabling difficulties.

Undergraduate Study
Board of Studies in Science and Mathematics
and the Faculty of Professional Studies

4070 Mathematics Education Course

4080 Science Education Course

4070
Mathematics Education Course

Bachelor of Science Diploma in Education
BSc DipEd

The Mathematics Education Course is a concurrent course leading to the award of the qualifications BSc DipEd and is designed primarily to prepare students for entry into the teaching profession as teachers of mathematics in secondary schools.

An important feature of the course is that students take education subjects along with mathematics subjects in second, third and fourth years. The Mathematics component is based on programs offered in the Science and Mathematics course. Students may proceed to honours level in either mathematics or in education.

Objectives of the Course

The objectives of the Mathematics components broadly aim: to develop a comprehensive knowledge and interest in mathematical techniques and problem solving, to develop an ability to reason mathematically and to present mathematical reasoning clearly and persuasively, and to ensure the student's understanding of the applications of mathematics.

Objectives related to the education component seek: to develop skills in teaching mathematics, to provide an understanding of the major disciplines which contribute to educational theory, to develop a knowledge of the latest innovations in educational practice and theory and to clarify the methodologies and curriculum materials relevant to secondary mathematics teaching.

Students enrolling in this course must seek advice from the Director of Science Teachers' Courses, Room 41, Building G2, Western Campus or at the enrolment centre.

Honours and Pass Degree Requirements

The course is offered at both pass and honours levels.

1. The pass course requires successful completion of a four-year program.

2. The honours course requires successful completion of a five-year program in which the fifth year is devoted to an approved honours program in one of the following options:

Pure Mathematics, Applied Mathematics, Mathematical Statistics, Theoretical Mechanics, or Education*.

The grades in this program shall be Honours Class I, II/1, II/2 and III.

Students who wish to proceed to the honours year should apply in writing to the Head of the School of Education. A letter of acceptance from the Head of the School in which they wish to study during the honours year should be included with this application.

*Students proceeding to the honours year in Education must have completed the Advanced Education subjects in Years 3 and 4 in addition to those Education subjects prescribed for the degree at pass level.

Components of the Course

The Mathematics Education Course consists of Mathematics, Education and General Studies components.

1. Mathematics Component

Two alternative programs are available. The programs consist of units ranked as Level I, Level II, Level II/III, Level III and Level IV. These units vary from 56 to 84 hours in duration. The terms Levels I, II and III do not necessarily refer to the years in which the unit must be studied. Units at the various levels may be taken in other years provided the prerequisites are met. Level II/III units have only Level I prerequisites.

Students must select one of the two following programs:

5811 The Mathematics and Science Program

The pass course requires at least 23 units in addition to Education and General Studies subjects

or

5812 The Mathematics and Liberal Studies Program

The pass course requires at least 24 units in addition to Education subjects.

For both programs the selection of units is subject to the requirements listed below:

(1) Not less than 8 units, nor more than 10 units selected from Level I. Except with the approval of the Head of the School of Mathematics and the Director of Science Teacher Courses, not more than 2 Level I units may be taken in any one discipline other than Mathematics.

(2) The following subjects or their higher equivalents shall be included:

10.001, 10.111A, 10.1113, 10.1114, 10.2111, 10.2112.

(3) Courses amounting to at least 2 full units chosen from:

10.1111, 10.1112, 10.1121, 10.1123, 10.1127, 10.1128, provided that a student may substitute for any of the above units such higher units as are deemed equivalent (for the purposes of satisfying this rule) by a professor of Pure Mathematics.

(4) Not less than 2 units from the following:

10.2113, 10.2115, 10.212L, 10.212M, 10.331, 10.311A, 10.311B, 10.3111, 10.3112, 10.312A, 10.312B, 10.312C, 10.312D, 10.312E, 10.411A, 10.411B, 10.412A, 10.1127, provided that a student may substitute for any of the above units such higher units as are deemed equivalent (for the purposes of satisfying this rule) by the Head of the School of Mathematics.

(5) Not less than 8 Level II or Level III Mathematics units from Table 1 (see below) and of these not less than four shall be Level III units of which only one may be Level II/III.

(6) For the award of honours the student must complete 10 units as specified in an individual program and must meet prerequisite requirements set out in Table 3 (see below).
(7) In order to graduate a student must pass all the units specified in the program of his/her choice.

2. Education Component

The Education component is one of the major sequences in the course. It consists of subjects grouped as follows:

Theory of Education	58.702,	58.703,	58.704
Mathematics Curriculum and Instruction	58.742,	58.743,	58.744
School Experience	58.712	58.713,	58.714
Honours	58.795,	58.793, 58.799	58.794

3. General Studies Component

(1) The General Studies component involves 56 hours in the pass course, which is made up of two half electives or their equivalent. The distribution of the two half electives may be varied to suit the programs of individual students.

(2) In the Mathematics and Liberal Studies Program the Liberal Studies subjects provide the General Studies component.

Enrolment Requirements

1. A student in first year must be enrolled in a Mathematics program in either the Science and Mathematics Course (**3970**) or the Mathematics Education Course (**4070**). In the second, third and fourth years a student must be enrolled in one of the Mathematics programs for the Course **4070**, the Education program and, in the case of Mathematics and Science program, General Studies.

2. A student may with the approval of the Director of Science Teachers' Courses, and in consultation with the Head of the School of Mathematics, change from one selected Mathematics program to another. A written application to make the change must be lodged, including details of optional units selected in the new program, at the Science Education Office, Room 41, Building G2, Western Campus.

3. A student must take care to satisfy the requirements of sequences of units such as prerequisites and co-requisites. A prerequisite subject is one which must be completed prior to enrolment in the subject for which it is prescribed. A co-requisite subject is one which must either be completed successfully before or be studied concurrently with the subject for which it is prescribed. In exceptional circumstances, on the recommendation of the Head of the School of Mathematics, the particular prerequisite or co-requisite may be waived by the Director of Science Teachers' Courses.

Programs

The course taken by each student has three component programs:

1. Education Program

This program is the same for each student though there are electives built in to some of the subjects. The program is as follows:

Year	Subject	Hours per week*
2	58.702	0.8
	58.712	2
	58.742	2
3	58.703	2.3
	58.713	3
	58.743	2½
4	58.704	2.2
	58.714	3
	58.744	2½
Honours in Education		
4	58.793	1
	58.794	1
5	58.795	4
	58.799	

*Average for 28 weeks.

2. General Studies Program

(1) For students electing the Mathematics and Science Program:

Two half electives (or equivalent) taken during Years 2, 3 *and/or* 4 for the pass degree.

(2) For students electing the Mathematics and Liberal Studies Program:

No specific General Studies subjects are required.

3. Mathematics Program

5811
Mathematics and Science

Year 1
10.001 *or* 10.011
Choose 6 units from:
Table 1 *&/or*
The BA course*† *&/or*
Table 2† for program 5811 except 14.501

Year 2
10.111A *or* 10.121A, 10.1113 *or* 10.1213, 10.1114 *or* 10.1214, 10.2111 *or* 10.2211, 10.2112 *or* 10.2212
Choose 4 or 5 units from:
Table 1 *&/or*
The BA course*† *&/or*
Table 2† for program 5811

Year 3
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1 *&/or*
The BA course*† *&/or*
Table 2† for program 5811

Year 4
Choose 2 Level III Mathematics units from Table 1
Choose a further Level II or III Mathematics unit if needed to make up the required 8
Choose 1 or 2 units from:
Table 1 *&/or*
The BA course*† *&/or*
Table 2† for program 5811

Year 5
10.123 *or* 10.223 *or* 10.323 *or* 10.423.

*Up to 5 units of this program may be replaced by subjects offered in the BA degree course (6 credit points at Level I, or 4 credit points at Upper Level are equivalent to 1 unit). The BA degree subjects are limited to those offered by the following schools: Drama, Economics, English, French, German, History, Political Science, Russian, Sociology, Spanish and Latin American Studies. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.
†Not more than 8 units that are not in Table 1 may be taken without the approval of the Director of Science Teacher Courses.

5812
Mathematics and Liberal Studies

Year 1
10.011 *or* 10.001
Choose 4-6 units from:
Table 1† *&/or*
The BA course*

Year 2
10.111A *or* 10.121A, 10.1113 *or* 10.1213, 10.1114 *or* 10.1214, 10.2111 *or* 10.221.1, 10.2112 *or* 10.2212
Choose 4 or 5 units from:
Table 1† *&/or*
The BA course*

Year 3
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1† *&/or*
The BA course*

Year 4
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1† *&/or*
The BA course*

Year 5
10.123
or
10.223
or
10.323

†Units in Geography, History and Philosophy of Science, and Philosophy shall be those from the BA degree course.
*At least 6 units of this program must come from subjects offered in the BA degree course (6 credit points at Level I, or 4 credit points at Upper Level are equivalent to 1 unit). The BA degree subjects are limited to those offered by the following Schools: Drama, Economics, English, French, Geography, German, History, History and Philosophy of Science, Philosophy, Political Science, Russian, Sociology, Spanish and Latin American Studies. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

4080
Science Education Degree Course

Bachelor of Science Diploma in Education BSc DipEd

The Science Education Course is a concurrent course leading to the award of the qualifications BSc DipEd and is designed primarily to prepare students for entry into the teaching profession as teachers of science in secondary schools.

An important feature of the course is that students take education subjects along with science subjects in second, third and fourth years. The science component is based on programs offered in the Science and Mathematics Course. Students may proceed to honours in a science or in education. One of the science units is a history and philosophy of science subject. This is included to give students an understanding of the nature of science and of its relationship to society, which is especially important to prospective teachers of science.

Students enrolling in this course must seek advice from the Director of Science Teachers' Courses, Room 41, Building G2, Western Campus or at the enrolment centre.

Objectives of the Course

The objectives of the course are those of the Science and Mathematics Course (3970) together with others which are essential for a course which is designed to prepare science teachers.

In summary, the objectives of the Science and Mathematics course broadly aim to develop a working knowledge of scientific methods of investigation and to promote an understanding of the significance of science, technology, economics and sociological factors in modern society. The objectives seek to develop in the student the ability and disposition to think logically, to communicate clearly by written and oral means and to read critically. Students are encouraged to develop the habit of seeking and recognizing relationships between phenomena, principles, theories, conceptual frameworks and problems.

The education component of the course seeks to provide a knowledge of theories of education and the latest innovations in educational practice and theory, and the development of skills in teaching science.

Honours and Pass Degree Requirements

There are both pass and honours programs available in the course leading to the award of the qualifications Bachelor of Science and Diploma in Education (BSc DipEd).

1. The pass course requires successful completion of a four-year program.

2. The honours course requires successful completion of a five-year program in which the fifth year is devoted to an approved honours program in one of the following disciplines:

Physics, Chemistry, Geology, Biochemistry, Biological Technology, Botany, Microbiology, Zoology, Education*, Physiology.

The grades in this program shall be Honours Class I, II/1, II/2 and III.

Students who wish to proceed to the honours year should apply in writing to the Head of School of Education. A letter of acceptance from the Head of the School in which they wish to study during the honours year should be included with this application.

*Students proceeding to the honours year in Education must have completed the Advanced Education subjects in Years 3 and 4 in addition to those Education subjects prescribed for the degree at pass level.

Components of the Course

The Science Education Course consists of Science, Education and General Studies components.

1. Science Component

The Science component is based on the prescribed programs from the Science and Mathematics Course (3970) rearranged to spread over one additional year. These programs are composed of units ranked as Level I, Level II, Level II/III, Level III, and Level IV, such units varying from 56 to 84 hours. The terms Levels I, II and III do not necessarily refer to the years in which the unit must be studied. Units at the various levels may be taken in other years provided the prerequisites are met. Level II/III units have only Level I prerequisites. For the pass course the science component requires at least 23 units with the following requirements:

(1) There shall be ten units from Level I and these must come from the following subjects: 1.001 or 1.011, 2.121, 2.131, 10.001 or 10.011 or 10.021B and 10.021C, 17.031, 17.041, 25.110, 25.120.

(2) Not less than four units from Level III. For purposes of this clause Level II/III units are counted as Level III units.

(3) Not less than two units beyond Level I in science disciplines in any of the teaching areas physics, chemistry (including biochemistry), biology and geology other than that of the student's major. In special circumstances this requirement may be waived with the permission of the Director of Science Teachers' Courses or as specified in individual programs.

(4) One unit shall be a History and Philosophy of Science subject selected from a list of subjects approved by the Director of Science Teachers' Courses. In special circumstances this requirement may be waived with the permission of the Director of Science Teachers' Courses or as specified in individual programs.

(5) For the honours program with honours in a science discipline there shall be at least six Level III units and students must meet prerequisite requirements set out in Table 3.

(6) For the award of honours in a science discipline the student must complete at least ten Level IV units as specified in an individual program.

(7) In order to graduate a student must pass all the units specified in the program of his/her choice.

2. Education Component

The Education Component is one of the major sequences in the course. It consists of subjects grouped as follows:

Theory of Education	58.702,	58.703,	58.704
Science Curriculum and Instruction	58.732,	58.733,	58.734
School Experience	58.712,	58.713	58.714
Honours	58.795,	58.793, 58.799	58.794

3. General Studies Component

The General Studies component involves 56 hours in the pass course, which is made up of two half electives or their equivalent. The distribution of the two half electives may be varied to suit the programs of individual students.

Enrolment Requirements

1. In all years of the course a student must be enrolled in one of the prescribed Science programs.

In years two, three and four a student must be also enrolled in the Education program and the General Studies program.

2. A student may, with approval of the Director of Science Teachers' Courses, change from one selected Science program to another. A written application to make the change must be lodged, including details of any optional units selected in the new program, at the Science Education Office, Room 41, Building G2, Western Campus.

3. The allowed specific programs, listed in Programs below, are made up of sequences of units. Where a choice is indicated care must be taken to satisfy the requirements such as prerequisites and co-requisites.

4. A prerequisite subject is one which must be completed prior to enrolment in the subject for which it is prescribed. A co-requisite subject is one which must either be completed successfully before or be studied concurrently with the subject for which it is prescribed. An excluded subject is one which cannot be counted together with the subject which excludes it towards the degree or qualification. In exceptional circumstances, on the recommendation of the head of the appropriate school, the particular prerequisite or co-requisite may be waived by the Director of Science Teachers' Courses.

5. Students lacking the HSC prerequisites for 1.001 Physics 1 *and/or* 2.121 Chemistry 1A may satisfy prerequisites by completing the respective introductory subjects 1.021 Introductory Physics for Health and Life Scientists *or* 2.111 Introductory Chemistry. Students requiring 10.001 Mathematics 1 for Physics programs may satisfy prerequisites by completing 10.021B where appropriate. Under these circumstances these introductory subjects are not counted among the units required for the degree course.

Programs

The Course followed by a particular student has three component programs.

1. Education Program

This program is the same for each student though there are electives built in to some of the subjects. The program is as follows:

Year	Subject	Hours per week*
2	58.702	1
	58.712	2
	58.732	2
3	58.703	2.3
	58.713	3
	58.733	4½
4	58.704	2.2
	58.714	3
	58.734	4
Honours in Education		
4	58.793	1
	58.794	1
5	58.795	4
	58.799	

*Average for 28 weeks.

2. General Studies Program

Two half electives (or equivalent) taken during second, third *and/or* fourth years for the pass degree.

3. Science Program

Each Science program is based on a program in the Science and Mathematics Course. Each one has an identifying number. The Science Education programs have 58 as the first two digits of the identifying number.

5801
Physics

Year 1
1.001
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011*
17.031, 17.041
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111*, 10.2112*
10.1113*, 10.1114*
17.031, 17.041
or
25.110, 25.120

Year 3
Choose 1 HPS unit
1.002
Choose 2 units from:†
1.0133, 1.023, 1.0333, 1.043, 10.111A*

Year 4
Choose 4 units from:†
Level III Physics units in Table 1, 10.111A*, 10.212A*, 10.412D*

Year 5
1.104

*See footnote to program 0100.
†Students are advised that units 1.0133, 1.0143, 1.023, 1.0333, 1.0343 and 1.043 are compulsory and must be completed by the end of Year 4. Students are also advised to read carefully the conditions relating to program 0100.

5802
Physics†
Single Major††

Year 1
1.001
10.001 *or* 10.011
2.121 & 2.131, *or* 2.141
17.031, 17.041
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111, 10.2112
17.031, 17.041
or
25.110, 25.120
Choose 1 unit from Table 1**

Year 3
Choose 1 HPS unit
1.002
Choose from 1 unit from:
1.0133, 1.023, 1.0333, 1.043
Choose 1 unit from Table 1**

Year 4
Choose 3 units from:
Level III Physics units in Table 1†
Choose 1 unit from Table 1**

†See footnote to program 5801.
**Units available for choice from Table 1 in this program are those from Schools other than Mechanical and Industrial Engineering, Electrical Engineering (except Level II), Mathematics, Psychology, Geography, Philosophy.
††Under exceptional circumstances students taking this program may be eligible for transfer into Year 5 of program 5801 providing a satisfactory level is attained in a number of Mathematics units. Students should consult the School of Physics for further details.

5803
Applied Physics

Year 1
1.001
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011*
17.031, 17.041
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111*, 10.2112*
10.1113*, 10.1114*
17.031, 17.041
or
25.110, 25.120

Year 3
Choose 1 HPS unit
1.002
Choose 2 units from:†
1.0133, 1.023, 1.0333, 1.043

Year 4
Choose 4 units from:†
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043, 1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.713, 1.763, 1.773

Year 5
1.304

*See footnote to program 0100.
†See footnote to program 5801.

5805
Theoretical Physics

Year 1
1.001
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011*
17.031, 17.041
or
25.110, 25.120

Year 2
10.111A*, 10.2111*, 10.2112*, 10.1113*, 10.1114*
17.031, 17.041
or
25.110, 25.120
1.012, 1.022

Year 3
Choose 1 HPS unit
1.002, 1.032
Choose 1 unit from:
1.0133, 1.1133, 1.023, 1.0333

Year 4
Choose 2½ units from:
1.0133, 1.1133, 1.023, 1.0333, 1.043
Choose 1½ units from:
1.5133, 1.5233, 1.5333, 1.5433, 1.5533, 10.412D*

Year 5
1.504

*See footnote to program 0100.

5821
Chemistry Major

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
or
25.110, 25.120

Year 2
2.002A, 2.002B, 2.042C, 2.002D
17.031, 17.041
or
25.110, 25.120
Choose 1 unit from:
Table 1**

Year 3
Choose 1 HPS unit
Choose 2 Level III Chemistry units
Choose 1 unit from Table 1**

Year 4
Choose 2 Level III Chemistry units
Choose 2 units from Table 1**

Year 5
2.004

**See footnote to program 5802.

5831
Geology
Double Major

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120

Year 2
17.031, 17.041
25.211, 25.221, 25.212, 25.223, 25.2261
Choose 1 HPS unit

Year 3
Choose 4 out of the following:
25.311, 25.321, 25.312, 25.314, 25.324, 25.325, 25.333, 25.3162, 25.3261, 25.3271

Year 4
Take the remaining 4½ units of Level III Geology not taken in Year 3

Year 5
Program as in 2501 Year 4

5832
Geology
Single Major

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120

Year 2
17.031, 17.041
25.211, 25.221, 25.212, 25.223
Choose 1 unit from Table 1**

Year 3
Choose 2 units from the following:
25.311, 25.312, 25.314, 25.3162, 25.321, 25.333, 25.324, 25.325, 25.3261, 25.3271
Choose 1 HPS unit
Choose 1 unit from Table 1**

Year 4
Choose 2 units of Level III Geology
Choose 2 units from Table 1**

Year 5
25.434

**See this footnote to program 5802.

5841
Biochemistry

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
2.002B
25.110, 25.120
41.101, 41.111
Choose 1 unit from Table 1**

Year 3
41.102A
Choose 1 HPS unit
Choose 1 unit from Table 1**

Year 4
Choose *either*
41.102B *or* 41.102C & 41.102E
Choose 2 units from Table 1**

Year 5
41.103

**See this footnote to program 5802.

5842
Microbiology and Biochemistry

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2*
2.002B
25.110, 25.120
41.101
44.101, 44.121

Year 3
41.102A, 41.102B, *or* 41.102C & 41.102E

Year 4
44.102, 44.112

Year 5
41.103 *or* 44.103

*Students are advised to include, where possible, the subject 41.111 in addition to those listed.

5854
Botany

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
17.012
25.110, 25.120
43.101, 43.111
Choose 2 units from Table 1**

Year 3
43.131
Choose 2 Level III Botany units
Choose 1 HPS unit

Year 4
Choose 2 Level III Botany units
Choose 2 units from Table 1**

Year 5
43.103

**See this footnote to program 5802.

5855
Botany with Zoology

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
25.110, 25.120
Choose 3 units from 17.012, 43.101, 43.111, 43.131
Choose 2 units from 45.101, 45.201, 45.301

Year 3
Choose 2 Level III Botany units
Choose 1 Level III Zoology unit
Choose 1 HPS unit

Year 4
Choose 2 Level III Botany units
Choose 2 Level III Zoology units

Year 5
43.103

5862
Microbiology (General)

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
25.110, 25.120
41.101
44.101, 44.121
Choose 1 unit from Table 1**

Year 3
44.102, 44.112

Year 4
Choose 1 HPS unit
Choose 3 units from Table 1**

Year 5
44.103

**See this footnote to program 5802.

5861
Microbiology

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
2.002B
25.110, 25.120
41.101
44.101, 44.121

Year 3
41.102A
44.102

Year 4
44.112, 44.132
Choose 1 HPS unit

Year 5
44.103

5866
Zoology (General)

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
25.110, 25.120
45.101, 45.201, 45.301
Choose 2 Level II units of Biochemistry, Chemistry, Physics, Geology or Mathematics

Year 3
43.101
Choose 1 HPS unit
Choose 2 Level III Zoology units from Table 1

Year 4
Choose 2 Level III Zoology units from Table 1
Choose 2 units from Table 1**

Year 5
45.103

**See this footnote to program 5802.

5867
Zoology with Botany

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
17.012
25.110, 25.120
43.121, 43.111
45.201, 45.301

Year 3
45.101
Choose 1 HPS unit
Choose 2 Level III Zoology units

Year 4
Choose 2 Level III Zoology units
Choose 2 Level III Botany units

Year 5
45.103

5871
Physiology
Single Major

Year 1
1.001
2.141 *or both* 2.121 *and* 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041

Year 2
25.110, 25.120
41.101, 41.111
73.111

Year 3
73.012

Year 4
Choose 1 HPS unit
Choose 3 units from Table 1**

Year 5
73.013

**See this footnote to program 5802.

Undergraduate Study
Board of Studies in Science and Mathematics
and the Faculty of Law

4770 Programs in the Combined Science/Law Course

For details of the combined Science/Law Course refer to the Faculty of Law Handbook.

Below are approved programs for Years 1, 2 and 3 only. Years 4 and 5 are detailed in the Faculty of Law Handbook.

Note that where the levels of elective units are not specified they must be chosen so that the maximum number of Level I units, viz 8, is not exceeded.

Physics

Year 1
1.001
10.001 *or* 10.011
90.112, 90.741
Choose 2 Level I units from Table 1

Year 2
1.002, 1.012, 1.022, 1.032
10.2111, 10.2112
90.141, 90.161
Choose 1 Level I or Level II unit from Table 1

Year 3
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043
90.216, 90.301, 90.621
Choose 2 units of appropriate levels from Table 1

Chemistry

Year 1
1.001
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
90.112, 90.741

Year 2
2.002A, 2.002B, 2.042C, 2.002D
90.141, 90.161
Choose 2 Level I or Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Chemistry units from Table 1
Choose 2 other units of appropriate levels from Table 1

Computer Science*

Year 1
6.611
10.001 *or* 10.011
90.112, 90.741
Choose 3 Level I units from Table 1

Year 2
6.621, 6.631, 6.641
90.141, 90.161
Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Computing Science units
Choose 2 other units of appropriate levels from Table 1

*Progress into Year 2 of this program is by competitive entry at the end of Year 1. See entry under Course 3970 Computer Science.

Mathematics

Year 1
10.001 *or* 10.011
90.112, 90.741
Choose 4 Level I units from Table 1

Year 2
10.111A *or* 10.121A,
10.1113 & 10.1114
or
10.1213 & 10.1214,
10.2111 & 10.2112
or
10.2211 & 10.2212
90.141, 90.161
Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Mathematics units from Table 1
Choose 2 other units of appropriate levels from Table 1

Psychology

Year 1
10.001 *or* 10.011 *or both* 10.021B & 10.021C
12.100
90.112, 90.741
Choose 2 Level I units from Table 1

Year 2
12.200
Choose 2 units from:
12.201, 12.202, 12.204, 12.205
90.141, 90.161
Choose 1 Level II unit from Table 1
Choose 2 Level I *or* Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Psychology units from Table 1
Choose 2 other units of appropriate levels from Table 1

Geology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
25.110, 25.120
90.112, 90.741

Year 2
1.001 *or* 1.011
25.211, 25.221, 25.212, 25.223
90.141, 90.161

Year 3
Choose four units from the following:
25.311, 25.312, 25.314, 25.321, 25.333, 25.324, 25.325, 25.3261, 25.3271
90.216, 90.301, 90.621
Choose 2 Level II *or* Level III units from Table 1

Geography

Year 1
10.001 *or* 10.011 *or both* 10.021B & 10.021C
27.111 *or* 27.818
27.819
Choose further Level I Science units from Table 1 to make a total of 6.
90.112, 90.741

Year 2
Choose 3 Level II Geography units
90.141, 90.161
Choose 1 Level II unit from Table 1
Choose 2 Level I *or* LevelI II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 units from:
27.133, 27.143, 27.153, 27.183, 27.862, 27.863
Choose 2 units of appropriate levels from Table 1

Biochemistry

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
2.002B
41.101
90.141, 90.161
Choose 1 Level II unit from Table 1 (preferably 41.111)
Choose 2 Level I *or* Level II units from Table 1

Year 3
41.102A
41.102B
or 41.102C & 41.102E
90.216, 90.301, 90.621
Choose 2 units of appropriate levels from Table 1

Botany

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
43.111
90.141, 90.161
Choose 3 Level II units from Table 1
Choose 2 Level I *or* Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Botany units from Table 1
Choose 2 other units of appropriate levels from Table 1

Microbiology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
41.101
44.101, 44.121
90.141, 90.161
Choose 2 Level I *or* Level II units from Table 1

Year 3
44.102, 44.112
90.216, 90.301, 90.621
Choose 2 units of appropriate levels from Table 1

Biotechnology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.021, 17.041
90.112, 90.741

Year 2
41.101
42.101
90.141, 90.161
Choose group **1.** *or* **2.** *or* **3.**
1. 44.101, 44.121
1 Level I *or* Level II unit from Table 1
2. 2.002B
41.111
1 Level I *or* Level II unit from Table 1
3. 2.002A, 2.002B
2.042C *or* 2.002D

Year 3
42.102A, 42.102B
90.216, 90.301, 90.621
Choose group **1.** *or* **2.** *or* **3. as appropriate.**
1. 44.102
Choose 2 other units of appropriate levels from Table 1
2. 41.102A
Choose 2 other units of appropriate levels from Table 1
3. Choose 2 Level III Chemistry units
Choose 2 other units of appropriate levels from Table 1

Zoology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
45.101, 45.201, 45.301
90.141, 90.161
Choose 41.101 *or* 2 Level II Chemistry units *or* 2 Level II Mathematics units
Choose 1 other Level I *or* Level II unit from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Zoology units from Table 1
Choose 2 other units of appropriate levels from Table 1

Ecology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
17.012
43.111
44.101
45.101, 45.201, 45.301
90.141, 90.161

Year 3
90.216, 90.301, 90.621
Choose 4 units from:
43.152, 43.172
45.112, 45.122, 45.302
Choose 2 other units of appropriate levels from Table 1

Marine Science

Year 1
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741
Choose one of the following:
1.001
2.141 *or both* 2.121 & 2.131
25.110, 25.120

Year 2
43.111
44.101
45.201 *or* 41.101
68.302
90.141, 90.161
Choose: *one* or *two* of the following as appropriate:
2.002A
10.031,
10.331 *or* 10.301
17.012
25.622
44.121

Year 3
43.172
45.112
90.216, 90.301, 90.621
Choose one of the following groups:
1. 2.043A
1 other Level III and 2 other units of appropriate levels from Table 1
2. 10.032, 10.412A
2 other units of appropriate levels from Table 1
3. 2 other Level III units and 2 other units of appropriate levels from Table 1

Anatomy†

Year 1
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741
Choose 2 Level I units from Table 1

Year 2
70.011A, 70.011C
90.141, 90.611
Choose 2 Level II units from Table 1*
Choose 2 Level I *or* Level II units from Table 1

Year 3
90.216, 90.301, 90.621
Choose 4 Level III Anatomy units from Table 2
Choose 2 other units of appropriate levels from Table 1*

*Anatomy units from Table 2 may be taken in lieu.

†Progress into Year 2 of this program is by competitive entry at the end of Year 1. See entry under Course **3970** Anatomy.

Physiology and Pharmacology

Year 1
2.141 *or both* 2.121 & 2.131
10.001 *or* 10.011 *or both* 10.021B & 10.021C
17.031, 17.041
90.112, 90.741

Year 2
41.101, 41.111
73.111
90.141, 90.161
Choose 1 Level I or Level II unit from Table 1

Year 3
73.012
90.216, 90.301, 90.621
Choose 2 units of appropriate levels from Table 1

Units offered by the
Board of Studies in Science and Mathematics

Table 1

Information Key
The following is the key to the information supplied about each subject in the table below: F (Full year, ie both sessions); S1 (Session 1); S2 (Session 2); SS (single session, ie *one* only); I, II, III (Levels, I, II, III); Hpw (Hours per week); C (Credit).

Physics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Physics Level I								
1.001	Physics 1	I	2	F	6	See Subject Descriptions later in this Handbook	10.021C, *or* 10.001, *or* 10.011	
1.021	Introductory Physics 1† (For Health and Life Scientists)	I	2	F	6		10.021B *and* 10.021C *or* 10.001 *or* 10.011	
1.041	Laboratory Computers in Physical Science	I	1	S1 *or* S2	6	As for 1.001	10.001 *and* 1.021 *or* 1.001 *or* 1.011	Programs 0600, 6806
1.061	Computer Applications in Experimental Science 1	I	1	S2	6	6.611	1.001 10.001 *or* 10.011	1.041 1.042

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Physics Level II*								
1.002	Mechanics, Waves and Optics	II	1	S1	4	1.001, 10.001	10.2111	10.4111, 10.4211, 1.992
1.012	Electromagnetism and Thermal Physics	II	1	S2	4	1.001, 10.001	10.2111	
1.022	Modern Physics	II	1	F	2	1.001, 10.001	10.2112	1.9322
1.032	Laboratory	II	1	F	3	1.001, 10.001		1.9222
1.0522	Methods in Mathematical Physics	II	½	S1	2	1.001, 10.001	10.2111, 10.2112, 10.1113	1.052
1.062	Computer Applications in Experimental Science 2	II	1	S1	5	1.041 *or* 1.061		1.042
1.9222	Electronics	II	½	S1	3	1.021		1.032
1.9322	Introduction to Solids	II	½	S2	3	1.021		1.022, 4.402, 4.412
1.9422	Introduction to Physics of Measurement	II	½	S1	3	1.001		1.042
Physics Level III*								
1.0133	Quantum Mechanics	III	½	S1	2	1.022, 10.2112		1.013, 2.023A, 10.222F
1.0143	Nuclear Physics	III	½	S2	2		1.0133	1.013
1.023	Statistical Mechanics and Solid State Physics	III	1	S1	4	1.012, 1.022, 10.2112		
1.0333	Electromagnetism	III	½	S1	2	1.012, 10.2111, 10.2112		10.222C, 1.033
1.0343	Advanced Optics	III	½	S2	2		1.002	1.033
1.043	Experimental Physics A	III	1	F	4	1.032		
1.0533	Experimental Physics B1	III	½	S1	4	1.032		1.053
1.0543	Experimental Physics B2	III	½	S2	4	1.032		1.053
1.1133	Advanced Quantum Mechanics	III	½	S2	2		1.0133	2.023A, 10.222F
1.133	Electronics	III	1	S1	6	1.032 *or* 1.9222		
1.1433	Biophysics	III	½	S1	3	1.012, 1.022		
1.1533	Biophysical Techniques	III	½	S2	3	1.012, 1.022, 1.032		
1.1633	Astrophysics	III	½	S2	2	1.022		
1.1733	Conceptual Framework of Physics	III	½	S2	3	1.012, 1.022	1.0133, 1.023	
1.3033	Mechanical Properties of Materials	III	½	S1	2		1.023	4.403
1.3133	Electrical, Optical and Thermal Properties of Materials	III	½	S2	2		1.023	
1.3233	Measurement and Non-destructive Testing	III	½	S1	2	1.032		

For footnotes, see overleaf

Physics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
1.3333	Applications of Radiation	III	½	S2	2		1.0333 1.0343	1.343 1.033
1.3533	Marine Acoustics	III	½	S1	2			
1.5133	Classical Mechanics and Field Theory	III	½	S1	2	1.002 (*or* 10.4111) 10.1113 10.2111 10.2112		
1.5233	Electrodynamics	III	½	S2	2	1.022 10.1113 10.2111 10.2112	1.0333	10.222C
1.5333	Radiation and Matter	III	½	S2	2	1.012, 1.022 10.2111, 10.2112	1.0133 *or* 10.222F *or* 2.023A 1.0333 (*or* 10.222C)	
1.5433	Plasmas and Laser Fusion	III	½	S1	2	1.012, 1.022		1.513
1.5533	General Relativity	III	½	S2	2	1.012, 1.022 10.1113, 10.2111 10.2112		1.523
1.713**	Advanced Laser and Optical Applications	III	1	F	2		1.002	
1.763**	Laser and Optical Technology Laboratory 1	III	1	F	4	1.032		
1.773**	Laser and Optical Technology Laboratory 2	III	1	F	4		1.763	

†For students who enrol in and successfully complete the subjects 1.021 Introductory Physics (2 units) and 1.001 Physics (2 units) the total unit value of the combined subjects be counted as 3 units.
*Where mathematics units are specified as prerequisites or as co-requisites, the higher levels of such units are acceptable and preferable. Similarly Physics 1.001 is acceptable in place of 1.021. Students are also advised that other units may be acceptable equivalent prerequisites or co-requisites to those listed, eg Unit 1.982 of course 3640 may be acceptable in place of 1.022. Enquiry should be made to the School of Physics.
**Students wishing to enrol in units 1.713, 1.763 or 1.773 without the stated prerequisites or corequisites should enquire from the School of Physics as to the suitability of their previous studies.

Chemistry

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.121	Chemistry 1A	I	1	S1 *or* S2	6	See Subject Descriptions later in this Handbook		2.141
2.131	Chemistry 1B	I	1	S1 *or* S2	6	See Subject Descriptions later in this Handbook		2.141
2.141	Chemistry 1M‡	I	2	F	6	See Subject Descriptions later in this Handbook		2.121, 2.131
2.002A	Physical Chemistry	II	1	S1 *or* S2	6	2.121 *or* 2.141, 10.001 *or* 10.011 *or* 10.021B & 10.021C		

Chemistry (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.002B	Organic Chemistry	II	1	F *or* S2	6	2.131 *or* 2.141		
2.002D	Analytical Chemistry	II	1	SS	6	2.121 & 2.131, *or* 2.141 10.001 *or* 10.011 *or* 10.021B & 10.021C		
2.042C	Inorganic Chemistry	II	1	SS	6	2.121 & 2.131 *or* 2.141		
2.003E	Nuclear and Radiation Chemistry	II/III	1	S1 *or* S2 *or* F	6	2.121 & 2.131 *or* 2.141 10.001 *or* 10.011 *or* 10.021B & 10.021C		
2.003H	Molecular Spectroscopy and Structure	II/III	1	S2	6	2.121 & 2.131 *or* 2.141		
2.003K	Solid State Chemistry	II/III	1	SS	6	2.121 & 2.131 *or* 2.141 *and* 10.001 *or* 10.011		
2.013A	Introductory Quantum Chemistry	II/III	1	S1	6	1.001 *or* 1.011 2.121 & 2.131 *or* 2.141 10.011 *or* 10.011 *or* 10.021B & 10.021C		
2.003A	Physical Chemistry	III	1	SS	6	2.002A		
2.003B	Organic Chemistry	III	1	S1	6	2.002B		
2.003C	Inorganic Chemistry	III	1	S1 *or* S2	6	2.042C		
2.003D	Instrumental Analysis	III	1	SS	6	2.002D, 2.002A		
2.003L	Applied Organic Chemistry	III	1	S1	6	2.002B	2.003B	2.033L
2.003M	Organometallic Chemistry	III	1	SS	6	2.002B		
2.013B	Synthetic Organic Chemistry	III	1	S2	6	2.003B		
2.013C	Advanced Inorganic Chemistry	III	1	SS	6	2.042C	2.003C	
2.013D	Advanced Analytical Chemistry	III	1	F *or* S2	6	2.002D	2.003D	
2.023A	Quantum Theory of Atoms and Molecules	III	1	F	3	2.002A, 10.2111 & 10.2112		
2.023B	Biological Organic Chemistry	III	1	S2	6	2.003B		
2.033A	Physical Chemistry of Macromolecules	III	1	S2	6	2.003J *or* 2.002B, 1.012 *or* 2.002A		
2.043A	Environmental Chemistry	III	1	S2	6	2.002A, 2.002D		
2.053A	Chemical Kinetics and Reaction Mechanisms	III	1	SS	6	2.002A		
2.063A	Advanced Molecular Spectroscopy	III	1	S2	6	2.013A		

‡Students majoring in Chemistry may take 2.141 in lieu of 2.121 and 2.131.

Metallurgy

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
4.302	Chemical and Extraction Metallurgy 1	II	1	F	3		2.002A*	
4.402	Physical Metallurgy 1	II	2	F	6		2.002A*, 4.502	1.9322, 4.412, 4.422
4.412	Metallurgical Phases — Structure and Equilibrium Part 1	II	1	S1	6		2.002A, 4.302	1.9322, 4.402
4.422	Metallurgical Phases — Structure and Equilibrium Part 2	II	1	S2	6	4.412	4.303	4.402
4.502	Mechanical Metallurgy	II	1½	F	4S1 3S2		4.402	4.512, 4.522
4.512	Mechanical Properties of Solids	II	1	S1	4		4.402	4.502
4.522	Mechanical Metallurgy	II/III	½	S2	3	4.512		4.502
4.602	Metallurgical Engineering 1	II	1	S2	5		4.302	
4.303	Chemical and Extraction Metallurgy 2	III	2	F	5	4.302, 4.602 *and* 4.402 *or* 4.412	4.422	
4.403	Physical Metallurgy 2	III	3	F	9	4.402		1.3033
4.613	Metallurgical Engineering 2A	III	½	S1	3	4.602		
4.703	Materials Science	III	½	S2	3		4.403	

*This unit must be taken in Session 1.

Mechanical and Industrial Engineering

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
5.006	Engineering E*	I	1	S1	6	See Subject Descriptions later in this Handbook		5.010, 5.020, 5.030
5.010	Engineering A	I	1	S1 *or* S2	6			5.006
5.030	Engineering C‡	I	1	S1 *or* S2	6			5.006
5.020	Engineering B	I	1	S2	6	5.010		5.006

‡Also offered over the full year at 3 hours per week, for the 'Production Technology' option only.

Electrical Engineering and Computer Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
6.611	Computing 1	I	1	S1	6	HSC Mathematics as for 10.001	10.001 *or* 10.011	1.041* 6.600 6.620 6.021D
6.621	Computing 2A	II	1	S1 *or* S2	5	6.611** 10.001 *or* 10.011		6.620 6.021D
6.631	Computing 2B	II	1	S1 *or* S2	5	6.621** *or* 6.620‡** *or* 6.021D**		6.021E
6.641	Computing 2C	II	1	S1 *or* S2	5	6.621** *or* 6.620‡** *or* 6.021D**		
6.646	Computer Applications	III	1	S1	5	6.620‡** *or* 6.621** *or* 6.021D** One of 10.311A, 10.321A, 10.301, 10.331 *or* 45.101 *or* equivalent.		6.622

*Excluded for students in programs 6806, 0601, 0611.
**Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.
‡Students who have completed 6.600 at a grade of credit or better, may be enabled to undertake this subject with permission.

Mathematics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.001	Mathematics 1	I	2	F	6	See Subject Descriptions later in this Handbook		10.011 10.021B 10.021C
10.011	Higher Mathematics 1	I	2	F	6	See Subject Descriptions later in this Handbook		10.001 10.021B 10.021C
10.021B	General Mathematics 1B	I	1	S1	6	See Subject Descriptions later in this Handbook		10.001 10.011
10.021C	General Mathematics 1C	I	1	S2	6	10.021B		10.001 10.011
10.081	Mathematics 1X	I	1	S2	6	As for 10.001	10.001 *or* 10.011 *and* 6.611 *or* 1.041	

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.031‡	Mathematics	II	1	F	2	10.001 *or* 10.021C (CR)		‡
10.032§	Mathematics	III	1	F	2	10.031		§
10.612	Mathematical Software	III	1	F	2	10.111A 10.2112, 6.621 or 10.211E	10.211E*	

††For any listed unit an appropriate higher unit may be substituted.

*For highly qualified students this co-requisite may be waived.

‡Mathematics 10.031 is included for students desiring to attempt only one Level II Mathematics unit. If other Level II units in Pure Mathematics, Applied Mathematics are taken, 10.031 Mathematics will not be counted.

§Mathematics 10.032 is included for students desiring to attempt only one Level III Mathematics unit. If other Level III units in Pure Mathematics, Applied Mathematics or Theoretical Mechanics are taken, 10.032 Mathematics will not be counted except that 10.412A may be taken with 10.032.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Pure Mathematics								
Pure Mathematics Level II								
10.111A	Linear Algebra	II	1	F	2½	10.001		10.121A
10.1113	Multivariable Calculus	II	½	S1 *or* S2	2½	10.001		10.1213
10.1114	Complex Analysis	II	½	S1 *or* S2	2½	10.001		10.1214
10.1115	Finite Mathematics A	II	½	S1	2	10.001		
10.1116	Finite Mathematics B	II	½	S2	2	10.1115 (or any other level II Mathematics half unit)		
Higher Pure Mathematics Level II†								
10.121A	Algebra	II	1	F	2½	10.011 *or* 10.001 DN		10.111A 10.1111
10.1213	Multivariable Calculus	II	½	S1	2½	10.011 *or* 10.001 DN		10.1113
10.1214	Complex Analysis	II	½	S2	2½	10.1213		10.1114
Pure Mathematics Level III* **								
10.1111	Group Theory	III	½	S1	2	***		10.121A
10.1112	Geometry	III	½	S2	2	***		10.121C
10.1121	Number Theory	III	½	SS	2	***		10.1421
10.1123	Logic and Computability	III	½	SS	2	***		
10.1124	Combinatorial Topology	III	½	SS	2	***		10.122C
10.1125	Ordinary Differential Equations	III	½	S1	2	10.111A	***	10.122E, 10.1425
10.1126	Partial Differential Equations	III	½	S2	2	10.1113, 10.1114	10.1125	10.1426

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.1127	History of Mathematics	III	½	S2	2	10.111A, 10.1113, 10.1114, 10.2111, 10.2112		
10.1128	Foundations of Calculus	III	½	S1	2	***		10.122B
10.1521	Combinatorics and its Applications	III	½	SS	2	***		
10.1522	Differential Geometry	III	½	SS	2	10.1113	***	10.112C, 10.1325, 10.122C
10.1523	Functional Analysis and Applications	III	½	SS	2	10.111A 10.2112	***	10.122B

Higher Pure Mathematics Level III**

10.122B	Real Analysis and Functional Analysis	III	1	F	2	10.121A *or* 10.111A DN 10.1213 *or* 10.1113 DN		10.112B
10.1321	Rings and fields	III	½	S1‡	2	10.121A *or* 10.111A DN		
10.1322	Galois Theory	III	½	S2‡	2		10.1321	
10.1323	Complex Analysis	III	½	S1‡‡	2	10.1214 *or* 10.1114 DN	†††	
10.1324	Integration and Fourier Analysis	III	½	S2‡	2		10.122B	
10.1325	Differential Geometry	III	½	S1‡	2	10.121A *or* 10.111A DN 10.1213 *or* 10.1113 DN		10.1522
10.1326	Calculus on Manifolds	III	½	S2‡	2		10.1325	
10.1421	Number theory	III	½	S1‡‡	2			10.1121
10.1422	Groups and Representations	III	½	S2‡‡	2	10.121A *or* 10.111A DN and 10.1111 DN		
10.1423	Topology	III	½	S1‡	2	10.1213 *or* 10.1113 DN		
10.1424	Geometry	III	½	S2‡‡	2	10.121A *or* 10.111A and 10.1111 DN		10.1112
10.1425	Ordinary Differential Equations	III	½	S1‡‡	2	10.121A *or* 10.111A DN 10.1213 *or* 10.1113 DN	†††	10.1125
10.1426	Partial Differential Equations	III	½	S2‡‡	2		10.1425	10.1126

††For any listed unit an appropriate higher unit may be substituted.

†1. Admission to Higher Pure Mathematics 2 normally requires completion of 10.011 Higher Mathematics 1; students who gain a superior pass in 10.001 Mathematics 1 may, subject to the approval of the Head of the School of Mathematics, be permitted to proceed to Higher Pure Mathematics 2 units.

2. Students majoring in Physics who wish to take Higher Pure Mathematics 2 should attempt 10.121A, 10.1213, 10.1214, either 10.2211 or 10.2111 and either 10.2212 or 10.2112.

3. Students aiming at Honours in Pure Mathematics must take 10.121A, 10.121C, 10.1213, 10.1214, either 10.2211 or 10.2111 and either 10.2212 or 10.2112.

**Students wishing to attempt Level III Higher Pure Mathematics units should consult the School of Mathematics prior to enrolment. Students will not normally be permitted to attempt a Level III Higher Pure Mathematics unit unless they have completed at least 2 Level II units from 10.121A, 10.1213, 10.1214, 10.2211 and 10.2212, or obtained sufficiently good gradings in the corresponding ordinary Level II units.
Pre- and co-requisites may be varied in special circumstances with the permission of the Head of the School of Mathematics.

***Students will not normally be permitted to attempt a Level III Pure Mathematics unit unless they have completed at least two Level II units from 10.111A, 10.1113, 10.1114, 10.2111 and 10.2112.

‡These subjects are to be offered in odd numbered years.

‡‡These subjects are to be offered in even numbered years.

†††The unit 10.122B is strongly recommended.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Applied Mathematics								
Applied Mathematics Level II								
10.2111	Vector Calculus	II	½	S1 *or* S2	2½	10.001		10.2211 4.813
10.2112	Mathematical Methods for Differential Equations	II	½	S1 *or* S2	2½	10.001		10.2212 4.813
10.2113	Introduction to Linear Programming	II	½	S1 *or* S2	2	10.001		10.2213
10.2115	Discrete-Time Systems	II	½	S2	2	10.001		10.2215
10.211E	Mathematical Computing	II	1	F	2	10.001		
Higher Applied Mathematics Level II								
10.2211	Vector Analysis	II	½	S1	2½	10.001 *or* 10.001 DN**		10.2111
10.2212	Mathematical Methods for Differential Equations	II	½	S2	2½	10.2211		10.2112
10.2213	Introduction to Linear Programming	II	½	S1	2	10.011 *or* 10.001 DN**		10.2113
10.2215	Discrete-Time Systems	II	½	S2	2	10.011 *or* 10.001 DN		10.2115
Applied Mathematics Level III								
10.212A	Numerical Analysis	III	1	F	2	10.2112, 10.111A		10.222A
10.212L	Optimization Methods	III	1	F	2	10.1113***		10.222L
10.212M	Optimal Control Theory	III	1	F	2	10.1113 *and* 10.1114 10.111A		10.222M
Higher Applied Mathematics Level III								
10.222A	Numerical Analysis	III	1	F	2	10.2212 *or* 10.2112 DN**, 10.121A *or* 10.111A DN**		10.212A
10.222C	Maxwell's Equations and Special Relativity	III	1	F	2	10.2211 *or* 10.2111 DN**, 10.2212 *or* 10.2112 DN**, 10.1214 *or* 10.1114 DN**, 1.001		1.033 1.0333
10.222F	Quantum Mechanics	III	1	F	2	10.2211 *or* 10.2111 DN**, 10.2212 *or* 10.2112 DN**, 10.121A *or* 10.111A DN**, 10.1213 *or* 10.1113 DN**, 10.1214 *or* 10.1114 DN**		1.013 1.0133
10.222L	Optimization Methods	III	1	F	2	10.1213 *or* 10.1113 DN** ****		10.212L
10.222M	Optimal Control Theory	III	1	F	2	10.1213 *or* 10.1113 DN**, 10.1214 *or* 10.1114 DN**, 10.121A *or* 10.111A DN**		10.212M

††For any listed unit an appropriate higher unit may be substituted.
**With the permission of the Head of the Department a sufficiently good grading may be substituted.
***At least one further unit chosen from the following: 10.111A, 10.1114, 10.2111, 10.2112, 10.2113.
****At least 1½ further units chosen from the following: 10.121A *or* 10. 111A DN, 10.1214 *or* 10.1114 DN, 10.2211 *or* 10.2111 DN, 10.2212 *or* 10.2112 DN, 10.2213 *or* 10.2113 DN, 10.2215 *or* 10.2113 DN.

Statistics

Theory of Statistics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.311A‡	Probability and Random Variables	II	1	S1‡	4	10.001 *or* 10.011 *or* 10.021C (CR)		10.321A 10.331 10.301 45.101
10.311B	Basic Inference	II/III	1	S2	4	10.311A		10.321B 10.331 10.301 45.101
10.3111	Statistical Computing and Simulation	II	½	S1	2	10.001 *or* 10.011 *or* 10.021C (CR)	10.311A	
10.3112	Nonparametric Statistical Inference	II	½	S2	2	10.311A	10.311B	
10.331	Statistics SS	II	1	F	2	10.001 *or* 10.021C (CR)		10.311A 10.311B 10.321A 10.321 B 10.301 45.101

Higher Theory of Statistics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.321A	Probability and Random Variables	II	1	S1	4	10.001 *or* 10.011		10.311A 10.331 10.301 45.101
10.321B	Basic Inference	II/III	1	S2	4	10.321A		10.311B 10.331 10.301 45.101
10.3211	Statistical Computing and Simulation	II	½	S1	2	10.001 *or* 10.011	10.321A	
10.3212	Nonparametric Statistical Inference	II	½	S2	2	10.321A	10.321B	

Theory of Statistics Level III**

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.312A	Probability and Stochastic Processes	III	1	S1	4	10.311A, 10.111A, 10.1113		10.322A
10.312B	Experimental Design (Applications) and Sampling	III	1	S2	4	10.311B *or* 10.331		10.322B
10.312C	Experimental Design (Theory)	III	1	S1	4	10.311B, 10.111A, 10.1113	10.312B†	10.322C
10.312D	Probability Theory	III	1	S2	4	10.311A, 10.111A, 10.1113, 10.2112		10.322D
10.312E	Statistical Inference	III	1	S2	4	10.311B, 10.111A, 10.1113	†	10.322E
10.312F	Statistical Computation	III	1	SS	4	10.311B (*or* 10.312B *or* 10.3321) 6.621 6.641		

For footnotes, see overleaf

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.3321	Regression Analysis and Experimental Design	III	½	S1	2	10.331 *or* 10.311B *or* 10.321B		10.312B 10.322B
10.3322	Applied Stochastic Processes	III	½	S2	2	10.331 *or* 10.311A *or* 10.321A		10.312A 10.322A
Higher Theory of Statistics Level III								
10.322A	Probability and Stochastic Processes	III	1	S1	4½	10.312A, 10.111A, 10.1113		10.312A
10.322B	Experimental Design (Applications) and Sampling	III	1	S2	4½	10.321B, 10.111A, 10.1113		10.312B
10.322C	Experimental Design (Theory)	III	1	S1	4½	10.321B, 10.111A, 10.1113	10.322B†	10.312C
10.322D	Probability Theory	III	1	S2	4½	10.321A, 10.111A, 10.1113		10.312D
10.322E	Statistical Inference	III	1	S2	4½	10.321B, 10.111A 10.1113	†	10.312E

††For any listed unit an appropriate higher unit may be substituted.
† Plus any two Level III Pure Mathematics, Applied Mathematics, Theoretical Mechanics or Computer Science units. It is sufficient to take 10.312B (10.322B) in the same year.
**For a student taking four of the units 10.312A, 10.312B, 10.312C, 10.312D, 10.312E (or the corresponding higher units) a project is required as part of either 10.312C (10.322C) or 10.312E (10.322E).
‡The evening course 10.311A will, subject to a sufficient enrolment, run at 3½ hours per week throughout the year.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Theoretical and Applied Mechanics								
Theoretical Mechanics Level II								
10.4111	Introduction to Theoretical Mechanics	II	½	S1	2	10.001, 1.001 *or* 5.006	10.2111, 10.2112, 10.1113	10.411B, 10.421B, 10.4211, 1.002, 1.992
10.4112	Introduction to Hydrodynamics	II/III	½	S2	2	10.001 *or* 1.002	10.4111 *or* 1.002	10.411A, 10.421A, 10.4212
Higher Theoretical Mechanics Level II								
10.4211	Introduction to Theoretical Mechanics	II	½	S1	2	10.011 *or* 10.001 (DN**) 1.001 *or* 5.006	10.2211, 10.2212, 10.1113	10.411B, 10.421B, 10.4111, 1.002, 1.992
10.4212	Introduction to Hydrodynamics	II/III	½	S2	2	10.011 *or* 10.001 (DN**) 1.002 (CR) *or* 10.4211		10.421A, 10.411A, 10.4112
Theoretical Mechanics Level III								
10.412A	Dynamical and Physical Oceanography	III	1	F	2	1.001, 10.2111 *and* 10.2112 *or* 10.031	‡	

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
10.412B	Continuum Mechanics	III	1	F	2	10.2111, 10.2112, 10.1113, 10.1114, 10.111A	10.4112 *or* 1.012 *or* 1.913	10.422B
10.412D	Mathematical Methods	III	1	F	2	10.2112, 10.1113, 10.1114, 10.111A		10.422D, 10.4331
10.4129	Applied Time Series Analysis	III	½	S2	2	10.2112 *or* 10.031 *or* 10.022	10.331 *or equivalent* 10.4331 *or* 10.412D *or equivalent*	
10.4331	Transform Methods	III	½	S1	2	10.1113, 10.1114, 10.2112 *or equivalent*		10.412D, 10.422D
Higher Theoretical Mechanics Level III								
10.422A	Fluid Dynamics	III	1	S2	4	10.421A *or* 10.411A DN**	10.422B	
10.422B	Mechanics of Solids	III	1	S1	4	10.2111, 10.2112, 10.1113, 10.1114, 10.111A, 10.421B *or* 10.411B DN** *or* 1.012		10.412B
10.422D	Mathematical Methods	III	1	F	2	10.2211 *or* 10.2111 DN**, 10.2212 *or* 10.2112 DN**, 10.1213 *or* 10.1113 DN**, 10.1214 *or* 10.1114 DN**		10.412D, 10.4331

**With the permission of the Head of the Department a sufficiently good grading may be substituted.
‡It is recommended that one of the following be taken concurrently: 10.4112 *or* 1.3533.
††For any listed unit an appropriate higher unit may be substituted.

Psychology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Psychology Level I								
12.100	Psychology 1	I	2	F	5			12.001
Psychology Level II See Notes								
12.200	Research Methods 2	II	1	F	3	12.100*		12.152
12.201	Basic Psychological Processes 2	II	1	S1	4	12.100*		12.052
12.202	Complex Psychological Processes 2	II	1	S2	4	12.100*		12.062
12.204	Human Relations 2	II	1	S2	4	12.100*		12.072
12.205	Individual Differences 2	II	1	S1	4	12.100*		12.082

For footnotes, see overleaf

Psychology (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Psychology Level III: Group A See Notes								
12.300	Research Methods 3A	III	1	S1	4	12.200		12.153
12.304	Personality and Individual Differences 3	III	1	S1	4	2 Psychology Level II subjects		12.303
12.305	Learning and Behaviour 3	III	1	S1 *or* S2	4	12.200 *and* 12.201		12.253
12.322	Abnormal Psychology 3	III	1	S1	4	12.200 *and* 12.201		12.603
Psychology Level III: Group B See Notes								
12.301	Research Methods 3B	III	1	S2	4	12.200 *and* 12.300		12.163
12.310	Physiological Psychology 3	III	1	S2	4	12.200 *and* 12.201		12.413
12.311	Perception 3	III	1	S1	4	12.200 *and* 12.201		12.473
12.312	Language and Cognition 3	III	1	S2	4	12.200 *and* 12.202		12.453
12.314	Motivation and Emotion 3	III	1	S2	4	12.200 *and* 12.201		12.323
12.320	Social Psychology 3	III	1	S1	4	12.200 *and* 12.202		12.503
12.321	Developmental Psychology 3	III	1	S2	4	12.200 *and* 12.202		12.553
12.324	Experimental Psychopathology 3	III	1	S2	4	12.322		
12.325	Social Behaviour 3	III	1	S1	4	12.200 *and* 12.202		
12.330	Psychological Assessment 3	III	1	S1	4	12.200, *and* 1 other Psychology Level II subject		12.042, 12.203 *and* 12.373
12.331	Counselling Psychology 3	III	1	S1	4	2 Psychology Level II subjects		12.623
12.332	Behavioural Change 3	III	1	Not offered 1985	4	12.200 *and* 12.201		12.713
12.333	Ergonomics 3	III	1	S2	4	12.200		12.663
12.334	Behaviour in Organizations 3	III	1	S2	4	2 Psychology Level II subjects		12.653
12.335	Behavioural Evaluation and Assessment 3	III	1	S2	4	12.322		
12.340	Special Topic 3	III	1	Not offered 1985	4	12.300, 12.304 *and* 12.305		

*Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.

Notes:

1. A student may not enrol in more than four Level II Psychology units.
2. A student may not enrol in more than three Level III Psychology units unless 12.200 Research Methods 2 has been passed.
3. A student may not enrol in more than six Level III Psychology units unless 12.300 Research Methods 3A has been passed.
4. A major in Psychology is 12.100, two Psychology Level II units, including 12.200 and four Psychology Level III units.
5. A student may not enrol in more than three Psychology Level III subjects selected from 12.304 Personality and Individual Differences 3, 12.322 Abnormal Psychology 3, 12.324 Experimental Psychopathology 3, 12.331 Counselling Psychology 3, and 12.335 Behavioural Evaluation and Assessment 3.
6. A student may not enrol in more than eight Level III Psychology units in course 3970.

Biological Sciences

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.031	Biology A	I	1	S1	6	See Subject Descriptions later in this Handbook		
17.041	Biology B*	I	1	S2	6	17.031		17.021
17.012	General Ecology	II	1	S2	6	17.031 *and* 17.041		

*Students with percentile range 61-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 45.201 or 45.301 in lieu of 17.041 after completion of 17.031. Students are selected by the Head of School for enrolment in these units. If successful, students will have met the prerequisite requirement of 17.041 Biology B for all units.

Applied Geology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
25.110	Earth Materials and Processes**	I	1	S1	6	See Subject Descriptions later in this Handbook		
25.120	Earth Environments and Dynamics****	I	1	S2	6	25.110		
25.211	Earth Materials 1*	II	1	S1	6	25.120		
25.221	Earth Materials 2‡‡	II	1	S2	6	25.211		
25.212	Earth Environments 1‡	II	1	S1	6	25.120		
25.223	Earth Physics**	II	1	S2	6	25.110		
25.2261	Mathematical Geology 1	II	½	S2	3	25.120		
25.621	Marine Geology 1**	II	1	F	3	25.601 *or* 25.110 *and* 25.120		††
25.622	Hydrological and Coastal Surveying‡	II/III	1	F	3			††
25.311	Earth Materials 3	III	1	S1	6	25.221		
25.321	Earth Materials 4†	III	1	S2	6	25.221		
25.312	Earth Environments 2‡‡	III	1	S1	6	25.212†††		
25.314	Mineral and Energy Resources 1****	III	1	S1	6	25.221		
25.3162	Mathematical Geology 2	III	½	S1	3	25.2261		
25.324	Mineral and Energy Resources 2****	III	1	S2	6	25.212 *or* 25.5212		
25.325	Engineering and Environmental Geology***	III	1	S2	6			
25.3261	Geochemical Analytical Techniques	III	½	S1	2	25.311		
25.3271	Advanced Structural Geology***	III	½	S2	2	25.221		

For footnotes, see overleaf

Applied Geology (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
25.333	Exploration Geophysics***	III	1	F	3S1 2S2	25.120		
25.6342	Exploration and Seismic Methods	III	½	S2	3			25.634, 25.9321
25.9311	Gravity and Magnetic Methods*	III	½	S1	3	1.001 10.001		
25.9312	Seismic Methods*	III	½	S1	3	1.001 10.001		
25.9313	Electrical Methods*	III	½	S1	3	1.001 10.001		

*Field work of up to 1 day.
**Field work of up to 2 days.
***Field work of up to 3 days.
****Field work of up to 4 days.
‡Field work of up to 5 days.
†Field work of up to 6 days.
‡‡Field work of up to 8 days.

Field tutorials are an essential part of the subject, and are held during weekends and/or recesses. Dates and costs are available during the first week of the subject. Attendance is compulsory.

††*Not* available for programs 2500, 2503 *nor* in Geology program of Course 4770, *nor* in Geology with some Mathematics program of Course 3730.
†††It is desirable that students taking 25.312 should also have taken 25.223.

Geography

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
27.111	Applied Physical Geography 1†	I	2	F	5	See **Subject Descriptions** later in this Handbook		27.801, 27.301, 27.818, 27.811, 27.828, 27.295, 27.311
27.818	Australian Environment and Human Response*	I	1	S1	4			27.801, 27.301, 27.295, 27.111
27.819	Technology and Regional Change*	I	1	S2	4			27.802, 27.302
27.1711	Introduction to Remote Sensing	II	1	S1	4	See **Subject Descriptions** later in this Handbook		
27.172	Environmental Measurements†	II	2	F	5	27.111 *or* 27.818 *and* 27.819 *or* 27.801 *and* 27.802 *or* 27.301 *and* 27.302		
27.813	Geographic Methods***	II	1	S2	4	27.111 *or* 27.818 *and* 27.819 *or* 27.301 *and* 27.302 *or* 27.801 *and* 27.802		27.2813
27.828	Australian Natural Environments***	II	1	S2	4	27.818 *or* 27.801/301		27.811, 27.311, 27.111

Geography (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
27.829	Australian Social Environments***	II	1	S1	4	27.819 *or* 27.802/302		27.812, 27.312
27.133	Pedology†	III	1	S1	5	27.111 *or* any 2 units from: 2.111, 2.121, 2.131, 2.141 *or* 27.828 *or* 27.311 *or* 27.811 (*or* 25.012 *or* 25.022) *or* 27.172		
27.143	Biogeography†	III	1	S2	5	27.814, *or* 27.111, *or* 17.031 *and* 17.041, *or* 27.811, *or* 27.172		
27.153	Climatology	III	1	S2	5	1.001, *or* 27.814, *or* 27.828, *or* 25.110 *and* 25.120, *or* 17.031 *and* 17.041†, *or* 27.111, *or* 27.172, *or* 27.311, *or* 27.811		
27.1712	Remote Sensing Applications	III	1	S1	4	27.1711		
27.183	Geomorphology†	III	1	S1	5	25.110 *and* 25.120, *or* 27.828, *or* 27.111, *or* 27.811, *or* 27.172, *or* 27.311		27.860
27.432	Computer Mapping and Display	III	1	S2	4	27.813, *or* 27.2813 *and* 27.2814		
27.652	Geographic Information Systems	III	1	S2	4	27.432		
27.753	Social Welfare and Urban Development	III	1	S1	4	27.829 *or* 27.812 *or* 27.312		
27.824	Spatial Population Analysis	III	1	S2	4	27.829 *or* 27.812/312		27.324, 27.834
27.825	Urban Activity Systems	III	1	S1	4	27.829 *or* 27.812 *or* 27.312		27.325, 27.835
27.826	Urban and Regional Development	III	1	S2	4	27.829 *or* 27.812 *or* 27.312		27.326, 27.836
27.862	Australian Environment and Natural Resources**	III	1	S2	4**	27.828 *or* 27.829 *or* 27.811 *or* 27.812		27.872
27.863	Ecosystems and Man**‡	III	1	S2	4**	27.828 *or* 27.829 *or* 27.811 *or* 27.812		27.363, 27.873
27.880	Advanced Geographic Methods	III	1	S1	4	27.813, *or* 27.2813 *and* 27.2814		
27.883	Special Topic	III	1	S1 or S2	4	See **Subject Descriptions** later in this Handbook		

*A field excursion, equivalent to 8 tutorial hours, is a compulsory part of the subject.
**Two field tutorials, equivalent to 16 tutorial hours, are compulsory.
***Three days fieldwork, equivalent to 24 tutorial hours, is compulsory.
†Up to 5 days fieldwork, equivalent to 40 tutorial hours, is compulsory.
‡Not offered in 1985.

Surveying

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
29.1010	Surveying 1*	I	1½	S1	4			
29.2010	Surveying 2*	I		S2	5	29.1010		

*These two subjects must be taken together in the one year.

Biochemistry‡

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
41.101	Biochemistry	II	2	S1	12	17.041†, 2.121† & 2.131†, *or* 2.141†		2.003J
41.111	Biochemical Control	II	1	S2	6	41.101		
41.102A	Biochemistry of Macromolecules	III	2	S1	12	41.101** *or* 41.111**, 2.002B		
41.102B	Physiological Biochemistry	III	2	S2	12	41.101** *or* 41.111**, 2.002B		
41.102C	Plant Biochemistry	III	1	S2	6	41.101** *or* 41.111**, 2.002B		
41.102E	Molecular Biology of Higher Organisms	III	1	S2	6	41.102A		

‡Level III units available only during the daytime.
*In exceptional circumstances a student may apply to the Head of School for variation of the prerequisite.
†Terminating pass not acceptable.
**Students must obtain a clear pass (PS) in *either* 41.101 *or* 41.111.

Biotechnology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
42.101	Introduction to Biotechnology	II	1	S2	6	2.121 & 2.131, *or* 2.141, 17.041, 10.001 *or* 10.011 *or* 10.021B *and* 10.021C		
42.102A	Biotechnology A	III	1	S1	6	41.101† 42.101† *or* 44.101†		
42.102B	Biotechnology B	III	1	S2	6	42.102A†		
42.102C	Microbial Genetics	III	1	S1	6	41.101 *or* 44.101		43.102

*In exceptional circumstances a student may apply to the Head of School for variation of the prerequisite.
†Pass Conceded (PC) or Terminating Pass (PT) awarded prior to Session 2, 1983 is not acceptable.

Botany

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.012	General Ecology					See under Biological Sciences		
43.111	Flowering Plants	II	1	S1	6	17.031 *and* 17.041		
43.121	Environmental Physiology	II	1	S2	6	17.031, 17.041, 2.141 *or* 2.121 *and* 2.131		43.122
43.131	Fungi and Man	II	1	S1	6	17.031 *and* 17.041		
43.112	Taxonomy and Systematics	III	1	S2	6	43.111	43.101	
43.132	Mycology-Plant Pathology	III	1	S2	6	43.131***		
43.142	Environmental Botany	III	1	S1	6	17.031 *and* 17.041		
43.152	Plant Community Ecology	III	1	S2	6	43.111 & 17.012 *or* 27.111		
43.172	Phycology and Marine Botany	III	1	S1	6	43.111		
43.192	Ultrastructure	III	1	S2	6	43.111 *or* 43.121 *or* 41.101 *or* 44.101 *or* 45.201 *or* 45.301		43.182

***A student may apply to the School for variation of the prerequisite.

Microbiology†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
44.101	Introductory Microbiology	II	1	S1	6	17.031 *and* 17.041		
44.121	Microbiology 1	II	1	S2	6	44.101 41.101 *or* 2.003J		
44.102	General Microbiology	III	2	S1	12	44.101, 44.121‡, 41.101		
44.112	Applied Microbiology	III	2	S2	12	44.102		
44.122	Immunology	III	1	S2	6	17.031 *and* 17.041, 41.101		
44.132	Virology	III	1	S2	6	44.102		

†All units available only during the daytime.
*In exceptional circumstances a student may apply to the Head of School for variation of the prerequisite.
‡Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.

Zoology†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.012	General Ecology					See under Biological Sciences		
45.101	Biometry	II	1	S2	6	17.031 *and* 17.041		10.311A, 10.321A, 10.331
45.201	Invertebrate Zoology	II	1	S2	6	17.031 *and* 17.041		

For footnotes, see overleaf

Zoology (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
45.301	Vertebrate Zoology	II	1	S1	6	17.031 *and* 17.041		
45.112	Marine Ecology§	III	1	S1	6	17.031 *and* 17.041, 45.201 *or* 25.621 *or* 2.002D		
45.121	Evolutionary Theory	III	1	S1	6	17.031 *and* 17.041		
45.122	Animal Behaviour	III	1	S2	6	45.101‡ *and* (45.201 *or* 45.301)		
45.132	Ecological Physiology‡‡	III	1	S2	6	45.201 *or* 45.301		
45.142	Comparative Physiology	III	1	S2	6	45.201 *or* 45.301		
45.152	Population and Community Ecology	III	1	S1	6	17.041 *and* 10.001 *or* 10.011		
45.302	Vertebrate Zoogeography and Evolution	III	1	S2	6	45.301		
45.402	Insects§	III	1	S1	6	17.031, 17.041, 45.202		
45.422	Economic Zoology	III	1	S1	6	45.201 *or* 45.402		
45.432	Project‡‡	III	1	‡‡	6	45.402 *or* 45.201		

Note: A student will not be admitted to Level III Zoology units without special permission of the Head of School, unless Chemistry 2.001 or 2.121 and 2.131, or 2.141, has been completed.

Students who wish to complete a major in the School of Zoology must take Biometry 45.101 and at least two Level II units from one of the following Schools: Biochemistry, or Chemistry, or Physics, or Mathematics, except as detailed in an approved program.

†Level III courses conducted by the School of Zoology are available only during the daytime.

§Students intending to enrol in this unit should register with the School of Zoology for the February field trip by 14 January.

‡One of: 10.311A; 10.321A; 10.331 may be substituted for 45.101 with special permission of the Head of School.

‡‡Not offered in 1985.

Philosophy

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
52.103	Introductory Philosophy A	I	1	S1	4			
52.104	Introductory Philosophy B	I	1	S2	4			
52.2010	Reasoning Skills	II	½	S1 or S2	2	Any Level I Subject		52.233
52.2020	Descartes	II	½	S1	2	Level II Status in Philosophy**		52.163
52.2021	Spinoza and Leibniz	II	½	S2	2	52.2020 *or* 52.163		52.303
52.2030	Predicate Logic A	II	½	S1	2	Any Level I Subject		52.153, 52.162, 52.1531
52.2031	Predicate Logic B	II	½	S2	2	52.2030 *or* 52.1531		52.153, 52.162, 52.1532
52.2040	Greek Philosophy: Thales to Plato	II	½	S1	2	Level II Status in Philosophy**		52.183

Philosophy (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
52.2050	Classical Political Philosophy†	II	½	S1	2	Level II Status in Philosophy**		52.182, 52.203
52.2060	Sartre	II	½	S1	2	Level II Status in Philosophy**		52.213
52.2130	British Empiricism	II	½	S2	2	Level II Status in Philosophy**		52.173
52.2140	Scientific Method	II	½	S1	2	Level II Status in Philosophy**		52.193
52.2150	Philosophy of Law	II	½	S2	2	Level II Status in Philosophy**		52.105
52.219	Philosophical Foundations of Marx's Thought	II	1	S1	3	Level II Status in Philosophy**		52.373
52.2170	Hume	II	½	S1	2	Level II Status in Philosophy**		52.563, 52.152
52.2220	Classical Greek Ethics†	II	½	S1	2	Level II Status in Philosophy**		52.5231
52.2230	Theories in Moral Philosophy	II	½	S2	2	Level II Status in Philosophy**		52.5232
52.2240	Philosophical Study of Woman	II	½	S2	2	Level II Status in Philosophy**		52.283
52.2250	Plato's Theory of Forms	II	½	S2	2	Level II Status in Philosophy**		52.483
52.2260	Aesthetics	II	½	S2	2	Level II Status in Philosophy**		52.273
52.2270	Social and Political Philosophy†	II	½	S2	2	Level II Status in Philosophy**		52.513
52.2330	Psychoanalysis — Freud and Lacan	II	½	S2	2	Level II Status in Philosophy**		52.573
52.2360	Theories, Values and Education	II	½	S1	2	Level II Status in Philosophy**		52.583
52.2371	Plato's Later Dialogues	II	½	S2	2	52.2250 *or* 52.483*		52.293
52.2411	History of Logic	II	½	S1	2	52.2030 *or* 52.1531		52.353, 52.393, 52.593
52.2980	Seminar A	II	½	S2	2	Level II Status in Philosophy**		52.423
52.2990	Reading Option A	II	½	S1 *or* S2	2	Level II Status in Philosophy**		52.413
52.3010	Seminar B	II	½	S1	2	Level II Status in Philosophy**		52.433
52.3020	Seminar C	II	½	S2	2	Level II Status in Philosophy**		52.443
52.3030	Reading Option B	II	½	S1 *or* S2	2	Level II Status in Philosophy**		52.453

*In exceptional circumstances a student may apply to the School for variation of the prerequisite or co-requisite.

Level II status in Philosophy consists in **1. being in second or later year of university study, and **2.** having taken and passed at least one Level I Philosophy unit. If the unit is composed of two half-units, these must have been passed in the same session. The prerequisite may be waived in certain cases by the School.
†Not offered in 1985.

History and Philosophy of Science

Students undertaking subjects in History and Philosophy of Science are required to supplement the class contact hours by study in the Library.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
62.110	Science, Technology and Social Change	I	1	S1	3			
62.211	The Seventeenth Century Intellectual Revolution	I	1	S2	3			62.012
62.022	Materials Machines and Men	II/III	1	S2	3			26.564, 26.251
62.032	The Scientific Theory	II/III	1	S2	3			
62.052	Scientific Knowledge and Political Power	II/III	1	S1	3			
62.062	The Social System of Science	II/III	1	S2	3			
62.072	Historical Origins of the American Scientific Estate	II/III	1	S1	3			
62.082	Science, Technology and Developing Countries	II/III	1	S1	3			
62.103	The Discovery of Time*	II/III	1	S1	3	A pass in four Level I units from Table 1		
62.104	The Darwinian Revolution	II/III	1	S2	2			
62.106	Mind, Mechanism and Life	II/III	1	S1	3			62.043
62.109	The History of Medical Theory and Practice	II/III	1	S1	3			62.043 26.568, 26.2506
62.241	Relations Between Science and the Arts*	II/III	1	S2	3			
62.242	Introduction to the History of Ideas*	II/III	1	S2	3			
62.285	Man, Woman and Deity	II/III	1	S2	3			
62.551	The Arch of Knowledge: History of the Philosophy and Methodology of Science to 1800*	II/III	1	S1	2			62.013

History and Philosophy of Science (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
62.552	Modern History of the Philosophy and Methodology of Science*	II/III	1	S2	2	62.551 *or* by permission of Head of School		62.013
62.554	Computers, Brains and Minds: Foundations of the Cognitive Sciences	II/III	1	S1	3	As for 62.022		
62.105	Research Methods in History and Philosophy of Science	III	1	F	1½	Completion of 3 HPS units with an average of Credit or better, or by permission of Head of School		

*Not offered in 1985.

Board of Studies in Science and Mathematics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
68.313	Physical Oceanography	III	1	S2	4	10.001 *or* 10.011 *and* 1.001		
68.601	Genetics of Behaviour 1	II	1	S1	5	17.031		79.402
68.602	Genetics of Behaviour 2	III	1	S2	5	79.402 *or* 68.601		79.403
68.451	Biological Laboratory Computing	I	1	S2	6	As for 10.021B		1.041 *and* Programs 0600, 6806

Pathology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
72.301	Basic and Applied Pathology	III	1	F	3	70.011A 70.011C 73.111 *or equivalent*		

Physiology and Pharmacology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
73.111	Physiology 1A	II	2	F	6	2.121 *and* 2.131, *or* 2.141, 10.001 *or* 10.011 *or* 10.021B *and* 10.021C, 17.041	41.101	73.121
73.121	Physiology 1B	II	2	F	6	2.121 *or* 2.141, 10.001 *or* 10.011 *or* 10.021B *and* 10.021C, 17.041	2.131*	73.111
73.012	Physiology 2	III	4	F	12	73.111, 41.101, 41.111		
73.012A	Membrane Biology	III	1	S1	6	Normally as for 73.012, but may be studied only with permission of Head of School		
73.012B	Neurophysiology	III	1	S1	6			
73.012C	Organ Physiology	III	2	S2	12			
73.022	Pharmacology	III	2	F	6	73.111 *or* 73.121	73.012 *or* 41.102A *and* 41.102B *or* 2 Level III Chemistry units	

Note: The above represent the normal prerequisites for the courses in Physiology, but the Head of School may recommend that students with a good academic record be granted exemption from them.

*Not if 2.141 has been completed.

Community Medicine

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
79.201	Population Genetics	III	1	S1	5	See † below		
79.202	Quantitative Methods in Human Genetics	III	1	S2	5	See * below		
79.302	Biochemical Genetics of Man	III	1	S1	6	43.101, 41.101		

†One unit of statistical methods, or theory, as approved by the Head of School.
*A unit of genetics and a unit of statistical methods, or theory, as approved by the Head of School.

Course 3970
Units available in specific programs

Table 2

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
1.982	Solid State Physics (Electrical Engineering)	II	1	S1	4½	1.001,10.001	10.2111, 10.2112	1.012	Course 3681
2.111	Introductory Chemistry*	I	1	S1	6				0100, 1200, 2700
2.013E	Advanced Nuclear and Radiation Chemistry	III	1	S2	6	2.003E			Any appropriate program *except* 0200 *and* Course 3910
2.951	Chemistry 1 ME	I	1	S2	6			2.121, 2.131, 2.141	Course 3681
2.991	Chemistry for Civil Engineers	I	1	S2	6			2.121, 2.131, 2.141	Course 3730
4.433	Physical Metallurgy 2C	III	2½	S1 S2	9 6	4.402		4.403	Course 3681
4.802	Metallurgical Physics	II	½	S2	2	1.001			Course 3681
4.813	Mathematical Methods	III	1	F	3	10.001 *or* 10.011		10.2111, 10.2112	
5.0201	Engineering Dynamics 1A	I	½	S1 *or* S2	3	5.010		5.020	Course 3681
5.300	Engineering Dynamics 1B	II	½	S2	2	1.001, 5.020 or 5.0201, 10.001			Course 3681
5.421	Mechanics of Solids 1	I	½	S2	4	5.010		5.020, 8.171	Course 3681
5.422	Mechanics of Solids 2/ Materials	II	1½	F	4½	5.020 *or* 5.421 *or* 8.171, 10.001		4.402, 4.442, 5.4221	Course 3681

For footnotes, see overleaf

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
5.4221	Mechanics of Solids 2/ Materials	II	1½	F	3½	5.020 *or* 5.421 *or* 8.171, 10.001	4.402 *or* 4.422	5.422	Course 3681
5.622	Fluid Mechanics/ Thermodynamics	II	1½	F	4	1.001, 5.010, 10.001	5.020 *or* 5.0201		Course 3681
6.010	Electrical Engineering	I	1	S2	6	Electrical *and* magnetism section of 1.001			0100, 0600, 6806
6.021A	Basic Circuit Theory	II	½	S1 *or* S2	4	6.010, 1.001, 10.001			0600
6.021C	Electronics	II	½	S1 *or* S2	4	6.021A, 1.982 *or equiv.*			0600
6.613	Computer Organization and Design**	III	1	S2	5	6.631*** *or* 6.021E***, 6.021D *or* 6.620*** *or* 6.621***		6.0318	0600 or in the Computer Science Quota. Courses 3611 3661 3681 3725 3730 4770
6.632	Operating Systems**	III	1	S1	5	6.631*** *or* 6.021E*** 6.641***		6.672	
6.633	Data Bases and Networks**	III	1	S2	5	6.641***		6.622, 6.652, 14.607, 14.608	
6.642	Design and Analysis of Algorithms**	III	1	S1	5	6.641***			
6.643	Compiling Techniques and Programming Languages*	III	1	S1	5	6.641***		6.672	
6.647	Business Information Systems**	III	1	S2	5	6.641*** 14.501		14.602, 14.603 14.605	
6.649	Computing Practice**†*****	III	1		5	6.641***	6.633 *or* 6.643 *or* 6.647		
8.171	Mechanics of Solids 1	I	½	SS	3	5.010		5.020, 5.421	Course 3681
8.1120	Computing	I	½	SS	3			6.611	Course 3681
9.801	Genetics 1	II	1	F	2S1 3S2				6840
9.811	Biostatistics 1	III	1	S1	4	45.101			6840
9.802	Genetics 2	III	1	F	4	9.801			6840
10.022	Engineering Mathematics 2	II	1	F	4	10.001			Courses 3681, 3730
10.301	Statistics SA	II	1	F	2	10.001 *or* 10.021CR			6832, 6833
14.501	Accounting and Financial Management 1A****††††	I	1	S1	4½				0600, 1000 5811, 1400, 6810 Course 3681

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
14.511	Accounting and Financial Management 1B	I	1	S2	4½	14.501			0600, 1000, 5811, 1400, 6810
14.522	Accounting and Financial Management 2A	II	1	S1	4½	14.511			0600, 1000, 5811, 1400, 6810
14.542	Accounting and Financial Management 2B	II	1	S2	4½	14.511			0600, 1000, 5811, 6810
14.563	Accounting and Financial Management 3A	III	1	S1	4½	14.542			6810
14.573	Accounting and Financial Management 3A (Honours)	III	1	S1	6	14.542			6810
14.583	Accounting and Financial Management 3B	III	1	S2	4½	14.522			1400, 6810
14.593	Accounting and Financial Management 3B (Honours)	III	1	S2	6	14.522			6810
14.601	Law and Society 1	I	1	S2	3				6810
14.602	Computer Information Systems 1	II	1	S1	3				0600, 1000, 6810, 5811, 1400
14.603	Computer Information Systems 2	II	1	S2	3	14.602		6.647	0600, 1000, 6810, 5811, 1400
14.605	Information Systems Implementation	III	1	S2	3	14.603		6.647	0600, 1400
14.607	Distributed Computer Systems	III	1	S2	3	14.603		6.633	0600, 1400, 6810
14.608	Database Systems	III	1	S1	3	14.603		6.633	0600, 1400, 6810
14.611	Information Systems Development	III	1	S1	3	14.603 and approval from Head of Department of Information Systems			0600, 6810
14.613	Business Finance 2	II	1	S2	3				0600, 1000, 5811, 1400, 6810
14.614	Business Finance 3A	III	1	S1	3	14.613			0600, 6810
14.615	Business Finance 3B	III	1	S2	3	14.614			0600, 6810
							HSC Exam Percentile Range Required		
15.001	Microeconomics 1	I	1	S1 *or* S2	3½	2 unit A English *or* 2 unit English *or* 3 unit English	31-100 21-100 11-100		0600, 1000, 1400, 6810
15.002	Microeconomics 2	II	1	S1	4	15.011 plus equivalent of 15.421			0600, 1000, 6810, 5811
15.003	Macroeconomics 3	III	1	S1	4	15.042	15.412		0600
15.011	Macroeconomics 1	I	1	S1 *or* S2	3½	15.001			0600, 1000, 6810, 1400

For footnotes, see overleaf

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
15.042	Macroeconomics 2	II	1	S2	4	15.011		15.062	0600, 1000, 6810, 5811
15.062	Applied Macroeconomics 2	II	1	S1 *or* S2	4	15.011		15.042	6810
15.072	Applied Microeconomics 2	II	1	S1	4	15.011		15.002	6810
15.143	Microeconomics 3	III	1	S2	4	15.002 *or* 15.012	15.412		0600, 1000
15.666	Australia in the International Economy in the Twentieth Century	I	1	S1 *or* S2	3½				6810
15.777	Management Strategy and Business Development	I	1	S2	3½	15.601 *or* 15.666			6810
25.5212	Sedimentology	II	½	S1	2	25.120		25.212	0125, 1025, 2503
25.5313	Stratigraphy	III	½	S1	2	25.5212		25.312	0125, 1025, 2503
25.631	Marine Geology 2	III	1	F	3	25.621			6833, 6870
25.632	Estuarine Geology‡	III	1	S1	3				6832, 6833, 6870
25.6341	Marine Mineral Deposits	III	½	S1	3	25.621	25.631		6833, 6870
25.635	Marine Resources	III	1	F	3	25.621	25.631		6833, 6870
25.9314	Geological Applications	III	½	S1	4	25.120			2503
25.9321	Geophysical and Geological Applications	III	½	S2	3	25.120		25.6342	2503
29.2050	Survey Camp	I	½				29.1010 *and* 29.2010		6870
48.023	Chemical Engineering Science 1	II	2	F	6S1 5S2	1.001, 10.001			0200
48.024	Chemical Engineering Principles 1	II	1	F	3S1 2S2	1.001, 10.001			1000, 5811
48.037	Chemical Engineering Science 2	III	2	F	7S1 6S2	2.002A, 48.023			0200
48.038	Chemical Engineering Principles 2	III	1	F	4S1 252				1000, 5811
48.403	Polymer Science	III	1	F	3	2.002A, 2.002B, 10.022	10.331		Course 3681
68.302	Introductory Marine Science	II	1	S1	4			25.601	6831, 6832, 6833, 6834, 6870
70.011A	Histology 1	II	1	S1	6	17.041, 17.031***			
70.011B	Mammalian Embryology	III	1	S2	6	70.011A***			
70.011C	Introductory Anatomy	II	1	S1	6	17.041, 17.031***			
70.012B	Visceral Anatomy	III	1	S2	6	70.011C***			
70.012C	Neuroanatomy 1	III	1	S1	6	70.011A***, 70.011C***			
70.304	Histology 2	III	1	S2	6	70.011A***			
70.305	Neuroanatomy 2	III	1	S2	3	70.012C (CR)	§§	70.3041§	7000 or in the Anatomy Quota. Courses 4770 (Anatomy) 3820
70.306	Functional Anatomy 1	III	1	S1	6	70.011C***			
70.307	Functional Anatomy 2	III	1	S2	6	70.306***			
70.3041	Histological and Histochemical Techniques‡‡‡	III	½	S2	3	17.031***, 17.041*** *and* any 1 of 14.101, 45.301 *or* 70.011A***		70.304§	

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
73.012F	Clinical Physiology	III	1	F	3	73.111, 41.101, 41.111 *or* 2.002B, 70.011A, 70.011C, 80.014			Course 3820
80.014	Human Behaviour	II	1	F	3				Course 3820

*Students who have passed 2.121 may not subsequently enrol in 2.111. Students meeting the 2.121 prerequisite are not permitted to enrol in 2.111 without the permission of the Head of the School of Chemistry. Once students enrol in 2.111 they must pass 2.111 before they can proceed to 2.121 or 2.131. Students may not count more than *two* Level I Chemistry units towards BSc degree requirements.

**In exceptional circumstances the Head of School may give permission for students outside the specified programs to undertake one of these subjects.

***Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable.

****Not available in Year 1 of programs 0600, 1000, 5811, 1400.

*****Can only be counted with at least 3 other Level III Computer Science units.

†Not offered in 1985.

††††May be counted in Courses 3611, 3661, 3681 and 3701 in special circumstances only.

‡Excluded by 25.211.

‡‡‡May not be offered in 1985 if insufficient enrolments.

§70.304 and 70.3041 are mutually exclusive (see **Subject Descriptions** later in this handbook).

§§Anatomy units may be counted as Table 1 units in any program on obtaining special permission of the Head of the School of Anatomy.

Course 3970
Level IV units offered by the Board of Studies in Science and Mathematics

Table 3

A student planning to complete a program involving any unit/units from this table must seek the approval of the Head of the School in which the unit is taught.

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
1.104	Physics 4 (Honours)	IV	10	F	Program 0100 Program 0161 Program 5801	7 6 6
1.304	Applied Physics 4 (Honours)	IV	10	F	Program 0100 Program 0161 Program 5803	7 6 6
1.504	Theoretical Physics 4 (Honours)	IV	10	F	Program 0100§ Program 0161 Program 5805	7 6 6
1.604	Biophysics 4 (Honours)	IV	10	F	Program 0100	6
2.004	Chemistry 4	IV	10	F	4 Level III Chemistry units Program 5821	8 7
4.004	Metallurgy 4	IV	10	F		7-8
6.606	Computer Science 4	IV	10	F	6.613, 6.632, 6.642, 6.643	8
10.123	Pure Mathematics Honours	IV		F	Program 1000 *Program 5811 *or* 5812	* *
10.223	Applied Mathematics Honours	IV		F	Program 1000 Program 5811 *or* 5812	* 7
10.323	Theory of Statistics Honours	IV		F	Program 1006 *Program 5811 *or* 5812	* 7
10.423	Theoretical Mechanics Honours	IV		F	Program 1006 *Program 5811 *or* 5812	* 7
12.403	Psychology 4 (Research)	IV	10	F	Program 1200	8
12.404	Psychology 4 (Course Work)	IV	10	F	Program 1200	8

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
14.794	Honours Thesis	IV				
14.853	Advanced Systems Management	IV				
14.857	Operations Research for Management 1	IV				
14.886	Research Topics in Information Systems 1	IV	10	F	Program 1400	6
14.887	Research Topics in Information Systems 2	IV				
14.891	Decision Support Systems	IV				
25.410	Resource Geology†	IV	2	S1		
25.4101	Topics in Advanced Geology†	IV	1	S1		
25.420	Field Project†	IV	5	S2		
25.412	Sedimentary Basin Resources†	IV	2		Programs 2500 and 5831	8
25.414	Mineral Resources†	IV	2			
25.415	Engineering and Environmental Geology†	IV	2			
25.931	Geophysics†	IV	2			
25.434	Geology 4 Honours (Single Major)	IV	10	F	Programs 2500, 2503 Program 5832	8 7
27.844	Geography 4	IV	10	F	Program 2700	8
41.103	Biochemistry 4	IV	10	F	4 Level III Biochemistry units Program 5841 *or* 5842	8 7
42.103	Biotechnology 4	IV	10	F	4 Level III units in a discipline, or disciplines, related to Biotechnology	8
43.103	Botany	IV	10	F	4 Level III Botany units or a closely related discipline Program 5854 *or* 5855	7 7
44.103	Microbiology Honours	IV	10	F	44.102, 44.112 Program 5861, 5862 *and* 5842	8 7
45.103	Zoology 4	IV	10	F	4 Level III Zoology units Program 5866 *or* 5867	8 7
62.014	History and Philosophy of Science Honours	IV	10	F	Program 6200	7
62.024	Science Studies Honours	IV	10	F	Program 6200	7
68.304	Marine Science 4	IV	10	F	Program 6831, 6832, 6833 *or* 6834	8
68.404	Genetics 4	IV	10	F	Program 6840	7
68.430	Combined Geology Physics Honours	IV	10	F	Program 0100	8
70.013	Anatomy 4	IV	10	F	4 Level III Anatomy units	6
72.402G	Principles of Disease Processes	IV	1	F	73.111 *or* equivalent 70.011C *or* equivalent	
73.013	Physiology 4	IV	10	F	4 Level III Physiology units Program 5871	7 7
73.023	Pharmacology	IV	10	F	Program 7300(b)	7
79.014	Human Genetics	IV	10	F	At least 3 of the following: 41.102A, 43.102, 44.122, 45.121, 79.201, 79.202, 79.302, 68.403	8

*Higher level units of Mathematics must be included at Levels I, II and III in order to comply with the prerequisites for admission to Level IV Mathematics. Since entry to Level IV is only with approval of the Head of School, students should discuss their Year 3 program with a Professor of the Department concerned. In special circumstances additional prerequisites may be required, or some of those listed may be waived.

§Students entering 1.504 from the 0100 program should have demonstrated adequate mathematical ability.

ϕField work of up to 7 days duration is a compulsory part of the subject.

†Students undertaking Geology IV Honours in program 2501 or 5831 must enrol in 25.410, 25.4101, 25.420 and *one* of the subjects 25.412, 25.414, 25.415, *or* 25.931.

Undergraduate Study: Faculty of Biological Sciences

Faculty of Biological Sciences

Introduction

The Schools of the Faculty of Biological Sciences contribute programs to the Science and Mathematics Course (**3970**) and the Faculty supervises the undergraduate course in Psychology (**3430**). The Schools of the Faculty also offer facilities for students to proceed to the award of a Graduate Diploma in Biochemical Engineering (**5320**); Graduate Diploma in Biotechnology (**5340**); to masters degrees in Biological Technology (**8260**) and in Psychology (**8250** and **8255**); and to the award of masters degrees by research and the award of the degree of Doctor of Philosophy.

Students requiring advice about the undergraduate course should contact School of Psychology ..... Dr K. R. Llewellyn
Mr T. J. Clulow

Students requiring advice about graduate studies should check details later in this handbook and also enquire from the Head of the appropriate School.

Course Outline 3430

3430
Psychology Degree Course — Full-time Course
Bachelor of Science
BSc

The four year course in Psychology, which leads to the award of the degree of Bachelor of Science, is designed to meet the requirements of students who intend to become professional psychologists, as either practitioners or research workers. It provides extensive study of psychological theory and practice, supported by an appropriate selection of other subjects.

The course is available on a full-time basis only. Entry into the course is subject to a quota which is determined from time to time.

In the fourth year, students undertake a program of study which includes courses in the major areas of general psychology and in a number of applied fields. In addition, each student must complete either a research thesis or a group research project.

Details of the qualifications required for admission to the Psychology Course leading to the award of BSc, the course requirements for Pass and Honours at graduation and rules governing admission with advanced standing are given below.

Rules governing the Psychology Course

1. Applicants for admission to the Course must be matriculated to this University; and also have satisfied either the entrance requirements for 10.001 Mathematics 1 *or* 10.021B General Mathematics 1B and 10.021C General Mathematics 1C *or* for 17.031 Biology A and 17.041 Biology B.

2. (1) In order to qualify for admission to the award of degree of BSc in Psychology under these regulations a candidate must attend classes and satisfy the examiners in the following subjects:

(a) *Each of:*
12.100 Psychology 1
12.200 Research Methods 2
12.201 Basic Psychological Processes 2
12.202 Complex Psychological Processes 2
12.203 Psychology 2A

A total of 8 Level III units of Psychology including 12.300, 12.305 and *either* 12.304 *or* 12.322 from Group A (see Table 1). Additionally, students intending to take the research alternative in Psychology Level IV Honours are required to include 12.301 Research Methods 3B from Group B (see Table 1).

(In special cases, the Head of the School of Psychology or his representative may approve of the substitution of some other appropriate course or equivalent units.)

and either
12.400 Psychology 4 (Research — **3430**) *or* 12.401 Psychology 4 (Course Work — **3430**) leading to the award of the degree of Bachelor of Science in Psychology.

(b) Five other subjects (or their equivalent in units) selected to meet the following requirements:

(i) that they shall include *at least* one of:
10.011 Higher Mathematics 1 *or*
10.001 Mathematics 1 *or*
10.021B General Mathematics 1B *and* 10.021C General Mathematics 1C
or
17.031 Biology A *and*
17.041 Biology B.
(They may include both the above alternatives.)

(ii) that they shall include *at least* one of:

53.001 Introduction to Sociology *or*
15.001 Microeconomics 1 *and* 15.011 Macroeconomics 1 *or* Political Science 1 (select two of 54.1002 Power and Democracy in Australia, 54.1003 Australian Political Institutions (54.1002 and 54.1003 are mutually exclusive), 54.1004 Government in the Modern World and 54.1005 A History of Political Thought) *or*
52.103 Introductory Philosophy A *and* 52.104 Introductory Philosophy B.

or
with the approval of the Head of the School of Psychology, one other Arts I subject.

(iii) that they shall include at least one subject (two Science and Mathematics Level II units or twelve Arts Upper Level credit points are equivalent to one Level II subject) which together with the subject meeting the requirements of (i) or (ii) immediately above constitutes a recognized sequence of two courses.

Examples of recognized sequences are:

- 10.001 Mathematics 1, followed by two Mathematics Level II units (chosen from 10.111A, 10.1113, 10.1114, 10.2111 and 10.2112) or by both of 10.311A Probability and Random Variables and 10.311B Basic Inference;

- 17.031 Biology A and 17.041 Biology B followed by two Level II units chosen from the following units according to the regulations of the Board of Studies in Science and Mathematics:

  41.101 Biochemistry (equivalent to 2 units)
  41.111 Biochemical Control
  45.101 Biometry
  45.301 Vertebrate Zoology
  73.121 Physiology 1B (equivalent to 2 units)
  68.601 Genetics of Behaviour 1
  68.602 Genetics of Behaviour 2

- 53.001 Introduction to Sociology followed by twelve credit points value of Sociology Upper Level subjects

  15.001 Microeconomics 1 and 15.011 Macroeconomics 1 followed by twelve credit points value of Economics Upper Level subjects

  Political Science 1 followed by twelve credit points value of Political Science Upper Level subjects

  52.103 Introductory Philosophy A and 52.104 Introductory Philosophy B followed by twelve credit points value of Philosophy Upper Level subjects

(2) The proposed course must be approved by the Head of the School of Psychology or his representative prior to or during enrolment. The courses must be chosen in such a way as to fit in with the timetable.

(3) Progression in the Course shall be by subjects, and the subjects in the Course may be completed in any order consistent with the requirements concerning prerequisites and co-requisites for the subjects chosen.

3. *Prerequisites and Co-requisites*
Before enrolling in any course (or equivalent units of a subject) the student shall have attended the classes and shall have satisfied the examiners in all relevant prerequisite subjects.

The student should refer to the appropriate Faculty Handbook for a statement of subject prerequisities and/or co-requisites.

4. The degree of BSc in Psychology will be awarded at either Pass level or with Honours, after a minimum of four years of full-time study.

Rules governing admission to the Psychology Course with advanced standing

1. Graduates of the University of New South Wales may be admitted to the Psychology Course leading to the award of the degree of BSc 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 of the University of New South Wales who transfer from another course to the Psychology Course may be admitted to the Psychology Course with exemption in no more than seven Psychology Course subjects or their unit equivalents.

3. Graduates or undergraduates of other universities may be admitted to the Psychology Course with advanced standing.

4. Students admitted under Rule 3 who have satisfied the examiners in subjects of the same title or subject matter as those permissible in the Psychology Course may, subject to the approval of the appropriate Heads of School, be granted exemption in no more than five subjects, of which no more than two may be Psychology subjects.

Recommended Psychology Course patterns

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 such course is compulsory);

3. supporting studies in the social sciences (a minimum of one such course is compulsory); and

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

For these reasons, no course patterns are prescribed. The patterns to be completed by students who are admitted with advanced standing will take into account the subjects credited.

Students commencing university studies for the first time will arrange their pattern of supporting subjects in consultation with the Head of the School or his representative before completing enrolment.

In *Year 1*, students must take four subjects which include 12.100, either Biology 1 or a first-year Mathematics, one of Economics 1, Sociology 1, Philosophy 1 or Political Science 1 or one other Arts 1 subject, and a fourth subject. (It should be noted that the University has arranged these subjects so that there is no clash of timetables. If other subjects are taken, care must be taken to check that there is no timetable clash in the program that is chosen.)

In *Year 2* students take 12.200, 12.201, 12.202, 12.203, a second-year follow on subject from one of the non-Psychology subjects completed in Year 1, and one other Level I, II or III non-Psychology subject. Eight Level III units of Psychology are taken in *Year 3*, while *Year 4* consists of either 12.400 or 12.401 only.

Some examples of patterns, based on different supporting subjects are suggested below:

Compulsory Psychology Subjects

Year 1
12.100

Year 2
12.200, 12.201, 12.202, 12.203

Year 3
8 Psychology Level III units including 12.300, 12.305 and either 12.304 or 12.322 from Group A. Additionally, if intending to take the research alternative in Psychology 4 12.301 must be taken from Group B.

Year 4
Either 12.400 *or* 12.401

With Pure Mathematics or Statistics as the main supporting subject

Year 1
10.001 Mathematics 1
A Level I Social Science subject, *and*
One other Level I subject

Year 2
Either two units of Level II Pure and Applied Mathematics, *or* 10.311A and 10.311B Theory of Statistics Level II, *and*
One other Level I or II subject

With Biochemistry or Physiology as the main supporting subject

Year 1
2.121 Chemistry 1A and 2.131 Chemistry 1B
Either 10.001 Mathematics 1, *or* 10.021B General Mathematics 1B and 10.021C General Mathematics 1C, *and*
17.031 Biology A and 17.041 Biology B

Year 2
A Level I Social Science subject, and
Either 41.101 Biochemistry,
or 73.121 Physiology 1B

With Zoology or Genetics as the main supporting subject

Year 1
10.001 Mathematics 1, *or* 10.021B General Mathematics 1B and 10.021 General Mathematics 1C
17.031 Biology A and 17.041 Biology B, *and*
A Level I Social Science subject

Year 2
Either 45.101 Biometry, 45.201 Invertebrate Zoology, 45.301 Vertebrate Zoology and one other unit for Zoology, *or* 68.601 Genetics of Behaviour 1, 68.602 Genetics of Behaviour 2 and two other units for Genetics

With Social Sciences as the main supporting subject

Year 1
10.001 Mathematics 1, *or* 10.021B General Mathematics 1B and 10.021C General Mathematics 1C, *or*
17.031 Biology A and 17.041 Biology B
A Level I Social Science subject, *and*
One other Level I subject

Year 2
An Upper Level Social Sciences subject, *and*
One other Level I or II subject

Notes: 1. For details of Psychology units, and Science and Mathematics units, including pre- and co-requisites, refer to Table 1 of the Science and Mathematics Course details set out earlier in this handbook.
2. For details of Social Science (Arts) subjects, including pre- and co-requisites, refer to the Faculty of Arts Handbook.

Undergraduate Study
Faculty of Science

Introduction

The Schools of the Faculty of Science contribute programs to the Science and Mathematics Course (3970) and the Faculty supervises the undergraduate courses in Pure and Applied Chemistry (3910) and Optometry (3950) and the graduate diploma course Food and Drug Analysis (5510). The Schools of the Faculty also offer facilities for students to proceed to masters degrees in Chemistry (8770), Mathematics (8740), Optometry (8760), Physics (8730), Statistics (8750) and Master of Science and Society (8780), to the award of masters degrees by research and to the award of the degree of Doctor of Philosophy.

Students requiring information about the undergraduate course should contact the representative of the appropriate School:
School of Chemistry ..... Executive Assistant to Head of School
School of Optometry ..... Dr J. Alexander

Students requiring information about the graduate studies which are available should seek advice from:
Graduate Diploma in Food and Drug Analysis..... Associate Professor G. Crank
or
in the case of masters and doctors degrees from:
School of Chemistry ..... Associate Professor P. S. Clezy
School of Mathematics ..... Professor M. Cowling
School of Optometry..... Professor H. B. Collin
School of Physics ..... Associate Professor H. G. L. Coster

Course Outlines

Chemistry

3910
Pure and Applied Chemistry Course
Specialization in Chemistry

While some students will wish to include a small number of chemistry units in courses leading to major studies in other disciplines, there will be others who wish to specialize in chemistry to varying degrees.

1. *Major in Chemistry in the Science and Mathematics Course.* For purposes of graduation Science and Mathematics course regulations require students to study a minimum of four Level III units in related disciplines, such a combination being regarded as major study in that discipline or group of disciplines.

When studies in chemistry are required to be regarded as being major studies at least seven units of chemistry *must* be included after completing Level I Chemistry and these *must* include at least three of the four Level II units.

Students wishing to take 8 or more Level III Chemistry units are required to transfer to the Pure and Applied Chemistry Course (3910) before the commencement of Year 2. If Year 2 studied in the Science and Mathematics course is similar to Year 2 of Course (3910), the transfer may still be made before the commencement of Year 3.

2. *Pure and Applied Chemistry Course.* This course, which allows intensive specialization in chemistry according to a prescribed pattern, leads to the award of the Bachelor of Science degree, and is administered by the Faculty of Science. It may be taken at pass or honours standard. The pass course requires full-time attendance at the University for three years.

An additional year is required for the honours degree. The program may also be extended over a longer period (previously referred to as part-time).

A total of 23 units is required for graduation at the pass level. Year 1 is similar to the Science and Mathematics Course and covers 8 units. Of the remaining 15 units *at least 13* must be chemistry units and must include the following:

2.002A, 2.002B, 2.002D, 2.003B, 2.003C, 2.003D, 2.0003H, 2.013A, 2.042C and 4 other Chemistry units.

The remaining 2 units may be chosen from any of the Science and Mathematics course topics listed in Table 1.

In all cases prerequisites, co-requisites and exclusions are similar to those prescribed for the units in the Science and Mathematics course.

Electives offered by the School of Chemistry

Level	No.	Title	Prerequisites	Co-requisites	Excluded
II/III	2.003E	Nuclear and Radiation Chemistry	2.121 & 2.131, *or* 2.141 10.001 *or* 10.011 *or* 10.021B *and* 10.021C		
II/III	2.003H	Molecular Spectroscopy and Structure	2.121 & 2.131, *or* 2.141		

Level	No.	Title	Prerequisites	Co-requisites	Excluded
II/III	2.003K	Solid State Chemistry	2.121 & 2.131, *or* 2.141 *and* 10.001 *or* 10.011		
II/III	2.013A	Introductory Quantum Chemistry	1.001 *and* 2.121 & 2.131, *or* 2.141 *and* 10.001 *or* 10.011 *or* 10.021B *and* 10.021C		
III	2.003A	Physical Chemistry	2.002A		
III	2.003B	Organic Chemistry	2.002B		
III	2.003C	Inorganic Chemistry	2.042C		
III	2.003D	Instrumental Analysis	2.002D *and* 2.002A		
III	2.003L	Applied Organic Chemistry	2.002B	2.003B	2.033L
III	2.003M	Organo-metallic Chemistry	2.002B		
III	2.013B	Synthetic Organic Chemistry	2.003B		
III	2.013C	Advanced Inorganic Chemistry	2.042C	2.003C	
III	2.013D	Advanced Analytical Chemistry	2.002D	2.003D	
III	2.013E	Advanced Nuclear and Radiation Chemistry	2.003E		Not available in Course 3910
III	2.023A	Quantum Theory of Atoms and Molecules	2.002A *and* 10.2111 *and* 10.2112		
III	2.023B	Biological Organic Chemistry	2.003B		
III	2.033A	Physical Chemistry of Macro-molecules	2.003J *or* 2.002B *and* 1.012 *or* 2.002A		
III	2.043A	Environmental Chemistry	2.002A, 2.002D		
III	2.053A	Chemical Kinetics and Reaction Mechanisms	2.002A		
III	2.063A	Advanced Molecular Spectroscopy	2.013A		

3910
Pure and Applied Chemistry — Full-time Course

Bachelor of Science
BSc

Year 1		Hours per week
1.001	Physics 1	6
2.121 2.131 2.141	Chemistry 1A & Chemistry 1B *or* Chemistry 1M	6
10.011 10.001 10.021B 10.021C	Higher Mathematics 1 *or* Mathematics 1 *or* General Mathematics 1B & General Mathematics 1C	6
Plus one of		
5.010 5.020 5.030	Engineering A *and* Engineering B *or* Engineering C	6
	or	
17.031 17.041	Biology A *and* Biology B	6
	or	
25.110* 25.120**	Earth Materials and Processes *and* Earth Environment and Dynamics	6
	or	
27.818 27.819	Australian Environment and Human Response*** *and* Technology and Regional Change***	4

*Field work of up to 2 days is a compulsory part of the subject.
**Field work of up to 4 days is a compulsory part of the subject.
***Field work is a compulsory component of each unit.

Year 2

		Hpw
2.002A	Physical Chemistry	3
2.002B	Organic Chemistry	3
2.002D	Analytical Chemistry	3
2.003H	Molecular Spectroscopy and Structure	3
2.042C	Inorganic Chemistry	3
	Science Electives* (2 units)	6
	Two General Studies Electives	4
		25

*To be chosen from units in the Science and Mathematics course in accordance with Science course requirements. The following are recommended.

Chemistry

Any non-compulsory units for which prerequisites are held.

Mathematics

10.031	Mathematics	2
10.331	Statistics SS	2
10.111A		
10.1113		
and		
10.1114		
10.2111		
and		
10.2112		

Physics

Choose 2 of

1.9222	Electronics	3
1.9322	Introduction to Solids	
1.9422	Introduction to Physics of Measurement	

Biological Science

17.031	Biology A *and*	6
17.041	Biology B	
41.101	Biochemistry	12
44.101	Introductory Microbiology	6

Geology

25.110	Earth Materials and Processes *and*	6
25.120	Earth Environment and Dynamics	
25.211	Earth Materials 1	3
25.221	Earth Materials 2	3
25.212	Earth Environment 1	3
25.223	Earth Physics	3

Year 3

2.003B	Organic Chemistry	3
2.003C	Inorganic Chemistry	3
2.003D	Instrumental Analysis	3
2.013A	Introductory Quantum Chemistry	3
	Advanced Electives* (4 units)	12
		24

*Chosen from Level II/III or Level III units offered by the School of Chemistry in the Science and Mathematics course and in accordance with Science and Mathematics course regulations.

Year 4 Honours

2.004	Chemistry Honours	24

Extended Time Program

The course in Pure and Applied Chemistry may be extended over a longer period of time (previously referred to as part-time); however, evening instruction is not necessarily offered in all subjects.

This provision has been designed for students employed in the chemical industry, but employment in this industry is not obligatory for extending the time for the program of study.

A possible way in which this extended time program may be done over six years is set out below:

Stages 1 and 2

Two of the following subjects are taken in the first year and the other two in the second year (as directed).

		Hpw
1.001	Physics 1	6
2.121	Chemistry 1A *and*	6
2.131	Chemistry 1B *or*	
2.141	Chemistry 1M	
10.001	Mathematics 1 *or*	6
10.021B	General Mathematics 1B *and*	
10.021C	General Mathematics 1C	
Plus one of		
5.010	Engineering A *and*	6
5.020	Engineering B *or*	
5.030	Engineering C	
	or	
17.031	Biology A	6
	and	
17.041	Biology B	
	or	
25.110*	Earth Materials & Processes	6
	and	
25.120**	Earth Environment & Dynamics	
	or	
27.818	Australian Environment and Human Response***	4
	and	
27.819	Technological and Regional Change***	

*Field work of up to 2 days is a compulsory part of the subject.
**Field work of up to 4 days is a compulsory part of the subject.
***Field work (to be arranged by the School of Geography) is a compulsory component of each unit.

Stage 3

		Hpw
2.002A	Physical Chemistry	3
2.042C	Inorganic Chemistry	3
	Science Electives* (two units)	6
		12

*See footnote * under Year 2 full-time course.

Stage 4

2.002B	Organic Chemistry	3
2.002D	Analytical Chemistry	3
2.003H	Molecular Spectroscopy and Structure	3
	Two General Studies Electives	4
		13

Stage 5

2.003B	Organic Chemistry	3
2.003C	Inorganic Chemistry	3
2.003D	Instrumental Analysis	3
2.013A	Introductory Quantum Chemistry	3
		12

Stage 6

	Advanced Electives* (4 units)	12

*See footnote under Year 3 full-time course.

Honours

The requirements for admission to the honours course and the program of study are the same as for Year 4 of the full-time course. A student wishing to do honours over a longer period should consult the Head of the School of Chemistry. Students are, however, advised to make every effort to do the honours year full time.

Optometry

3950 Optometry Course

The School of Optometry 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. The first year of the course involves a study in the fundamental sciences of physics, chemistry, mathematics and biology. Students who have completed the first year of a science course including physics, chemistry, mathematics and general and human biology or zoology at any Australian university are eligible for selection for admission to the second year of the course. Second, third and fourth years are devoted to professional training in optometry including clinical optometry in the final year.

3950 Optometry — Full-time Course

Bachelor of Optometry BOptom

Year 1

		Hours per week
1.001	Physics 1	6
2.121	Chemistry 1A *and*	
2.131	Chemistry 1B *or*	6
2.141	Chemistry 1M	
10.001	Mathematics 1 *or*	
10.011	Higher Mathematics 1 *or*	6
10.021B	General Mathematics 1B *and*	
10.021C	General Mathematics 1C	
17.031	Biology A *and*	6
17.041	Biology B	
		24

In special cases, students who do not meet the prerequisites for admission to 2.121 Chemistry 1A may be enrolled in 2.111 Introductory Chemistry in Session 1, 2.121 Chemistry 1A in Session 2 and be permitted to carry 2.131 Chemistry 1B into Session 1 of Year 2.

Year 2

31.811	Optometry 1	10
31.821	Anatomy and Physiology of the Eye and Visual System	6
73.011A	Principles of Physiology	6
	General Studies Elective	2
		24

Year 3

12.100	Psychology 1	5
31.812	Optometry 2	15
31.831	Diseases of the Eye	3
	Two General Studies Electives	4
		27

Year 4

Full Year		S1	S2
12.741	Psychology (Optometry)	2	2
31.813	Optometry 3	6	6
31.841	Clinical Optometry	15	15
Session 2			
74.001	Indications for Medical Referral	0	1
		23	24

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

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 a person may be admitted under these rules if he or she 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.

Undergraduate Study:

Subject Descriptions

Identification of Subjects by Number

A subject is defined by the Professorial Board as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

Each approved subject of the University is identifiable both by number and by name as this is a check against nomination of subject other than the one intended.

Subject numbers are allocated by the Registrar and the system of allocation is based on the following guidelines:

1. The authority offering the subject, normally a School of the University, is indicated by the number before the decimal point.

2. Each subject number is unique and is not used for more than one subject title.

3. Subject numbers which have not been used for some time are not used for new subject titles.

4. Graduate subjects are indicated by a suffix 'G' to a number with three digits after the decimal point. In other subjects three or four digits are used after the decimal point.

Subjects taught are listed in full in the handbook of the faculty or board of studies responsible to the particular course within which the subjects are taken. Subject descriptions are contained in the appropriate section in the handbooks.

The **identifying numerical prefixes** for each subject authority are set out below.

Servicing Subjects are those taught by a school or department outside its own faculty, and are published at the end of the entry for the relevant school. Their subject descriptions are also published in the handbook of the faculty in which the subject is taught.

HSC Exam Prerequisites

Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range refer to the **1978 and subsequent Examinations.**

Candidates for enrolment who obtained the HSC in previous years or hold other high school matriculation should check with the appropriate school on what matriculation status is required for admission to a subject.

Information Key

The following is the key to the information which may be supplied about each subject: S1 (Session 1); S2 (Session 2); F (Session 1 *plus* Session 2, ie full year); S1 or S2 (Session 1 *or* Session 2, ie choice of either session); SS (single session, ie which session taught is not known at time of publication); L (Lecture, followed by hours per week); T (Laboratory/ Tutorial, followed by hours per week); Sem (Seminar, followed by hours per week) hpw (hours per week); C (Credit *or* Credit units), CR (Credit Level), DN (Distinction); R (after subject number) Broken Hill syllabus.

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32	Centre for Biomedical Engineering	Engineering	
35	School of Building	Architecture	
36	School of Town Planning	Architecture	
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38	School of Food Technology	Applied Science	
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	School, Department etc	Faculty	Page
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75	School of Obstetrics and Gynaecology	Medicine	
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78	School of Medical Education	Medicine	
79	School of Community Medicine*	Medicine	181
80	Faculty of Medicine*	Medicine	182
81	Medicine/Science/Biological Sciences	Medicine	
85	Australian Graduate School of Management	AGSM	
90	Faculty of Law	Law	
97	Division of Postgraduate Extension Studies		

Physics

Physics Level I Units

1.001 Physics 1 — F L3T3

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Mathematics or	*71-100*
3 unit Mathematics or	*21-100*
4 unit Mathematics	*1-100 or*
and	*(for 1.001 only) 10.021B*
2 unit Science (Physics) or	*31-100*
2 unit Science (Chemistry) or	*31.100*
4 unit Science (Multistrand)	*31.100*

Co-requisite: 10.021C or 10.001 or 10.011.

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Aims and nature of physics and the study of motion of particles under the influence of mechanical, electrical, magnetic and gravitational forces. Concepts of force, inertial mass, energy, momentum, charge, potential, fields. Application of the conservation principles to solution of problems involving charge, energy and momentum. Electrical circuit theory, 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. The wave theories of physics, transfer of energy by waves, properties of waves. Application of wave theories to optical and acoustical phenomena such as interference, diffraction and polarization.

1.021 Introductory Physics 1 (For Health and Life Scientists) — F L3T3

Prerequisites: None. Co-requisites: 10.021A & 10.021B, or 10.021B & 10.021C, or 10.001 or 10.011.

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, electronics, geometrical optics, optical instruments, wave optics, microscopes and their uses.

1.041 Laboratory Computers in Physical Sciences — S1 or S2 L2T4

Prerequisites: As for 1.001. Co-requisite: 10.001, and 1.021 or 1.001 or 1.011. Excluded: Programs 0601, 0610 & 0611, 6806.

Fundamentals of binary logic, binary arithmetic, arithmetic operations as logical algorithms. Electronic logic devices, principles of computer operation, microprocessors and microcomputer architecture. Machine language and BASIC programming in microcomputers. Fundamentals of real world interfacing techniques, flow of data and control across the interface. Mathematical modelling of the real world in BASIC, iteration and simulation techniques, laboratory experiments collecting real world data via an interface and analysing it in the microcomputer. The developing role of the laboratory computer in scientific research.

1.061 Computer Applications in Experimental Science 1 — S2 L2T4

Prerequisites: 6.611. Co-requisite: 1.001, 10.001 or 10.011. Excluded: 1.041, 1.042.

Review of binary logic variables, arithmetic operations as logical algorithms on binary variables, computer architecture and machine language instruction sets. Microprocessor and microcomputer architecture; Apple II microcomputer architecture, disc operating system, graphics, languages. Computer modelling of real physical systems iterative techniques. Fundamentals of interfacing, data and control flow across the interface. Transducers, encoding. Data collection techniques used in Experimental Sciences. Labratory experiments involving direct data collection via interfaces, data reduction and comparison with computer models. The developing role of the laboratory computer in experimental science.

Physics Level II Units

1.002 Mechanics, Waves and Optics — S1 L3T1

Prerequisites: 1.001 or 1.011, 10.001 or 10.011. Co-requisite: 10.2111. Excluded: 1.992, 10.4111, 10.4211.

Harmonic motion, systems of particles, central force problems, Lagrange's equations, coupled oscillations, travelling waves, pulses, energy and momentum transfer, polarization, birefringence, interference, thin films, gratings, lasers, holography, fibre optics, Faraday effect, photoelasticity.

1.012 Electromagnetism and Thermal Physics — S2 L3T1

Prerequisites: 1.001 or 1.011, 10.001 or 10.011. Co-requisite: 10.2111. Excluded: 1.972.

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.

1.022 Modern Physics **F L1½T½**

Prerequisites: 1.001 or 1.011, 10.001 or 10.011. Co-requisite: 10.2112. Excluded: 1.9322, 1.982.

Special theory of Relativity: time dilation, length contraction, simultaneity, Lorentz transformations, energy and mass. Photon properties, de Broglie relations, Uncertainty principle, operators in quantum mechanics, postulates of quantum mechanics, potential wells, steps and barriers, harmonic oscillator, H atom, angular momentum, magnetic moment, electron spin, nuclear spin. Atomic and molecular spectra, lasers, quantum statistics, free electron model of a metal, band theory; nuclear size, density, mass; nuclear models, fission and fusion, nuclear forces.

1.032 Laboratory **F T3**

Prerequisites: 1.001 or 1.011, 10.001. Excluded: 1.9222.

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

1.0522 Methods in Mathematical Physics **S1 L1½T½**

Prerequisites: 1.001 or 1.011 and 10.001 or 10.011. Co-requisites: 10.2111 or 10.2211 and 10.2112 or 10.2212. Excluded: 1.052.

Differential and integral equations in physics. Fourier series and transform. Distributions (statistics, quantum mechanics). Legendre and Laguerre polynomials (hydrogen atom). Orthonormal functions. Integral equations, infinite matrices. Potential equation, Green's Theorem and functions. Waves, group velocity.

1.062 Computer Applications in Experimental Science 2 **S1 L2T3**

Prerequisites: 1.061 or 1.041. Excluded: 1.042.

Interface between computer and experiment, programmed and interrupt interaction, direct and dual port memory access concepts, hardware, software and timing restraints. Real-world variables, transducers and conversion to binary representation, converters and counters, signals and noise. Data collection, reduction and storage as digital matrices. Numerical modelling, analysis and elementary control of a system.

Terminating Physics Level II Units

1.9222 Electronics **S1 L1T2**

Prerequisites: 1.001 or 1.001 or 1.021. Excluded: 1.032.

The application of electronics to other disciplines. Includes: principles of circuit theory and analogue computing; amplifers, their specification and application, transducers; electronic instrumentation; industrial data acquisition.

1.9322 Introduction to Solids **S2 L2T1**

Prerequisites: 1.001 or 1.011 or 1.021. Excluded: 1.022, 4.402, 4.412.

Introductory quantum mechanics and atomic physics; crystal structure; point and line defects; introductory band theory; conductors, semi-conductor and insulators; energy level diagrams.

1.9422 Introduction to Physics of Measurement **S1 L1½T1½**

Prerequisites: 1.001 or 1.011. Excluded: 1.042

Resolution; accuracy and sensitivity of instruments, errors of observation; experimental design; transducers; thermometry; electrical noise; servo systems; mechanical design of apparatus; optical instruments; optical fibres; photometry; calorimetry; analogue to digital conversion and digital instruments; measurement of very large and very small quantities.

Physics Level III Units

1.0133 Quantum Mechanics **S1 L1½T½**

Prerequisites: 1.022, 10.2112. Excluded: 2.023A, 10.222F, 1.013.

Revision of basic concepts, harmonic oscillator systems, spherically symmetric systems, angular momentum, H atom, first-order perturbation theory, identical particles, Exclusion Principle, atomic structure, spin-orbit coupling, Helium atom, introductory quantum theory of molecules.

1.0143 Nuclear Physics **S2 L1½T½**

Co-requisite: 1.0133. Excluded: 1.013.

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.

1.023 Statistical Mechanics and Solid State Physics **S1 L3T1**

Prerequisites: 1.012, 1.022, 10.2112.

Canonical distribution, paramagnetism, Einstein solid, ideal gas, equipartition, grand canonical ensemble, chemical potential, phase equilibria, Fermi and Bose statistics, Bose condensation, blackbody radiation. Crystal structure, bonding, lattice dynamics, phonons, free-electron models of metals, band theory, point defects, dislocations.

1.0333 Electromagnetism **S1 L1½T½**

Prerequisites: 1.012, 10.2111, 10.2112. Excluded: 10.222C, 1.033.

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

1.0343 Advanced Optics **S2 L1½T½**

Co-requisite: 1.002. Excluded: 1.033.

Fresnel and Fraunhofer diffraction, Fourier transforms, filtering, coherence length and time, stellar interferometers, laser theory, nonlinear optics.

1.043 Experimental Physics A **F T4**

Prerequisite: 1.032.

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).

1.0533 Experimental Physics B1 **S1 T4**

Prerequisite: 1.032. Excluded: 1.053.

Selected experiments and projects. Advanced experimental techniques and open ended projects in the areas covered in 1.043 Experimental Physics A together with projects involving electron and nuclear magnetic resonances, low temperature physics and superconductivity. Fourier optics, holography.

1.0543 Experimental Physics B2 **S2 T4**

Prerequisite: 1.032. Excluded: 1.053.

As for 1.0533 Experimental Physics B1.

1.1133 Advanced Quantum Mechanics **S2 L1½T½**

Co-requisite: 1.0133. Excluded: 2.023A, 10.222F.

Formal structure, matrix formalism, relativistic quantum mechanics, spin, scattering theory, Born approximation, phase shifts, many particle systems, occupation number formalism.

1.133 Electronics **S1 L2T4**

Prerequisites: 1.9222 or 1.032.

Extension of AC circuit theory. Revision of transistors, parameters, multi-stage discrete amplifiers, bias, coupling, stability. Positive feedback, oscillators, integrated amplifiers, properties. Negative feedback. Regulated power supplies. Narrow band amplifiers, power and pulse amplifiers. Modulation, AM FM chopper amplifiers. Pulse circuits, gates, flip-flops, scalers, Schmitt trigger, integrated circuits. Thyristors.

1.1433 Biophysics **S1 L2T1**

Prerequisites: 1.012, 1.022.

Thermodynamics in biology, electrochemical potentials, Donnan equilibrium, irreversible processes, diffusion and applications to biological systems. Membrane potentials, Nernst potential, Goldman and Nernst-Planck equation, generalized approach. Active transport. Membrane structure. The nerve impulse, activation and inactivation, Hogkin and Huxley equations. Muscle, contractive process, thermodynamics. Ecological ensemble theory, global thermodynamics interaction of species, ecological associations.

1.1533 Biophysical Techniques **S2 L2T1**

Prerequisites: 1.012, 1.022, 1.032.

The theory and application of physical techniques of relevance to the study of biological systems. Techniques considered may include optical and electron microscopy X-ray and neutron diffraction, magnetic resonance, lasers, light scattering, calorimetry, fluorescence, electrochemical techniques and electrophysiological methods and dielectric measurements.

1.1633 Astrophysics **S2 L1½T½**

Prerequisites: 1.022.

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.

1.1733 Conceptual Framework of Physics **S2 L2T1**

Prerequisites: 1.012, 1.022. Co-requisites: 1.0133, 1.023.

Physics and metaphysics, the place of speculation in theory formation. Space and time, coordinate systems, nature of time. Fundamental physical phenomena, electrical, gravitational, inertial, nuclear phenomena, entropy and probability. Field theory, formulation, action at a distance, propagation, energy. Relativity, postulates, simultaneity, limiting speeds, mass energy. Relationship between micro and macrocosmos, statistics, entropy and information, arrow of time. Matter and anti-matter and energy, conservation laws, inertial mass, field energy. Quantum processes, granularity, measurements and uncertainty principle, determinism versus indeterminism, nuclear phenomena.

1.3033 Mechanical Properties of Materials **S1 L1½T½**

Co-requisite: 1.023. Excluded: 4.403.

Properties of materials in relation to their structure: atomic and molecular structure of solids; elasticity, inelasticity, long-range (rubber) elasticity, viscoelasticity; plasticity; brittle fracture; viscosity and surface tension of liquids; adhesion; friction and lubrication.

1.3133 Electrical, Optical and Thermal Properties of Materials **S2 L1½T½**

Co-requisite: 1.023.

Review of electronic structure and lattice vibrations in crystalline materials. electrons and holes in semiconductors. Solid state devices. Photoconductivity. Optical absorption. Luminescence. Dielectric and magnetic phenomena. Thermal expansion and thermal conductivity.

1.3233 Measurement and Non-destructive Testing **S1 L1½T½**

Prerequisite: 1.032.

Design and analysis of experiments. Dynamics of measurement systems, 1st and 2nd order response, introduction to servomechanisms. Metrology, standards legislation. Techniques of mechanical, thermal, optical, photometric, fluidic and acoustic measurement. Introduction to nondestructive testing: radiography, surface crack and flaw detection, acoustic emission, magnetic and eddy current methods, acoustic spectroscopy.

1.3333 Applications of Radiation — S2 L1½T½

Co-requisites: 1.0333, 1.0343.

The present and potential uses of electro-magnetic radiation over the whole spectrum. Microscopy, interferometry and optical spectroscopy. Applications of thermal radiation, microwaves, radio waves, polarized light. Principles and applications of lasers. Holography, X-ray spectroscopy, diffractometry and radiography. Special radiation sources and detectors.

1.3533 Marine Acoustics — S1 L1½T½

Wave theory: general wave equation for fluids, viscoelastic media and solids. Travelling and standing wave solutions. Wave guides: fluid and solid wave guides, ray and mode theories. Sound transmission in the ocean and application of reflection and refraction theory, scattering and diffraction effects.

1.5133 Classical Mechanics and Field Theory — S1 L1½T½

Prerequisites: 1.002 or 10.411B, 10.1113, 10.2111, 10.2112.

Lagrange's equations and applications, variational principles, Hamiltonian formulation, canonical transformations, Poisson brackets, Hamilton-Jacobi equation, continuous systems and fields.

1.5233 Electrodynamics — S2 L1½T½

Prerequisites: 1.022, 10.1113, 10.2111, 10.2112. Co-requisite: 1.0333. Excluded: 10.222C.

Special relativity, covariant formulation of electrodynamics, stress tensor, radiation from moving charges, Lienard-Wiechert potentials, synchrotron radiation, bremsstrahlung, electro-magnetic mass, radiative damping, multipole expansion for fields, scattering.

1.5333 Radiation and Matter — S2 L1½T½

Prerequisites: 1.012, 1.022, 10.2111, 10.2112. Co-requisites: 1.0133 or 10.222F or 2.023A, 1.0333 or 10.222C.

The interaction of electromagnetic radiation with matter. Blackbody radiation; Einstein coefficients. Dipole radiation; shape and broadening of spectral lines. Quantum mechanical transition probabilities. Propagation and dispersion of radiation. Scattering theory. Radiative transfer.

1.5433 Plasmas and Laser Fusion — S1 L1½T½

Prerequisites: 1.012, 1.022. Excluded: 1.513.

Microscopic and macroscopic descriptions of plasma, electromagnetic waves in plasma, stress tensor, ponderomotive force, laser-plasma interactions, momentum transfer and instabilities, non-linear force, self-focussing mechanisms, laser induced nuclear fusion, theoretical and experimental progress and prospects.

1.5533 General Relativity — S2 L1½T½

Prerequisites: 1.012, 1.022, 10.1113, 10.2111, 10.2112. Excluded: 1.523.

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.

1.713 Advanced Laser and Optical Applications — F L1½T½

Co-requisite: 1.002. See also Table 1.

Laser operation, characteristics, theory, design of such types as gas, ion, molecular, excimer and dye lasers. Filter design, multiple beam interference, etalon use, dielectric mirror design. Modulators, theory and application, electro and acousto optic phenomena. Detectors, types, basic theory and design. Solid state and vacuum tube systems. Non-linear optics, theory and applications. A design study and case history of a typical optical system. Materials processing fundamentals. Laser safety.

1.763 Laser and Optical Technology Laboratory 1 — F L½T3½

Prerequisite: 1.032. See also Table 1.

Aims to make students conversant with the techniques employed in advanced laser technology and to become familiar with the various components used in such applications. Includes: a study of advanced optical techniques including the construction, operation and characterization of various types of laser; preparation and investigation of optical, electro-optical and other related devices in terms of their basic behaviour and with respect to applications in complex optical systems; a small lecture content on a variety of topics relating to laser applications and including safety aspects.

1.773 Laser and Optical Technology Laboratory 2 — F T4

Co-requisite: 1.763. See also Table 1.

This laboratory unit extends the work of the 1.763 unit in providing further experience with advanced optical systems. Students visit external establishments where lasers are being used for commercial purposes and are involved with experimental tasks related to these high technology applications. Session 2: each student is required to complete a design study and assembly of an advanced optical system selected to answer a specific problem appropriate to the subject.

Physics Level IV Units

All Physics honours courses consist of lecture units and project work. Some of the lecture units of which quantum mechanics, statistical mechanics and solid state physics are examples, are taken by all students. Other units which are considered particularly relevant to the type of honours chosen are also prescribed. The actual list of topics in this second category varies from time to time and is partly influenced by student numbers and interest. Examples of such units are given below under each honours subject heading. The project work may be experimental or theoretical and forms a very significant part of each course. Usually two projects are undertaken during the year of study.

Students whose academic records are satisfactory are invited to enrol in the honours year. Full details of courses and projects are then supplied. The approval of the Head of School is required for each program of study.

1.104 Physics 4 (Honours)

Students doing this honours course should enrol in the single subject 1.104 only. Examples of specific lecture units which may be offered include: astronomy, additional topics in solid state physics, lasers, biophysics etc.

1.304 Applied Physics (Honours)

Students doing this honours course should enrol in the single subject 1.304 only. Examples of specific lecture units which may be offered include: physical principles of instrumentation, applied solid state physics, physics of materials etc.

1.504 Theoretical Physics 4 (Honours)

Students doing this honours course should enrol in the single subject 1.504 only. Examples of specific lecture units which may be offered include: quantum theory of solids, plasma theory, quantum electrodynamics.

1.604 Biophysics 4 (Honours)

Students taking this honours course should enrol in the single subject 1.604 only. Biophysics, statistical mechanics and solid state physics are examples of prescribed units. Additional lecture units may be selected from those on offer in other Physics honours courses and from Biochemistry and Physiology.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Arts Handbook.

1.901 Astronomy — S1 or S2 L2T2

Involves an overview of Astronomy, from the Solar System to the galaxies. Includes an exploration of the Solar System, to indicate the advances that have been made, particularly and most recently with space probes, in our understanding of planetary systems. The characteristics of stars discussed along with their use in establishing an understanding of stellar evolution. The treatment of galaxies includes consideration of the nature of our galaxy and its relation to other external systems, concluding with a brief discussion of aspects of observational cosmology. Discussion of such recent topics as black holes, pulsars, quasars.

For further information regarding the following subject see the Faculty of Architecture Handbook.

1.931 Physics 1 (Building) — S2 L2T2

4 credit points; compulsory. Prerequisites: nil.

Mechanics of solids: kinematics. Newton's Law of motion, work and energy. Atomistic description of mechanical properties of matter. Atomic structure of matter. Elasticity. Plasticity: dislocations, fracture, viscosity. Electrostatics, electromagnetism and DC circuits: Coulomb's Law. Electric field. Electric potential. Capacitance. Electrical energy sources. Conductors. Resistivity. Atomic view of conduction. EMF. Kirchoff's Laws. Magnetic induction. Torque on a coil in magnetic field. Moving coil meter. Wheatstone's bridge. Potentiometer. Faraday's Law. Transient circuits.

Wave motion, heat light and sound: simple harmonic motion. Wave motion. Interference, Doppler effect. Energy transfer. Heat, heat capacity. Joule's equivalent. Thermometry. Convection. Conduction. Radiation. Black body. Emittance. Absorptance. Light. Electro-magnetic spectrum. Huygens' Principle. Curved mirrors. Lenses. Dispersion. Interference. Polarization. Photometry. Colorimetry Sound. Longitudinal waves. Overtones. Intensity levels. Decibels. Quality of sound.

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

1.951 Physics 1 (Mechanical Engineering) — F L2T2

Prerequisites: As for 1.001 Physics 1.

For students in the School of Mechanical Engineering.

Physical properties of solids, liquids and gases: microscopic theory of elasticity, friction, fracture in solids, viscosity in liquids and kinetic theory of gases. Dynamics of solids and fluids: Newton's laws, energy and momentum conservation, rotational mechanics, fluid mechanics. Compressional waves: acoustics. Thermostatic properties of matter: concepts of thermodynamics, thermal properties of liquids and solids. Electric fields and currents: electrostatics, direct-current circuits. Electromagnetism: magnetic forces and fields, electro-magnetic induction. Non-steady electric currents, transients in RC, LR and LC circuits, alternating-current circuits. Optics: geometric optics, optical instruments, interference and diffraction, polarization.

1.961 Physics 1 (Electrical Engineering) — F L3T3

Prerequisite: As for 1.001 Physics 1.

For students in the School of Electrical Engineering.

Electrostatics in vacuum, electrostatics in dielectrics, steady state currents, magnetostatics in vacuum, ferromagnetism, electromagnetic induction, transient currents. Vectors, motion in one dimension, motion in a plane, particle dynamics, work and energy, the conservation of energy, conservation of linear momentum, collisions, rotational kinematics, rotational 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.

1.971 Physics 1 (Surveying) — F L3T3

Prerequisite: As for 1.001 Physics 1.

For students in the School of Surveying.

Aims and nature of physics, linear and rotational mechanics, hydrostatics, elasticity, gravitation, temperature, electricity and magnetism, wave motion, optical instruments, interference and diffraction, lasers and atomic clocks. The importance in surveying of precise frequency, time, speed and distance measurements.

1.981 Physics 1 (Civil Engineering) — S1 L2T2 and S2 L2T1

Prerequisite: As for 1.001 Physics 1.

For students in the School of Civil Engineering.

Aims of physics and its relation to civil engineering. Mechanical concepts, properties of matter, atomic structure, elasticity, plasticity, fracture of solids; surface tension and viscosity of fluids, electrical and magnetic forces, electromagnetism, DC and AC circuits, digital electronics. Simple harmonic motion and its relation to wave motion. Acoustic and mechanical waves, attenuation, velocity of propagation. Elastic moduli. Non-destructive testing, instrumentation, techniques and theory. Emphasis on the physics involved in non-destructive testing and the aspects of vibration important to civil engineering.

1.962 Physics of Measurement (Surveying) — S1 L1T2

Prerequisite: 1.971.

For students in the School of Surveying.

Resolution, accuracy and sensitivity of instruments. Errors of observation and their treatment. Experimental design. Displacement transducers. Transducers for other mechanical quantities. Thermometry. Electrical noise. Dynamic response of measuring systems. Servosystems. Mechanical design of apparatus. Microscopes, telescopes and other optical instruments. Lenses, optical fibres and other optical components. Photometry. Colorimetry. Measurements under adverse ambient conditions. Analogue-to-digital conversion. Digital instruments. Measurements of very large and very small quantities.

1.972 Electromagnetism (Electrical Engineering) — S1 or S2 L2T2

Prerequisite: 1.961 or 1.001 or 1.011, 10.001. Co-requisites: 10.2111, 10.2112. Excluded: 1.012.

Electrostatics in vacuum, Eiectrostatics in Dielectrics, electric currents, magnetostatics in vacuum, magnetic scalar potential, magnetostatics in magnetic media, time varying fields, Maxwell's equations.

1.982 Solid State Physics (Electrical Engineering) — S1 or S2 L2½T2

Prerequisite: 1.961 or 1.001 or 1.011, 10.001. Co-requisites: 10.2111, 10.2112. Excluded: 1.022, 1.9322.

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.

1.992 Mechanics and Thermal Physics (Electrical Engineering) — F L1½T½

Prerequisite: 1.961, 10.001 or 10.011. Co-requisites: 10.2111. Excluded: 1.002, 1.012.

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.

Chemistry

Students wishing to take 8 or more Level III Chemistry units are required to transfer to the Pure and Applied Chemistry Course (3910) before the commencement of Year 2. If Year 2 studied in the Science and Mathematics course is similar to Year 2 of Course 3910, the transfer may still be made before the commencement of Year 3.

The Pure and Applied Chemistry Course which enables specialization in Chemistry is described in detail earlier in this handbook.

Chemistry Level I Units

2.111 Introductory Chemistry — S1 L2T4

Prerequisite: Nil.

Note: Students who have passed 2.121 or 2.131 may not enrol in 2.111 or 2.141. Students meeting the 2.121 or 2.141 prerequisite are not permitted to enrol in 2.111 without the permission of the Head of the School of Chemistry. Students who enrol in 2.111 must pass 2.111 before they can proceed to 2.121 or 2.131 or 2.141.

Classification of matter and the language of chemistry. The gas laws and the Ideal Gas Equation, gas mixtures and partial pressure. The structure of atoms, cations and anions, chemical bonding, properties of ionic and covalent compounds. The periodic classification of elements, oxides, hydrides, halides and selected elements. Acids, bases, salts, neutralization. Stoichiometry, the mole concept. Electron transfer reactions. Qualitative treatment of reversibility and chemical equilibrium, the pH scale. Introduction to the diversity of carbon compounds.

2.121 Chemistry 1A — S1 or S2 L2T4

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Mathematics or*	*71-100*
3 unit Mathematics or	*21-100*
4 unit Mathematics	*1-100*
and	
2 unit Science (Physics) or	*31-100*
2 unit Science (Chemistry) or	*31-100*
4 unit Science (multistrand) or	*31-100*
2 unit Science (Geology) or	*51-100*
2 unit Science (Biology)	*51-100*
or	
2.111.	

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Stoichiometry and solution stoichiometry. Properties of gases; kinetic molecular theory. Thermochemistry. Atomic structure, electron configurations and the periodic table. Types of chemical bonds, electronegativity, molecular geometry. Periodicity of physical and chemical properties of common representative elements and compounds.

Liquids and solids, changes of state, phase diagrams. Types of solids. Solutions and their properties. Colloids. Facts and theories about reaction kinetics.

Note: Students who have passed 2.121 or 2.131 may not enrol in 2.111 or 2.141. Students meeting the 2.121 or 2.141 prerequisite are not permitted to enrol in 2.111 without the permission of the Head of the School of Chemistry. Students who enrol in 2.111 must pass 2.111 before they can proceed to 2.121 or 2.131 or 2.141.

2.131 Chemistry 1B — S1 or S2 L2T4

Prerequisite: 2.121.

Chemical equilibrium, equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria; buffers, titrations, chemical analysis. Oxidation and reduction reactions, electrode potentials. Chemical thermodynamics, entropy, free energy. Chemistry of carbon compounds, stereoisomerism; alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines.

Note: Students who have passed 2.111 may be permitted to enrol in 2.131 on application to the Head of the School of Chemistry.

2.141 Chemistry 1M — F L2T4

Prerequisites:

	HSC Exam Percentile Range Required
*2 unit Mathematics**	*71-100*
3 unit Mathematics	*21-100*
4 unit Mathematics	*1-100*
and	
2 unit Science (Physics) or	*51-100*
2 unit Science (Chemistry) or	*51-100*
4 unit Science (multistrand) or	*51-100*
2 unit Science (other than Physics or Chemistry)	*51-100*
or	
2.111	

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Note: As for *Note,* 2.121 Chemistry 1A.

The syllabus is an integrated one of 2.121 and 2.131 (see above). Students majoring in Chemistry may take 2.141 in lieu of 2.121 and 2.131.

Chemistry Level II Units

2.002A Physical Chemistry — S1 or S2 L3T3

Prerequisites: 2.121 & 2.131, or 2.141; and 10.011 or 10.001 or 10.021B & 10.021C.

Thermodynamics: first, second and third laws of thermodynamics; statistical mechanical treatment of thermodynamic properties; applications of thermodynamics: chemical equilibria, phase equilibria, solutions of nonelectrolytes and electrolytes, electrochemical cells. Kinetics: order and molecularity; effect of temperature on reaction rates; elementary reaction rate theory. Surface chemistry and colloids: adsorption, properties of dispersions; macromolecules and association colloids.

2.002B Organic Chemistry — F or S2 L3T3

Prerequisite: 2.131 or 2.141.

Chemistry of the more important functional groups; aliphatic hydrocarbons, monocyclic aromatic hydrocarbons, halides, alcohols, phenols, aldehydes, ketones, ethers, carboxylic acids and their derivatives, nitro compounds, amines and sulphonic acids.

2.002D Analytical Chemistry — SS L2T4

Prerequisites: 2.121 & 2.131, or 2.141; and 10.001 or 10.011 or 10.021B & 10.021C.

Chemical equilibria in analytical chemistry. Acid-base, complex formation, redox systems, solid/solution, and liquid/liquid equilibria with applications to volumetric, gravimetric and complexometric analysis, and to liquid/liquid extractions. Spectrophotometry, basic principles. Chromophores. Fundamentals of precision. Electrochemistry, theory and applications to electrodeposition and potentiometry; ion selective electrodes. radioactive tracer techniques. Data evaluation in analytical chemistry. Qualitative analysis.

2.042C Inorganic Chemistry — SS L2T4

Prerequisites: 2.121 & 2.131, or 2.141.

Chemistry of the non-metals including B, C, Si, N, P and S. Chemistry of the metals of groups 1A, 2A, and Al. Typical ionic, giant-molecule and close-packed structures. Transition metal chemistry, including variable oxidation states, paramagnetism, Werner's theory, isomerism of six and four-coordinate complexes, chelation, stabilization of valency states. Physical methods of molecular structure determination. Chemistry of Fe, Co, Ni, Cu, Ag, Au and Hg.

Chemistry Level II/III Units

2.003E Nuclear and Radiation Chemistry — F or S1 or S2 L2T4

Prerequisites: 2.121 & 2.131, or 2.141; and 10.001 or 10.011 or 10.021B & 10.021C.

Fundamental particles, nuclear structure and properties. Nuclear transformations. Properties of nuclear radiations. Interaction of radiation with matter. Detection and measurement of nuclear radiations. Nuclear pulse spectrometry. Nuclear instrumentation. Radiation chemistry: primary and secondary processes in the absorption of ionizing radiation in gases, liquids and solids. Free radical detection and reactions. Technological applications and techniques. Preparation of radionuclides in high energy machines and nuclear reactors. Radiochemical techniques. Handling precautions. Chemistry of nuclear transformations. Chemistry of reactor fuel cycles. Applications of radionuclides in chemistry, biology and industry.

2.003H Molecular Spectroscopy and Structure — S2 L3T3

Prerequisite: 2.121 & 2.131, or 2.141.

Absorption and emission of radiation. Atomic spectra. Molecular spectroscopy: vibrational, including infrared and Raman; UV-visible; instrumentation and sample handling. Magnetic resonance. Mass spectometry with particular reference to structure determination. Laboratory and tutorial work to illustrate the above, including inspection of major instruments.

2.003K Solid State Chemistry — SS L2T4

Prerequisites: 2.121 & 2.131, or 2.141; and 10.001 or 10.011.

The determination of crystal structures by single crystal diffraction: X-ray and neutron diffraction methods. Practical and automated aspects of the solution of crystal structures: applications to inorganic, molecular and macromolecular crystals. Patterns of solid state structure: the structures of crystals with unusual and valuable chemical and physical properties. Solid state reactions, surface properties and catalysis. Applications of EPR, NMR and mass spectrometry.

2.013A Introductory Quantum Chemistry — S1 L2T4

Prerequisites: 1.001; 2.121 & 2.131, or 2.141; and 10,001 or 10.011 or 10.021B & 10.021C.

Quantum mechanical concepts. Particle in a box. Rotational and vibrational motions — spectra. The hydrogen atom. Angular momentum. Many electron atoms; effects of electron spin; atomic spectra. Molecular spectroscopy and valence; electronic structure and spectra of molecules. The Frank-Condon principle. Delocalization; Hückel M. O. theory. Ligand field theory. Photoelectron spectroscopy. Magnetic resonance: basic principles and experimental techniques; spin density effects in ESR spectra; theory of nuclear shielding and spin-spin coupling; relaxation processes.

Chemistry Level III Units

2.003A Physical Chemistry — SS L3T3

Prerequisite: 2.002A.

Thermodynamics, including non-ideal systems; advanced electrochemistry; statistical thermodynamics; applications to gases, liquids and chemical equilibria; states of matter.

2.003B Organic Chemistry — S1

Prerequisite: 2.002B.

Heterocyclic Chemistry. Synthesis and reactions of the following heteroaromatic systems; pyridine, quinoline, isoquinoline, pyrimidine, pyrrole, furan, thiophen, indole, imidazole; examples of naturally occurring alkaloids where relevant. *Alicyclic Chemistry.* Stereochemistry of acyclic systems; classical and non-classical strain in cyclic systems; stereochemistry and conformation of monocyclic and polycyclic compounds; synthesis, reactions and rearrangement of monocyclic compounds including stereochemical selectivity; transannular reactions in medium rings. Synthesis and reactions of fused and bridged polycyclic systems, examples of steroids and terpenes where relevant.

2.003C Inorganic Chemistry — S1 or S2 L2T4

Prerequisite: 2.042C.

Coordination chemistry: valence bond and crystal field theory and their application to magnetic and spectral properties of complexes. Factors affecting the stability of complexes; unusual oxidation states of transition metals. Chemistry of the groups 3A (the lanthanides and actinides), IVA, VA, VIA and VIIA. More advanced chemistry of groups 3B, IVB, VB, VIB and VIIB and the noble gases.

2.003D Instrumental Analysis — SS L2T4

Prerequisites: 2.002A and 2.002D.

Selected spectrophotometric methods of analysis: infrared, emission, flame, precision spectroscopy, spectrofluorimetry, X-ray fluorescence, mass spectroscopy. Instrumental chromatography, thermal analysis. Electrochemical and kinetic methods. Introduction to automation and data processing.

2.003L Applied Organic Chemistry — S1 L2T4

Prerequisite: 2.002B. Co-requisite: 2.003B.

Discussion at advanced level of the chemistry of selected commercially important groups of organic materials with emphasis on reaction mechanisms and model systems. *Polymerization processes and synthetic polymers.* Thermal and oxidative polymerization, treatment of initiators, chain transfer agents, retarders; sulfur-olefin reactions. *Pigments and dyestuffs.* Basis of colour in organic compounds, azo, carbonyl, cationic dyes, colour photography; synthetic and natural pigments, eg phthalocyanines, carotenes, flavones, anthocyanins; fluorescent whiteners. *Oxidation and reduction processes.* Oxidation of allylic compounds, phenols, sulfur compounds, etc; catalytic dehydrogenation and hydrogenation; hydride and dissolving metal reductions.

2.003M Organometallic Chemistry — SS L2T4

Prerequisite: 2.002B.

Synthesis, structure and reactions of metal alkyls and aryls; metal carbonyls, isonitriles and acetylides; compounds of metals with unsaturated hydrocarbons; organic chemistry of boron, silicon, phosphorus and arsenic; application of organometallic compounds in organic synthesis and homogeneous catalysis.

2.013B Synthetic Organic Chemistry — S2 L2T4

Prerequisite: 2.003B.

Synthetic methods. Modern functional group transformations with particular reference to positional and stereochemical control; organometallic and carbanionic reagents. *Pericyclic reactions and photochemistry.* Electrocyclic sigmatropic reactions, Diels-Alder and related cycloadditions, Woodward-Hoffman rules, ring formation and cleavage. *Synthetic strategy.* Principles of planning of organic synthesis; disconnection approach to representative syntheses of compounds of theoretical and biological interest; use of protecting groups.

2.013C Advanced Inorganic Chemistry — SS L2T4

Prerequisite: 2.042C. Co-requisite: 2.003C.

Reaction mechanisms involving metal complexes. Spectroscopic methods for investigating metal complexes, including infrared, electronic and Mössbauer spectroscopy. Inorganic crystal chemistry: structures and properties of simple compounds. Cluster compounds, metal-metal bonding, extended electronic interactions. π-Complexes, carbonyls, nitrosyls, ethylene complexes, and sandwich-type compounds; methods of preparation, reactions, evidence for structures and type of bonding involved.

2.013D Advanced Analytical Chemistry F or S2 L2T4

Prerequisite: 2.002D. Co-requisite: 2.003D.

Sampling of biological, environmental and industrial materials. Preparation for analysis. Approaches to analysis of gases, waters, soils and geological materials, plants and biological materials, ceramics, ferrous and non-ferrous metals and alloys. Chemical microscopy.

2.013E Advanced Nuclear and Radiation Chemistry L2T4

Prerequisite: 2.003E.

Only available to non-Chemistry majors. It may not be included in program 0200 or Course 3910.

Advanced nuclear instrumentation and special counting methods; isotope effects and isotope separation methods; nuclear reactors, accelerators and isotope production; isotope labelling techniques; radiation sources and their uses; hot atom and recoil reactions; actinide chemistry and nuclear reactor fuel processing; environmental radioactivity; biochemical applications including radioimmunoassay techniques and the preparation of short lived radiopharmaceuticals; isotopic methods applied to chemical measurements; industrial tracer applications. *Laboratory classes* involve experiments associated with the above topics.

2.023A Quantum Theory of Atoms and Molecules F L2T1

Prerequisites: 2.002A, 10.2111 & 10.2112.

Wave mechanics — linear operators; Schrödinger wave equation, applications, method of solution; variation principle, linear combinations, perturbation theory. Many-electron problems — central field method; electron spin; Fermi-Dirac statistics; angular momentum operators; Coulomb repulsion two-electron operator; spin-orbit coupling; Russell-Saunders and jj coupling; Zeeman effect; vector coupling and Wigner coefficients; allowed transitions. Group theory — symmetry operations; matrix representation; irreducible representation; characters of a group; non-rigid molecules; antisymmetry operators.

2.023B Biological Organic Chemistry S2 L2T4

Prerequisite: 2.003B.

Interdisciplinary aspects of selected classes of organic compounds of biological significance. *Natural polymers.* Synthesis and properties of proteins, polysaccharides, nucleic acids. *Pharmacological chemistry.* Discussion of structural and synthetic aspects of several selected drugs; structure-activity relationships, metabolism, methods of analysis. *Herbicides, fungicides, pesticides.* Synthesis, degradation and mode of action of selected compounds.

2.033A Physical Chemistry of Macromolecules S2 L2T4

Prerequisites: 1.012 or 2.002A and 2.002B or 2.003J.

Macromolecules in solution; determination of molecular size; gel permeation chromatography, diffusion, sedimentation, viscometry, osmometry and light scattering. Spectroscopic properties: circular dichroism and optical rotary dispersion; conformation of macromolecules in solution; helix-random coil transitions. Macromolecules in the solid state; micelles; synthetic polymers.

2.043A Environmental Chemistry S2 L3T3

Prerequisites: 2.002A, 2.002D.

Physico-chemical aspects of atmosphere chemistry: dispersion of colloids and solid matter, photochemical reactions. Hydrological cycle: reactions in the sea, rivers and estuaries; chemical characteristics of surface and sub-surface waters. Corrosion of metals.

and either
Simple digital and analogue computer models of ecological systems based on chemical data and physico-chemical properties.

or
Distribution of elements and nutrient cycles in water; organic carbon cycles, oxygen balance (redox processes in aquatic systems). Chemical models of these processes (including an introduction to simple computing). Practical project (mostly field work) dealing with nutrient cycles.

2.053A Chemical Kinetics and Reaction Mechanisms SS L3T3

Prerequisite: 2.002A

Basic kinetic concepts, mechanisms of elementary processes and fundamental theories of kinetics. Gas-phase systems, unimolecular and free-radical reactions. Reactions involving excited species, pyrolysis, photolysis, mass spectrometry; comparison of flash photolysis and pulse radiolysis. Reactions in solution. Surface kinetics and catalysis. Fast reactions. Laser spectroscopy; molecular beams.

2.063A Advanced Molecular Spectroscopy S2 L2T4

Prerequisite: 2.013A.

Theory: Born-Oppenheimer approximation; theory of transition probabilities; group theory; normal mode analysis.

Spectra: rotational, vibrational and electronic structure in molecular spectra, including microwave, infrared, Raman, UV-visible and photoelectron spectra. Kinetic spectroscopy. Lasers.

Chemistry Level IV Unit

2.004 Chemistry Honours

An honours program consisting of selected series of lectures on advanced topics in Chemistry and a research project.

Students intending to seek admission to this course 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 pass degree).

Servicing Subjects

These are subjects taught within courses offered by other faculties.

81.002 Chemistry and Biochemistry for Medical Students

Conjoint subject with the School of Biochemistry.

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

2.003J Fundamentals of Biological and Agricultural Chemistry **SS L2T4**

Prerequisites: 2.121 & 2.131, or 2.141. Excluded: 2.013L, 41.101.

Aspects of the chemical and physical properties of materials important in biological systems. Methods of separation, of purification and estimation, and correlations of structure with reactivity. Methods of separation and identification, such as gel permeation, discussed as appropriate to each topic. Significance of isomerism in biological systems, optical and geometrical, absolute configuration. Amino acids, peptides and introduction to protein structure. Relevant properties, acid/base properties, pK values, zwitterion, isoelectric points. Simple peptide synthesis. Treatment of carbohydrates, establishment of structures, reactivity. Chemistry of monosaccharides, disaccharides and polysaccharides. Methods of analysis, chemical and physiochemical. Fats, correlation of properties with saturated and unsaturated fatty acid composition. Structural chemistry of fatty acids. Reaction of unsaturated fatty acids, urea complexes. Detergents. Trace elements in biological systems. Chemistry of common heterocyclic systems with emphasis on molecules of biological importance.

2.013L Chemistry and Enzymology of Foods **F L1T2**

Prerequisite: 2.002B. Excluded: 2.003J, 2.043L.

The chemistry of food constituents at an advanced level and the relationship between the chemistry and enzymology associated with the origin and handling of foodstuffs. Treatment of the stability of constituents, changes in colour and texture occurring during processing and storage. Methods of assessment, chemical and physical. General classification of constituents, role of free and combined water. Fixed oils and fats, rancidity of enzymic and autoxidative origin, antioxidants — natural and synthetic — theories on mechanisms of action, carbohydrates, reactivity, role in brewing processes, carbohydrate polymers, starch structure, enzymic susceptibility and mode of action, estimations, enzymic degradation and enzymic browning, reactions and stability of natural pigments, vitamins, preservatives.

2.030 Organic Chemistry **S1 L2T4 S2L1**

Prerequisite: 2.002B.

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 discussing syntheses and reactions including degradation.

2.043L Chemistry and Enzymology of Foods **F L2T4**

Prerequisite: 2.002B. Excluded: 2.013L.

As for 2.013L but in greater detail and depth.

2.951 Chemistry 1ME **S2 L3T3**

Prerequisite: Nil.

A treatment of chemistry which illustrates the application of the principles of chemistry to problems of concern to mechanical engineers. Topics: chemistry of materials, thermochemistry, chemical kinetics and equilibrium, radioactivity and nuclear power, electrochemistry and corrosion of metals. Introduction to organic chemistry, structure and properties of polymers, fuels and lubricants. Surface chemistry.

2.991 Chemistry 1CE **S2 L3T3**

Prerequisites: As for 2.121.

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

Metallurgy

4.024 Metallurgy Project **S1 6 S2 3**

An experimental investigation of some aspects of metallurgy. Includes three weeks laboratory work during the mid-year recess.

4.054 Metallurgy Seminar **F L2**

Lectures on the preparation and presentation of technical papers. Each student is required to prepare and present a paper on a nominated subject.

4.302 Chemical and Extraction Metallurgy 1 **F L1T2**

Co-requisite: 2.002A.

Metal extraction from ores in terms of unit operations and overall systems, illustrated by the extraction of iron, copper, aluminium and other metals. Elementary process analysis. Laboratory — analysis and solution of problems.

4.303 Chemical and Extraction Metallurgy 2 **F L3T2**

Prerequisites: 4.302, 4.602 and 4.402 or 4.412. Co-requisite: 4.222.

Metallurgical thermodynamics, application to equilibria involving liquid metals, slags, gases and the solid state. Electrochemistry; corrosion; hydrometallurgy. Kinetics applied to metallurgical processes. Process assessment and selection.

4.314 Chemical and Extraction Metallurgy 3A **S1 L3 T1½**

Prerequisite: 4.303.

Kinetics of interphase transfer in metallurgical systems. Advances in pyrometallurgy related to fuel utilization, agglomeration, emission, recycling. Advances in hydrometallurgy. Corrosion and oxidation, selection of materials.

4.324 Chemical and Extraction Metallurgy 3B **S2 L3½T1**

Prerequisite: 4.303.

A selection of advanced topics in chemical and extractive metallurgy.

4.402 Physical Metallurgy 1 — S1 L3T3 S2 L2T4

Co-requisites: 2.002A, 4.502. Excluded: 1.9322, 4.412, 4.422.

The crystal structure of metallic phases. Crystal defects. Physical properties of solids. X-ray diffraction. Phase equilibrium in alloy systems. The genesis of microstructure. Mechanisms of phase transformations, departures from equilibrium, metastable transition phases. Heat treatment of alloys. Structure of carbon steels and cast irons. Optical metallography.

4.403 Physical Metallurgy 2 — F L4T5

Prerequisite: 4.402. Excluded: 1.3033j.

Diffusion in metals. Nucleation of phase transformations. Mechanisms of precipitation in the solid state. Metallography and properties of commercial alloys. Geometry of deformation in metals. Introduction to dislocation theory and its application to mechanical behaviour of alloys. Zone theory of solids — application to electrical, thermal and magnetic properties and to theory of alloys. Preferred orientation in metals. Optical, X-ray and electron metallography.

4.404 Physical Metallurgy 3 — S1 L3T4½ S2 L3T1½

Applications of dislocation theory to work hardening and annealing processes. Phase transformations in alloys. Mathematical crystallography, reciprocal lattice, diffraction. Electron and X-ray metallography. Selection of advanced topics in physical metallurgy including radiation damage, martensitic transformations, neutron diffraction, internal friction, sintering, creep, superplasticity, fracture, microplasticity.

4.412 Metallurgical Phases — Structure and Equilibrium, Part 1 — S1 L3T3

Co-requisites: 2.002A, 4.302. Excluded: 1.9322, 4.402.

The crystal structure of metallic phases. Crystal defects. Physical properties of solids. Phase equilibrium in alloy systems. The genesis of microstructure. Metallography.

4.414 Physical Metallurgy 3A — S1 L3T1½

Prerequisite: 4.403.

Applications of dislocation theory to work hardening and annealing processes. Phase transformations in alloys. Mathematical crystallography, reciprocal lattice, diffraction. Electron and X-ray metallography.

4.422 Metallurgical Phases — Structure and Equilibrium, Part 2 — S2 L2T4

Prerequisite: 4.412. Co-requisite: 4.303. Excluded: 4.402.

X-rays and X-ray diffraction. Mechanism of phase transformations, departures from equilibrium, metastable transition phases. Principles of heat treatment. Optical and X-ray examination of metallurgical materials.

4.433 Physical Metallurgy 2C — S1 L4T5 S2 L3T3

Prerequisite: 4.402.

Diffusion in metals. Nucleation of phase transformations. Mechanisms of precipitation in the solid state. Metallography and properties of commercial alloys. Geometry of deformation in metals. Introduction to dislocation theory and its application to mechanical behaviour of alloys. Optical, X-ray and electron metallography. Preferred orientation in metals.

4.502 Mechanical Metallurgy — S1 L2T2 S2 L1T2

Co-requisite: 4.402.

Combination of 4.512 and 4.522.

4.512 Mechanical Properties of Solids — S1 L2T2

Co-requisite: 4.402.

The nature and significance of mechanical properties. Analysis of stress and strain. Stress/strain/time relationships. Influence of stress state, temperature, strain rate and environment on mechanical behaviour. Modes of failure under load. Mechanical testing.

4.522 Mechanical Metallurgy — S2 L1T2

Prerequisite: 4.512.

Flow and fracture in metals. Plasticity theory. Principles of metal shaping processes. Relationship between formability and conventional mechanical test results. Fracture mechanics. Fractography. Defects and their significance. Experimental methods related to stress analysis flow and fracture.

4.504 Mechanical and Industrial Metallurgy — S1 L3 S2 L3T6

Prerequisites: 4.403 or 4.433, 4.502 or 4.522.

The application of metallurgical principles to industrial processing with particular reference to casting, welding, shaping, properties and selection of materials. Metal finishing. Metallurgical aspects in engineering design. Fracture mechanics, design against fatigue, brittle and ductile fracture.

4.602 Metallurgical Engineering 1 — S2 L3T2

Co-requisite: 4.302.

Mass and energy accounting in metallurgical processes. An introduction to the principles and applications of transport processes in systems with specific reference to industrial processes in primary and secondary metallurgy.

4.613 Metallurgical Engineering 2A — S1 L2T1

Prerequisite: 4.602.

An extension of the principles and applications of transport processes to metallurgical systems. The principles of metallurgical heating and cooling including fuels, refractories and furnace design and operation. Solidification in moulds, continuous casting. *Process Economics:* As for 48.031 Chemical Engineering 2A Unit 6.

4.703 Materials Science — S2 L2T1

Co-requisite: 4.403.

The application of the principles of physical metallurgy to the development of modern materials. Particular attention is paid to the structure/property relationships that determine the design of materials. The topics covered include materials used for structural purposes, high temperature application, corrosive environments, nuclear engineering, fuel cells, magnetic applications.

4.802 Metallurgical Physics — S2 L2

Prerequisite: 1.001 or 1.011.

Development of physical principles for application in metallurgy — theory of metal models. Sommerfeld Theory, zone theory, interaction of radiation with matter, solid state devices, instrumentation.

4.813 Mathematical Methods — F L2T1

Prerequisite: 10.031 or 10.211A.

1. *10.351 Statistics SM (see Engineering Handbook).* **2.** *Numerical Methods.* Simultaneous linear equations. Solution of non-linear equations. Systems of simultaneous non-linear equations; application to phase equilibria. Finite difference methods: solutions of ordinary and partial differential equations; application to heat and mass transfer. Finite element methods: application to determination of elastic stress and strains. Computing: BASIC language; programming assignments in numerical methods.

Mechanical and Industrial Engineering

5.006 Engineering E — S1 L/T6

Prerequisite: as for 5.010. Excluded: 5.010, 5.020, 5.030.

Mechanics: Composition and resolution of forces, laws of equilibrium. Friction. Statics of rigid bars, pin-jointed frames, and beams. Kinetics of the plane motion of a particle, equations of motion, dynamic equilibrium, work and energy. Kinetics of systems of particles. Rotation of rigid bodies about a fixed axis. *Engineering Drawing:* Graphic communication. First and third angle orthographic projection. Descriptive geometry fundamentals and their application to engineering problems. Australian standard engineering drawing practice. *Introduction to Design:* Engineering method, problem identification, creative thinking, mathematical modelling, computer-aided design, materials and processes, communication of ideas, the place of engineering in society.

5.010 Engineering A — S1 or S2 L4T2

Prerequisite:

	HSC Exam Percentile Range Required
Either	
2 unit Science (Physics) or	*31-100*
4 unit Science (multistrand)	*11-100*
or	
2 unit Industrial Arts or	*31-100*
3 unit Industrial Arts	*11-100*

Note: Students who wish to enrol in this subject in courses other than the full-time courses in Aeronautical Engineering, Civil Engineering, Industrial Engineering, Mechanical Engineering and Naval Architecture can make up for the lack of the prerequisite by work taken in Physics in the first half of the first year.

Statics: Composition and resolution of forces, laws of equilibrium. Friction. Statics of rigid bars, pin-jointed frames, and beams. Simple states of stress. Statics of fluids. *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 Materials Science:* The structure and properties of the main types of engineering materials, with emphasis on the way in which properties may be controlled by controlling structure.

5.020 Engineering B — S2 L4T2 or L/T6

Prerequisite: 5.0101 or 5.010 or 8.170.

Not offered in 1985.

Engineering Dynamics: Kinematics of a particle in the plane: rectilinear and curvilinear motion; motion relative to a translating frame of reference. Kinetics of a particle in the plane: Newton's second law; D'Alembert's principle; work, power and energy; belt and rope drives; gear trains. Virtual work. Kinetics of a system of particles: impulse and momentum; moment of momentum; equations of motion; impact. Fixed-axis rotation of a rigid body: angular momentum; equation of motion; moment of inertia; energy; centre of percussion. Steady mass flow: theoretical principles; Pelton wheel. *Mechanics of Solids:* Concepts of stress, strain. Stress and deformation due to axial force. Linear and non-linear problems, compound bars. Concepts of stiffness and flexibility. Bending moment and shear force in simple beams. First and second moments of area. Stress and deformation due to bending; linear and non-linear problems; use of step functions.

5.0201 Engineering Dynamics 1A — S1 or S2 L/T3

Prerequisite: 5.0101 or 5.010 or 8.170.

As for 5.020 Engineering B, *Engineering Dynamics.*

5.030 Engineering C — S1 or S2 L2T4 or L/T6 or F L/T3

Prerequisites: as for 5.010.

Engineering Drawing: Graphic communication. First and third angle orthographic projection and isometric projection. Descriptive geometry fundamentals and their application to engineering problems with special emphasis on visualization of problems and development of methods for their solution. Australian standard engineering drawing practice. Applications involving detail and assembly drawings, functional dimensioning and tolerancing.

and one of the following options (determined by the course of study)

1. *Production Technology* F L/T3
(Mechanical, Industrial and Aeronautical Engineering and Naval Architecture students must take this option.) Description and appraisal of the processes classified as: forming from liquid or solid, material removal, material joining. Machines. Analysis of the primary functions of the machine tools and an appraisal of their limitations. Principles of operation of common machine tools and illustrations of their use.

2. *Introduction to Chemical Industry*
(Chemical Engineering and Industrial Chemistry students must take this option.) The chemical industry in Australia. The role of professional societies. Special topics on the engineering and chemical aspects of the industry, ie pollution control, energy sources, food and biochemicals and polymers, mineral processing, safety, etc. A visit to a factory in the Sydney area and the preparation of a short report after an introduction to information retrieval by university librarians.

3. *Introduction to Metallurgical Engineering*
(Metallurgy students must take this option.) History and significance of the exploitation of metals. Ores, mineral economics, mineral processing, and metal extraction and processing methods illustrated by reference to the Australian mineral and metal industries. Properties, uses and applications of metallic materials. The role of the metallurgist in industry and in processing and materials research, and in relation to conservation and the environment.

4. *Introduction to Mining Engineering*
(Mining Engineering students must take this option.) Mineral deposits; metallic, non-metallic and fuels. Elements of prospecting and exploration. Basic mining techniques. Mining phases: development, exploitation, beneficiation and withdrawal. Mining and the environment. Mining services. Relevance of basic science and engineering subjects to mining design and operations.

5. *Introduction to Ceramic Engineering*
(Ceramic Engineering students take this option.) The classification of materials. The nature of ceramics. The materials science approach. The scope of the ceramic industry. The origin, classification, physical properties and uses of clay minerals and other non-clay raw materials. Principal unit operations used in the ceramic industry. Drying and firing of ceramics, melt forming, pot forming and other forming procedures.

5.300 Engineering Dynamics 1B S2 L1T1

Prerequisites: 1.001 or 1.011 or 1.951, 5.0201, 10.001 or 10.011.

Kinematics and kinetics of rigid bodies in planar motion: absolute motion and motion relative to translating and rotating frames of reference; constraint and degrees of freedom; friction; extensions to Newton's second law; D'Alembert's principle; differential equations of motion; gyroscopic couple; work and energy, variational principles; impulse and momentum, impact.

5.421 Mechanics of Solids 1 S2 L2T2

Prerequisite: 5.010 or 5.0101.

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.

5.422 Mechanics of Solids 2/Materials F L2T2½

Prerequisites: 5.421 or 5.040 or 5.020 or 8.171, 10.001 or 10.011.

Mechanical properties of materials: tensile and compressive behaviour; hardness; testing machines. Statics of frames and machines. Unsymmetrical bending. Analysis of stress; analysis of strain; generalized Hooke's Law. Thin-walled pressure vessels. Combined loads. Theories of failure. Stress concentrations and fatigue. Shear stress in beams; shear centre. Stability and buckling of columns. Solidification. Mechanical processing of metals. Phase equilibrium and its application to engineering materials. Fracture, creep, corrosion.

5.4221 Mechanics of Solids 2 F L1½T2

Prerequisites: 5.020 or 5.421 or 8.171, 10.001 or 10.011.

Mechanical properties of materials: tensile and compressive behaviour; hardness; testing machines. Statics of frames and machines. Unsymmetrical bending. Analysis of stress; analysis of strain; generalized Hooke's Law. Thin-walled pressure vessels. Combined loads. Theories of failure. Stress concentrations and fatigue. Fatigue of biaxial and triaxial systems. Shear stress in beams; shear centre. Stability and buckling of columns.

5.622 Fluid Mechanics/Thermodynamics F L2T2

Prerequisites: 10.001 or 10.011; 1.951 or 1.001 or 1.011; 5.010 or 5.0101. Co-requisite: 5.300 or 5.330 (for students in Faculty of Engineering only).

Comprises 5.6221, 5.6222, 5.6223.

5.6221 Introductory Thermofluids S1 L2T2

Not offered separately in 1985.

Work, energy, power. Units. Systems, states and processes. Flow fields; unsteady and compressible flow. 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, Bernouli's equation. Momentum equations: linear and rotational. Ideal flow.

5.6222 Fluid Mechanics S2 L1T1

Not offered separately in 1985.

Flow measurement: orifice, nozzle, venturi meters, pitot tubes, other flow meters. 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. Equations of fluid motion. Elementary boundary layer flow, skin friction and decay.

5.6223 Thermodynamics S2 L1T1

Not offered separately in 1985.

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.

Electrical Engineering and Computer Science

6.010 Electrical Engineering 1 — S2 L2T4

Prerequisite: Electricity and magnetism section of 1.961.

Prepares students for the various areas and disciplines of Electrical Engineering. Includes field and circuit theory; electronics; logic circuits; communications; energy conversion; automatic control. Laboratory exercises and project work are major components.

6.021A Circuit Theory 1 — S1 or S2 L2T2

Prerequisites: 1.961 or equivalent, 6.010, 10.001.

Lumped modelling concepts used in circuit theory and their relationship to observed physical properties and behaviour. Linear circuit elements. Kirchhoff's Laws. Resistive network topology and systematic derivation of network equations using node and loop methods. Network theorems. Exponentials and first order transients. Sinusoidal steady state operation including phasors, impedance and admittance concepts and systematic circuit equations. Power relations and second order systems response. Resonance, Q factor and bandwidth. Three phase circuits. Controlled sources and two port analysis.

6.021C Electronics 1 — S1 or S2 L2T2

Prerequisite: 1.982, 6.021A (one of these to be passed, the other to be attempted at an acceptable level and to be repeated concurrently).

Principles of operation and low-frequency characteristics of PN diodes, bipolar and field effect transistors, thyristors and various optoelectronic devices. Transistor low-frequency small-signal equivalent circuits. Design and analysis of low frequency Class A transistor amplifiers. Temperature effects. Device ratings and use of data sheets.

6.606 Computing Science Honours

6.611 Computing 1 — S1 or S2 L3T3

Prerequisite: As for 10.001. Co-requisite: 10.001 or 10.011. Excluded: 6.600, 6.620, 6.021D (1.041 excluded for students enrolled in Program 6806 and Computer Science programs in the Science and Mathematics course).

Introduction to programming: design and correctness of algorithms and data structures; programming in a high-level algorithmic language which provides simple, high level program control and data structuring facilities. Problem solving: basic ideas of problem solving; introduction to abstract structures used for computing solutions to problems. Introduction to propositional logic, computing machinery, computer arithmetic, artificial intelligence, and operating systems.

6.613 Computer Organization and Design — S2 L2T3

Prerequisites: 6.631 or 6.021E, 6.021D or 6.620 or 6.621 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for these subjects).Excluded: 6.0318.

Bussing structures (asynchronous and synchronous); input/output organization; polling, interrupt and DMA control; parallel and serial device and processor communication and interfacing. Memory organization; CPU and control unit design. Processes: synchronization and communication. Microprocessor case studies.

6.621 Computing 2A — S1 or S2 L3T2

Prerequisites: 6.611 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject), 10.001 or 10.011. Excluded: 6.620, 6.021D.

For those students who intend to take further subjects in computer science.

Expansion and development of material introduced in 6.611 Computing 1. Systematic program development: introduction to programming language semantics, reasoning about programs, program derivation, abstract programs, realization of abstract programs (conversion from abstract to concrete). Practice in programming in a high-level programming language. Data-structures: arrays, lists, sets, trees; recursive programming. Introduction to computer organization: a simple machine architecture. Introduction to operating systems.

6.622 Computer Applications — SS L3T2

Prerequisite: 6.641. Excluded: 6.646, 6.633.

Simulation: discrete event simulation, pseudo-random number generation, simple queueing theory. Non-numeric programming: artificial intelligence, symbolic computing. Database systems: data base models: relational, hierarchical and network structures; query languages; case study of Ingres; data base security.

6.631 Computing 2B — S1 or S2 L3T2

Prerequisites: 6.620 or 6.621 or 6.021D (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for these subjects), 6.600 (CR). Excluded: 6.021E.

Assembler programming: programming in a low level machine oriented language in order to illustrate the mapping of higher level language constructs onto a typical machine and the interaction between operating systems and devices. *Digital Logic Design:* Boolean algebra and logic gates, simplification of Boolean functions, combinational logic, medium scale integration building blocks, clocked sequential circuits, registers and memory, computer arithmetic.

6.632 Operating Systems — S1 L2T3

Prerequisites: 6.631 or 6.021E, 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for these subjects). Excluded: 6.672.

Introduction to operating systems via an intensive case study of a particular system, namely the UNIX Time-sharing system which runs on the PDP11 computer. Includes system initialization, memory management, process management, handling of interrupts, basic input/output and file systems. A comparison of UNIX with other operating systems. General principles for operating system design.

6.633 Data Bases and Networks — S2 L3T2

Prerequisite: 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject). Excluded: 6.622, 6.652, 14.607, 14.608.

Data Base Management Systems: data models; relational and network structures; data description languages; data manipulation languages; multi-schema structures. Data integrity and security; recovery; privacy. *Computer Networks:* economic and technological considerations; digital data transmission; error detection and recovery; network configurations; circuit switching, packet switching; communication protocols, current international standards; data compression; encryption and decryption.

6.641 Computing 2C — S1 or S2 L3T2

Prerequisites: 6.620 or 6.021D or 6.621 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for these subjects), 6.600 (CR).

Design of Data Structures: abstraction, representation, manipulation and axiomatization. Key transformations (hashing), balanced and multiway trees, introduction to graphs. *Files:* sequential access, random access, merging, sorting and updating. File organizations and introduction to data base systems. *Programming in Logic:* descriptive programming languages, symbolic manipulation, pattern matching and associative programming. *Software Engineering:* a survey of some current techniques in problem specification and program design.

6.642 Design and Analysis of Algorithms — S1 L3T2

Prerequisite: 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject).

Techniques for the design and performance analysis of algorithms for a number of classes of problems. Analysis of algorithms: order notation, recurrence equations, worst case and expected order statistics. Design of efficient algorithms: recursion, divide and conquer, balancing; backtracking algorithms, branch and bound, dynamic programming; set manipulation problems; fast search algorithms, balanced optimal and multiway trees; graph representations and algorithms; pattern matching algorithms. NP — complete problems. Design and specification of programs: modularization, interface design, introduction to formal specification techniques.

6.643 Compiling Techniques and Programming Languages — S1 L3T2

Prerequisite: 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject). Excluded: 6.672.

1. Language description: phrase structure grammars, Chromsky classifications, context-free grammars, finite state grammars, Backus Naur Form, syntax graphs, LL(k), LR(k), LAL(k). **2.** Lexical analysis: translation of an input (source) string into a (machine independent) quasi-terminal symbol string. Finite state recognizers. **3.** Syntax analysis: top-down compilation for LL(1) grammars using syntax graph driven analysers or recursive descent. Bottom-up compilation for simple- and weak-precedence and LR(k) grammars. **4.** Semantic analysis: program translation and code generation; attributed grammars. **5.** Compiler generators: automatic generation of compilers for LALR(1) grammars. **6.** Code optimization by systematic program transformation. **7.** Run-time organization: activation record stacks, heap management.

6.646 Computer Applications — S1 L3T2

Prerequisites: 6.620 or 6.021D or 6.621 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for these subjects), or 6.600 (CR), one of 10.311A, 10.321A, 10.301, 10.331, 45.101 or equivalent. Excluded: 6.622.

The use of computers for solving problems with a substantial mathematical and operational research content: includes use of some standard software packages. Topics selected from: discrete event simulation; a simulation language; pseudo random number generation; simple queueing theory, applications of mathematical programming; dynamic programming; statistical calculations; critical path methods; computer graphics, artificial intelligence.

6.647 Business Information Systems — S2 L3T2

Prerequisites: 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject), 14.501. Excluded: 14.602, 14.603, 14.605.

Introduction to accounting systems — general ledger, debtors and creditors; models of business information systems; integrated business systems. System specification, system analysis, system design and implementation; testing and debugging. Managing a project team, project control. The COBOL programming language. File organization and design; sequential, indexed sequential, random, inverted, B-tree file organizations; data dictionaries, program generators, automatic system generators. A major project, written in COBOL, is undertaken as a team exercise.

6.649 Computing Practice — S2 L3T2

Prerequisite: 6.641 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable for this subject). Co-requisites: 6.633 or 6.643 or 6.647.

Not offered in 1985.

Can only be counted with at least 3 other Level III Computer Science units.

For students majoring in Computer Science who seek a programming career in government or commercial industry. Topics, related to current computing practice, include: Comparative study of computer hardware in current popular use; Comparative study of the 'popular' programming languages, eg COBOL, RPG, BASIC, FORTRAN, PL/1, APL. Job control languages. Data Preparation procedures. Keyboard entry. Verification. Word processing; report preparation; documentation. Social implications of computing. Professional responsibilities and ethics. Project management; software engineering; psychology of computer programming.

Mathematics

Note: When a unit is listed as a prerequisite or co-requisite, the appropriate higher unit may be substituted.

Many units 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 Credit are only awarded in the ordinary level in exceptional circumstances.

Students should note that all of the Mathematics honours programs require them to take most of their Mathematics units at higher level. However, students should not think that the higher level units are intended only for those in honours programs. Any student with the ability to undertake higher units benefits from so doing.

First Year Mathematics

10.001 Mathematics 1. This is the standard subject and is generally selected by the majority of students in the Faculties of Science, Biological Sciences, Engineering and Applied Science who intend to pursue further studies in mathematics, computer science, physics, chemistry or engineering.

10.011 Higher Mathematics 1 (day course only). This subject has the same purpose as 10.001, but is aimed at the more mathematically able students, including those who may wish to take an honours degree in mathematics. It covers all the material in 10.001, plus other topics, at greater depth and sophistication. It is intended for students who have obtained high marks in the 3 unit mathematics course of the Higher School Certificate as well as for those who have taken the 4 unit course.

General Mathematics

This is a combination of the single session units 10.021B and 10.021C and provides for students who do not intend studying mathematics beyond first year but whose other studies require some knowledge of basic mathematical ideas and techniques. It is particularly designed to meet the needs of such students in Biological Sciences, Optometry, Applied Psychology and Wool and Pastoral Sciences. However, students who select this subject should weigh seriously the implications of their choice because *no further mathematical units are normally available.* A student with meritorious performance in 10.021C may be permitted to proceed to a certain limited number of second year subjects intended for biologists and chemical engineers. The single unit 10.021B is also available to students seeking a prerequisite for 10.001.

Mathematics as a Subsidiary Subject

The School also provides the sequence of two units 10.031 and 10.032 at the second and third levels respectively, for students in the Science and Mathematics Course and the Faculty of Science who are mainly interested in the chemical and biological sciences. These courses offer an introduction to mathematical techniques for scientists and engineers.

There is also the Level II unit in Statistics, 10.331, which provides an introduction to statistical procedures commonly used in Science, and which also leads to the Level III units 10.3321 Regression Analysis and Experimental Design, 10.3322 Applied Stochastic Processes and, with a Credit Pass, to 10.312B Experimental Design (Applications) and Sampling.

For both the above Level II units the entry qualification is a pass in 10.001 Mathematics 1, but in appropriate cases students who have passed in 10.021C General Mathematics 1C at a satisfactory level may be given permission to enrol.

10.001 Mathematics 1 — F L4T2

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Mathematics or*	*71-100*
3 unit Mathematics or	*21-100*
4 unit Mathematics	*1-100*
or	
10.021B.	

Excluded: 10.011, 10.021B, 10.021C.

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

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

10.011 Higher Mathematics 1 — F L4T2

Prerequisite:

	HSC Exam Percentile Range Required
3 unit Mathematics	*71-100*
or	
4 unit Mathematics	*11-100*

Excluded: 10.001, 10.021B, 10.021C.

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

10.021B General Mathematics 1B — S1 L4T2

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Mathematics or*	*51-100*
3 unit Mathematics or	*11-100*
4 unit Mathematics	*1-100*
or	
10.021A.	

Excluded: 10.011, 10.001

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

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.

10.021C General Mathematics 1C — S2 L4T2

Prerequisite: 10.021B. Excluded: 10.001, 10.011.

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.

10.031 Mathematics **F L1T1**

Prerequisite: 10.001 or 10.011 or 10.021C (CR).

Note A: A unit, together with 10.032, which is available to Faculty of Science students as one of a sequence of two units constituting a terminating service course in mathematics. As such it is mutually exclusive to any other Level II or Level III unit in Pure and/or Applied Mathematics and/or Theoretical Mechanics except that 10.412A may be taken with 10.031 and 10.032.

Note B: Mathematics 10.031 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, 10.031 Mathematics will not be 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.

10.032 Mathematics **F L1T1**

Prerequisite: 10.031.

Note A: As for Note A in 10.031 Mathematics.

Note B: Mathematics 10.032 is included for students desiring to attempt only one Level III Mathematics unit. If other Level III units in Pure Mathematics, Applied Mathematics or Theoretical Mechanics are taken, 10.032 Mathematics will not be counted.

Vector Calculus; special functions; convolution theorem and applications; complex variable theory; Fourier integrals; Laplace transforms with application to ordinary and partial differential equations.

10.081 Mathematics 1X **S2 L4T2**

Co-requisites: 10.001 or 10.011, 6.611 or 1.041.

Elementary logic, truth tables, finite structures, recurrence relations, combinatorics. Use of mathematics for real-world problems (mathematical modelling); practical applications of calculus to topics such as population dynamics.

10.612 Mathematical Software **F L1½T½**

Prerequisites: 6.621, 10.111A, 10.2112 (or equivalent).

Review of FORTRAN 77. Desirable attributes of mathematical software. Linear Algebra: numerically stable methods for matrix factorizations and solving systems of linear equations, condition numbers and scaling, methods for matrices with special structure, calculation of eigenvalues and eigenvectors. Calculus: numerical quadrature methods, special methods for singular, oscillatory and infinite integrals, adaptive methods, multiple integrals. Numerical solution of ordinary differential equations. Initial value and boundary value methods. Further examples and assignments chosen from more advanced areas of the above topics. Extensive use is made of computers and currently available software packages.

Pure Mathematics

10.111A Pure Mathematics 2 — Linear Algebra **F L1½T1**

Prerequisite: 10.001 or 10.011. Excluded: 10.121A.

Vector spaces, linear transformations and matrices, change of basis. Eigenvalues and eigenvectors, generalized eigenvectors. Functions of matrices. Linear systems of differential equations including the use of Laplace transform. Inner products, orthogonalization, projections. Unitary and self-adjoint transformations. Quadratic and Hermitian forms.

10.1113 Pure Mathematics 2 — Multivariable Calculus **S1 or S2 L1½T1**

Prerequisite: 10.001 or 10.011. Excluded: 10.1213.

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

10.1114 Pure Mathematics 2 — Complex Analysis **S1 or S2 L1½T1**

Prerequisite: 10.001 or 10.011. Excluded: 10.1214.

Analytic functions, Taylor and Laurent series, integrals. Cauchy's Theorem, residues, evaluation of certain real integrals.

10.1115 Pure Mathematics 2 — Finite Mathematics A **S1 L1½T½**

Prerequisite: 10.001.

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.

10.1116 Pure Mathematics 2 — Finite Mathematics B **S2 L1½T½**

Prerequisite: 10.1115 (or any other Year 2 Mathematics half-unit).

Introduction to combinatorial computing, recurrence relations, examples of divide and conquer strategies, backtrack and branch and bound algorithms. Finite Fourier transforms, roots of unity, convolutions, applications to fast multiplication and the analysis of pseudo-random numbers. Boolean algebra, switching circuits.

10.121A Higher Pure Mathematics 2 — Algebra **F L2T½**

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.111A, 10.1111.

Linear Algebra: vector spaces, commutative rings, polynomials, modules, linear transformations, eigenvectors, invariant subspaces, canonical forms, linear functions, bilinear and multi-linear algebra. Group Theory: subgroups, quotient groups, isomorphisms,Lagrange's theorem, Sylow's theorem.

10.1213 Higher Pure Mathematics 2 — Multivariable Calculus **S1 L2T½**

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.1113.

As for 10.1113 Pure Mathematics 2 — Multivariable Calculus, but in greater depth.

10.1214 Higher Pure Mathematics 2 — Complex Analysis **S2 L2T½**

Prerequisite: 10.1213. Excluded: 10.1114.

As for 10.1114 Pure Mathematics 2 — Complex Analysis, but in greater depth.

10.1111 Pure Mathematics 3 — Group Theory **S1 L1½T½**

Prerequisite: 10.001. Co-requisites: 10.111A, 10.1113, 10.1114, 10.2111, 10.2112. Excluded: 10.121A.

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

10.1112 Pure Mathematics 3 — Geometry **S2 L1½T½**

Prerequisite: 10.001. Co-requisite: 10.1111. Excluded: 10.121C, 10.1424.

Elementary concepts of Euclidean, affine and projective geometries.

10.1121 Pure Mathematics 3 — Number Theory **SS L1½T½**

*Prerequisites: ***. Excluded: 10,1421, 10.121C.*

Euclidean algorithm, congruences, sums of squares, diophantine equations.

10.1123 Pure Mathematics 3 — Logic and Computability **SS L1½T½**

*Prerquisites: ***.*

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

10.1124 Pure Mathematics 3 — Combinatorial Topology **SS L1½T½**

*Prerequisites: ***.*

Elementary combinatorial topology of surfaces.

10.1125 Pure Mathematics 3 — Ordinary Differential Equations **S1 L1½T½**

*Prerequisites: 10.111A ***. Excluded: 10.1425, 10.122E.*

Systems of ordinary differential equations; variations of constants formula; stability; Poincare space; Lyapunov's direct method.

10.1126 Pure Mathematics 3 — Partial Differential Equations **S1 L1½T½**

Prerequisites: 10.1113, 10.1114. Co-requisite: 10.1125. Excluded: 10.1426.

System of partial differential equations; characteristic surfaces; classifications; Cauchy problem; Dirichlet and Neumann problems; the maximum principle; Poisson's formula; conformal mapping.

10.1127 Pure Mathematics 3 — History of Mathematics **S2 L1T1**

Prerequisites: 10.111A, 10.1113, 10.1114, 10.2111, 10.2112.

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.

10.1128 Pure Mathematics 3 — Foundations of Calculus **S1 L1½T½**

*Prerequisites: ***. Excluded: 10.122B.*

Properties of the real numbers. Convergence of sequences and series. Properties of continuous and differentiable functions of a real variable.

10.1129 Pure Mathematics 3 — Real Analysis **S2 L1½T½**

Prerequisites: 10.2112, 10.1128. Excluded: 10.122B.

Taylor's Theorem. Sequences and series of functions and applications. Metric spaces and the contraction mapping principle. Fourier Series.

10.1521 Pure Mathematics 3 — Combinatorics and its Applications **SS L1½T½**

*Prerequisites: ***.*

Generating functions, their properties and applications to partitions and recurrence relations. Branching processes, trees and the analysis of their paths, the analysis of algorithms and the Galton-Watson process. Coding theory and other design problems, Latin squares, block designs and error-correcting codes.

10.1522 Pure Mathematics 3 — Differential Geometry **SS L1½T½**

*Prerequisites: 10.1113. Co-requisites: *** Excluded: 10.1325, 10.112C, 10.122C.*

Curves and surfaces in space. Gaussian curvature, The Gauss Theorem, The Gauss Bonnet Theorem.

10.1523 Pure Mathematics 3 — Functional Analysis and Applications **S1 or S2 L1½T½**

Prerequisites: 10.111A, 10.2112. Excluded: 10.122B.

Geometry of Hilbert spaces, approximation problems, linear operators, filters, spectral methods for differential equations.

***Students are not normally permitted to attempt a Level III Pure Mathematics unit unless they have completed at least two Level II units from 10.111A, 10.1113, 10.1114, 10.2111 and 10.2112.

10.122B Higher Pure Mathematics 3 — Real Analysis and Functional Analysis FL1½T½

Prerequisites: 10.121A or 10.111A (DN), 10.1213 or 10.1113 (DN). Excluded: 10.1128.

The limit processes of analysis; introduction to Lebesgue integration; introduction to metric spaces. Hilbert spaces; linear operators; Fourier series.

10.1321 Higher Pure Mathematics 3 — Rings and Fields S1 L1½T½

Prerequisites: 10.121A or 10.111A (DN).

Rings; integral domains; factorization theory. Fields; algebraic and transcendental extensions. Introduction to algebraic number theory; quadratic reciprocity.

10.1322 Higher Pure Mathematics 3 — Galois Theory S2 L1½T½

Co-requisite: 10.1321.

Galois fields. Galois groups. Solution of equations by radicals. Further algebraic number theory.

*** See footnote in previous column.

10.1323 Higher Pure Mathematics 3 — Complex Analysis S1 L1½T½

Prerequisites: 10.1214 or 10.1114 (DN). Co-requisites: 10.122B (strongly recommended).

Topics in advanced complex function theory chosen from the following: Conformal mapping. Analytic continuation. Entire and meromorphic functions. Elliptic functions. Asymptotic methods. Integral formulae. Harmonic functions.

10.1324 Higher Pure Mathematics 3 — Integration and Fourier Analysis S2 L1½T½

Co-requisite: 10.122B.

Lebesgue integration; measure theory. Fourier transforms.

10.1325 Higher Pure Mathematics 3 — Differential Geometry S1 L1½T½

Prerequisites: 10.121A or 10.111A (DN), 10.1213 or 10.1113 (DN). Excluded: 10.1522.

Curves and surfaces in space; classification of surfaces. Curvature; geodesics.

10.1326 Higher Pure Mathematics 3 — Calculus on Manifolds S2 L1½T½

Co-requisite: 10.1325.

Manifolds; vector fields; flows. Introduction to Morse theory. Differential forms; Strokes' theorem; the Gauss-Bonnet theorem.

10.1421 Higher Pure Mathematics 3 — Number Theory S1 L1½T½

Excluded: 10.1121.

Prime numbers; number theoretic functions; Dirichlet series; partitions. Continued fractions; diophantine approximation; p-adic numbers.

10.1422 Higher Pure Mathematics 3 — Groups and Representations S2 L1½T½

Prerequisites: 10.121A or 10.111A (DN) and 10.1111 (DN).

Abelian groups; composition series; nilpotent groups; soluble groups. Representations and characters of finite groups; induced representations.

10.1423 Higher Pure Mathematics 3 — Topology S1 L1½T½

Prerequisites: 10.1213 or 10.1113 (DN).

Naive set theory; the axiom of choice. Metric and topological spaces; compactness.

10.1424 Higher Pure Mathematics 3 — Geometry S2 L1½T½

Prerequisites: 10.121A or 10.111A (DN) and 10.1111 (DN). Excluded: 10.1112.

Axioms for a geometry; affine geometry, Desargues' theorem; projective geometry.

10.1425 Higher Pure Mathematics 3 — Ordinary Differential Equations S1 L1½T½

Prerequisites: 10.121A or 10.111A (DN), 10.1213 or 10.1113 (DN). Co-requisites: 10.122B (strongly recommended). Excluded: 10.1125.

Existence and uniqueness theorems. Linearization. Qualitative theory of autonomous systems.

10.1426 Higher Pure Mathematics 3 — Partial Differential Equations S1 L1½T½

Co-requisite: 10.1425. Excluded: 10.1126.

Classification, Characteristics. Cauchy problem; Dirichlet and Neumann problems. Distributions.

10.123 Pure Mathematics 4

An honours program consisting of the preparation of an undergraduate thesis together with advanced lecture courses on topics chosen from fields of current interest in Pure Mathematics. With the permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools.

Applied Mathematics

10.2111 Applied Mathematics 2 — Vector Calculus — S1 or S2 L1½T1

Prerequisite: 10.001 or 10.011. Excluded: 10.2211, 4.813.

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

10.2112 Applied Mathematics 2 — Mathematical Methods for Differential Equations — S1 or S2 L1½T1

Prerequisites: 10.001 or 10.011. Excluded: 10.2212, 4.813.

Series solution or ordinary differential equations; numerical methods. Partial differential equations: separation of variables. Fourier series, Bessel functions.

10.2113 Applied Mathematics 2 — Introduction to Linear Programming — S1 or S2 L1½T½

Prerequisite: 10.001. Excluded: 10.2213.

Mathematical expression of practical optimization problems. Calculus methods for simple problems. Feasible regions and graphical methods.

Linear programming: the standard problem, basic solutions, fundamental theorem, simplex tableau, initial solution, unbounded and multiple solutions, degeneracy, duality; the dual simplex method, post optimal analysis.

10.2115 Applied Mathematics 2 — Discrete-Time Systems — S2 L1½T½

Prerequisite: 10.001. Excluded: 10.2215.

Introduction to discrete-time dynamic systems. Difference equations: existence and uniqueness of solutions, general solution of linear equations. Linear systems: dynamics, stability, and oscillations, z-transforms, state-space methods. Nonlinear systems: equilibrium points, limit cycles.

Applications selected from problems of importance in engineering, biological, social, management, and economic systems.

10.211E Applied Mathematics 2 — Mathematical Computing — F L1½T½

Prerequisite: 10.001.

The development of efficient and reliable software for mathematical applications using FORTRAN 77. Topics covered will include: data types, input/output, structured programming, communication between sub-programs, file manipulation, portability, efficiency, accuracy, documentation, de-bugging. Examples will be chosen from the following areas: non-linear equations in one and two variables, extrapolation procedures, numerical quadrature, systems of linear equations, difference equations, ordinary differential equations.

10.2211 Higher Applied Mathematics 2 — Vector Analysis — S1 L1½T1

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.2111.

As for 10.2111 but in greater depth.

10.2212 Higher Applied Mathematics 2 — Mathematical Methods for Differential Equations — S2 L1½T1

Prerequisite: 10.2211. Excluded: 10.2112.

As for 10.2112 but in greater depth.

10.2213 Higher Applied Mathematics 2 — Introduction to Linear Programming — S1 L1½T½

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.2113.

Mathematical expression of practical optimization problems. Calculus methods for simple problems. Feasible regions.

Linear programming: the standard problem, basic solutions, fundamental theorem, simplex tableau, initial solution, unbounded and multiple solutions, degeneracy, revised simplex method, duality, dual simplex method, post optimal analysis.

10.2215 Higher Applied Mathematics 2 — Discrete-Time Systems — S2 L1½T½

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.2115.

As for 10.2115, but in greater depth and with additional material on positive linear systems and Markov chains.

10.212A Applied Mathematics 3 — Numerical Analysis — F L1½T½

Prerequisites: 10.2112, 10.111A. Excluded: 10.222A.

Theory of Interpolation and approximation, using polynomials, splines, rational functions and Fourier methods. Numerical quadrature including Gaussian and Clenshaw-Curtis rules, adaptive methods and methods for singular and oscillatory integrands. Sets of linear equations and their numerical solution, matrix eigenvalue problems. Numerical solution of ordinary and partial differential equations, boundary value problems, introduction to finite element methods.

10.212L Applied Mathematics 3 — Optimization Methods — F L1½T½

Prerequisites: 10.1113 (at least 1 further unit chosen from the following: 10.111A, 10.1114, 10.2111, 10.2112, 10.2113). Excluded: 10.222L.

Theory of unconstrained and constrained multivariable optimization; including necessary and sufficient optimality conditions, stationary points, Lagrange multipliers, Kuhn-Tucker conditions, convexity and duality. Numerical methods: one dimensional minimization methods, unconstrained multivariable methods (including steepest descent, Newton, quasi-Newton and conjugate gradient methods) and constrained multi-variable methods (including linear programming, quadratic programming and penalty functions). A selection of special methods from branch and bound, geometric and separable programming.

10.212M Applied Mathematics 3 — Optimal Control Theory F L1½T½

Prerequisites: 10.1113 & 10.1114, 10.111A. Excluded: 10.222M.

Introduction to dynamical systems and their control. Open and closed loop control systems. Mathematical description of dynamical systems. Transform methods for linear systems. Stability, feedback and control. State space, observability and controllability. Optimal control. Dynamic programming and the Bellman equation with applications. The Pontryagin maximum principle. Applications. Calculus of variations.

[Examples and applications are drawn not only from the physical sciences but also from economics, resource and financial management, social and biological sciences.]

10.222A Higher Applied Mathematics 3 — Numerical Analysis F L1½T½

Prerequisites: 10.2212 or 10.2112 (DN), 10.121A or 10.111A (DN). Excluded: 10.212A.

As for 10.212A but in greater depth.

10.222C Higher Applied Mathematics 3 — Maxwell's Equations and Special Relativity F L1½T½

Prerequisites: 10.2211 or 10.2111 (DN), 10.2212 or 10.2112 (DN), 10.1214 or 10.1114 (DN), 1.001. Excluded: 1.033, 1.0333.

Electrostatics; Poisson and Laplace equations, potential theory, boundary value problems, spherical harmonics, Green's functions, dielectrics. Magnetic fields and forces; applications, magnetohydrodynamics. Electromagnetic fields, electromagnetic potentials, waves and radiation, vector and scalar wave equations, spherical waves, applications. Lorentz transformation, relativistic electrodynamics.

10.222F Higher Applied Mathematics 3 — Quantum Mechanics F L1½T½

Prerequisites: 10.2211 or 10.2111 (DN), 10.2212 or 10.2112 (DN),10.121A or 10.111A (DN), 10.1213 or 10.1113 (DN), 10.1214 or 10.1114 (DN). Excluded: 1.013, 1.0133.

Review of physical basis for quantum mechanics, simple harmonic oscillator, hydrogen atom. General formalism, angular momentum, perturbation theory and other approximation methods. Scattering problems.

10.222L Higher Applied Mathematics 3 — Optimization Methods F L1½T½

Prerequisites: 10.1213 or 10.1113 (DN) (at least 1½ further units chosen from the following: 10.121A or 10.111A (DN), 10.1214 or 10.1114 (DN), 10.2211 or 10.2111 (DN), 10.2212 or 10.2112 (DN), 10.2213 or 10.2113 (DN), 10.2214 or 10.2114 (DN)). Excluded: 10.212L.

As for 10.212L but in greater depth.

10.222M Higher Applied Mathematics 3 — Optimal Control Theory F L1½T½

Prerequisites: 10.1213 or 10.1113 (DN), 10.1214 or 10.1114 (DN), 10.121A or 10.111A (DN). Excluded: 10.212M.

As for 10.212M but in greater depth and including: Liapunov functions and the stability of non-linear systems. Further optimal control theory. Stochastic and Adaptive Control.

10.223 Applied Mathematics 4

An honours program consisting of the preparation of an undergraduate thesis together with advanced lecture courses. Lecture topics include selections from: advanced optimization and control theory, functional analysis and applications, numerical analysis, mathematics of economic models and of economic prediction, stability theory of differential and differential-difference equations, stochastic processes, statistical mechanics, quantum physics, astro-physics. With permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools.

10.233 Applied Mathematics 4 (Short Course)

6 units consisting of the preparation of an undergraduate thesis together with advanced lecture courses. Lecture topics include selections from: advanced optimization and control theory, functional analysis and applications, mathematics of economic models and of economic prediction, stability theory of differential and differential-difference equations, stochastic processes. With permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools.

Statistics

10.311A Theory of Statistics 2 — Probability and Random Variables S1 L3T1

Prerequisite: 10.001 or 10.011 or 10.021C (CR). Excluded: 10.321A, 10.301, 10.331, 45.101.

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

10.311B Theory of Statistics 2 — Basic Inference S2 L3T1

Prerequisite: 10.311A. Excluded: 10.321B, 10.301, 10.331, 45.101.

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.

10.321A Higher Theory of Statistics 2 — Probability and Random Variables S1 L3T1

Prerequisite: 10.001 or 10.011. Excluded: 10.311A, 10.301, 10.331, 45.101.

As for 10.311A but in greater depth.

10.321B Higher Theory of Statistics 2 — Basic Inference **S2 L3T1**

Prerequisite: 10.321A. Excluded: 10.311B, 10.301, 10.331, 45.101.

As for 10.311B but in greater depth.

10.3111 Theory of Statistics 2 — Statistical Computing and Simulation **S1 L1½T½**

Prerequisite: 10.001 or 10.011 or 10.021C(CR). Co-requisite: 10.311A.

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.

10.3211 Higher Theory of Statistics 2 — Statistical Computing and Simulation **S1 L1½T½**

Prerequisite: 10.001. Co-requisite: 10.321A.

As for 10.3111 but in greater depth.

10.3112 Theory of Statistics 2 — Nonparametric Statistical Inference **S2 L1½T½**

Prerequsite: 10.311A. Co-requisite: 10.311B.

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

10.3212 Higher Theory of Statistics 2 — Nonparametric Statistical Inference **S2 L1½T½**

Prerequisite: 10.321A. Co-requisite: 10.321B.

As for 10.3112 but in greater depth.

10.312A Theory of Statistics 3 — Probability and Stochastic Processes **S1 L2T2**

Prerequisites: 10.311A, 10.111A, 10.1113. Excluded: 10.322A.

Elementary treatment of probability and moment generating functions and characteristic functions. Convergence in distribution. Central Limit Theorem. Convergence in probability. Weak law of large numbers. Poisson processes Elementary treatment of Markov chains. Birth-and-death processes. Queueing theory.

10.312B Theory of Statistics 3 — Experimetal Design (Applications) and Sampling **S2 L2T2**

Prerequisite: 10.311B or 10.331 (normally CR). Excluded: 10.322B.

Principles of good experimental design. Completely randomized experiment, randomized block experiment in detail. Latin squares. Contrasts. Analysis of factorial experiments. Multiple comparison methods. Random models. Split plot design. Sampling theory.

10.312C Theory of Statistics 3 — Experimental Design (Theory) **S1 L2T2**

Prerequisites: 10.311B, 10.111A, 10.1113. Co-requisites: 10.312B, plus any two Level III Pure Mathematics or Applied Mathematics or Theoretical Mechanics or Computer Science units. Excluded: 10.322C.

Matrix theory. Cochran-James theorem. Multivariate normal. Quadratic forms. Independence. The General Linear Hypothesis. Gauss-Markov theorem. Hypothesis testing. Analysis of variance.

10.312D Theory of Statistics 3 — Probability Theory **S2 L2T2**

Prerequisites: 10.311A, 10.111A, 10.1113, 10.2112. Excluded: 10.322D.

Rigorous treatment of probability and moment generating functions and characteristic functions. Convergence in probability. Weak law of large numbers. Almost sure convergence. Strong law of large numbers. Compound distributions. Branching process. Advanced treatment of Markov chains. Markov chains with continuous parameter.

10.312E Theory of Statistics 3 — Statistical Inference **S2 L2T2**

Prerequisites: 10.311B, 10.111A, 10.1113. Co-requisites: Any two Level III Pure Mathematics or Applied Mathematics or Theoretical Mechanics units or Computer Science. Excluded: 10.322E.

Bayesian inference and decision theory. Classical inference. Contingency tables (large sample and exact tests). Order Statistics. Nonparametric methods.

10.312F Theory of Statistics 3 — Statistical Computing **SS L2T2**

Prerequisites: 10.311B or 10.321B or 10.3321, 6.621, 6.641.

Processing of data for statistical purposes: storage, retrieval, manipulation. Array and sequential processing. Standard statistical operations, and their efficient coding. Probability distributions, discrete and continuous; their inverses. Generation of (pseudo-) random variables from specific distributions and their use in simulation. Modular package construction, and the use of packages (eg STATAPL, IDAP, INSTAPAK, SPSS).

A project, to construct a small package consistent with general specifications and with safeguards against common errors.

10.3321 Regression Analysis and Experimental Design **S1 L1½T½**

Prerequisite: 10.331 or 10.311B or approved equivalent. Excluded: 10.312B or 10.322B.

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.

10.3322 Applied Stochastic Processes — S2 L1½T½

Prerequisite: 10.331 or 10.311A or 10.321A, or approved equivalent. Excluded: 10.312A, 10.322A.

An introduction to processes in discrete and continuous time. Markov chains and Markov Processes, branching processes, Time Series with moving average models.

10.322A Higher Theory of Statistics 3 — Probability and Stochastic Processes — S1 L2½T2

Prerequisites: 10.321A, 10.111A, 10.1113. Excluded: 10.312A.

As for 10.312A but in greater depth.

10.322B Higher Theory of Statistics 3 — Experimental Design (Applications) and Sampling — S2 L2½T2

Prerequisites: 10.321B, 10.111A, 10.1113. Excluded: 10.312B.

As for 10.312B but in greater depth.

10.322C Higher Theory of Statistics 3 — Experimental Design (Theory) — S1 L2½T2

Prerequisites: 10.321B, 10.111A, 10.1113. Co-requisites: 10.322B, plus any two Level III Pure Mathematics or Applied Mathematics or Theoretical Mechanics or Computer Science units. Excluded: 10.312C.

As for 10.312C but in greater depth.

10.322D Higher Theory of Statistics 3 — Probability Theory — S2 L2½T2

Prerequisites: 10.321A, 10.111A, 10.1113. Excluded: 10.312D.

As for 10.312D but in greater depth.

10.322E Higher Theory of Statistics 3 — Statistical Inference — S2 L2½T2

Prerequisites: 10.321B, 10.111A, 10.1113. Co-requisites: Any two Level III Pure Mathematics or Applied Mathematics, Theoretical Mechanics units or Computer Science. Excluded: 10.312E.

As for 10.312E but in greater depth.

10.323 Theory of Statistics 4

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.

10.301 Statistics SA — F L1½T½

Prerequisite: 10.001 or 10.021C. Excluded: 10.331, 10.311A, 10.311B, 10.321A, 10.321B, 45.101.

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.

10.331 Statistics SS — F L1½T½

Prerequisite: 10.001 or 10.021C (CR). Excluded: 10.311A, 10.311B, 10.321A, 10.321B, 10.301, 45.101.

An introduction to the theory of probability, with finite, discrete and continuous sample spaces. The standard elementary 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 and mixed models, involving multiple comparisons and estimation of variance components.

Theoretical and Applied Mechanics

10.4111 Theoretical Mechanics 2 — Introduction to Theoretical Mechanics — S1 L1½T½

Prerequisites: 10.001, 1.001 or 5.006. Co-requisites: 10.2111, 10.2112, 10.1113. Excluded: 1.992, 1.002, 10.411B, 10.421B, 10.4211.

Revision of vectors, kinematics. Dynamics of particles including simple harmonic motion and projectiles. Systems of particles. Conservation principles. Work, energy and power. Rotating frames of reference and the motion of rotating bodies.

10.4112 Theoretical Mechanics 2 — Introduction to Hydrodynamics — S2 L1½T½

Prerequisite: 10.001. Co-requisite: 10.4111 or 1.002. Excluded: 10.411A, 10.421A, 10.4212.

Equations of continuity and motion. Bernoulli's equation for an incompressible liquid. Kelvin's theorem. Some irrotational flow problems in one, two and three dimensions.

10.4211 Higher Theoretical Mechanics 2 — Introduction to Theoretical Mechanics — S1 L1½T½

Prerequisites: 10.011 or 10.001 (DN), 1.001 or 5.006. Co-requisites: 10.2211, 10.2212, 10.1113. Excluded: 1.992, 1.002, 10.411B, 10.421B, 10.4111.

As for 10.4111 but in greater depth.

10.4212 Higher Theoretical Mechanics 2 — Introduction to Hydrodynamics S2 L1½T½

Prerequisites: 10.011 or 10.001 (DN), 10.4211 or 1.002 (CR). Excluded: 10.421A, 10.411A, 10.4112.

As for 10.4112 but with additional topics chosen from aerofoil theory, water waves and sound waves.

10.412A Theoretical Mechanics 3 — Dynamical and Physical Oceanography F L1½T½

Prerequisites: 10.2111 & 10.2112 or 10.031, 1.001. It is recommended that one of the following be taken concurrently: 10.4112 or 1.3533.

A brief review of the basic physical features of the oceans and the physical properties of sea water. Elementary hydrodynamics. An introductory discussion of turbulence. Geostrophy, dynamic heights and the inference of currents from hydrographic measurements. Ekman layers. Wind-driven ocean circulation, western boundary currents. Surface and internal waves, tides. Thermohaline processes: mixing, entrainment, double-diffusive phenomena, mixed layers and gravity currents.

10.412B Theoretical Mechanics 3 — Continuum Mechanics F L1½T½

Prerequisites: 10.2111, 10.2112, 10.111A, 10.1113, 10.1114. Co-requisites: 10.411A or 1.012 or 1.913. Excluded: 10.422B.

Cartesian tensors, stress and strain in continuous media. Equations of equilibrium and motion. Equations of elasticity. Bending and torsion of beams. Plane elasticity (if time available). Viscous flow of liquids (if time available).

10.412D Theoretical Mechanics 3 — Mathematical Methods F L1½T½

Prerequisites: 10.2112, 10.111A, 10.1113, 10.1114. Excluded: 10.422D.

An elementary treatment of mathematical methods for problems arising mainly in physics and engineering (waves and vibrations; diffusion and heat conduction; electromagnetic, gravitational and hydrodynamic fields and potentials; linear systems and signal analysis). Ordinary and partial differential equations. Integral equations. General Fourier series — orthogonal functions and eigenfunction expansions. Fourier and Laplace transforms. Calculus of variations and variational methods. Green functions. Perturbation methods.

10.4129 Theoretical Mechanics 3 — Applied Time Series Analysis S2 L1½T½

Prerequisite: 10.2112 or 10.031 or 10.022. Co-requisites: 10.331 or equivalent; 10.4331 or 10.412D or equivalent.

Classification of random processes, sampling for discrete analysis, Fourier analysis, spectra, filtering. Cross-spectra, estimation and hypothesis testing, confidence limits, application to experiment planning. Course emphasis is on computer analysis of actual data.

10.422A Higher Theoretical Mechanics 3 — Fluid Dynamics S2 L3T1

Prerequisite: 10.421A or 10.411A (DN). Co-requisite: 10.422B.

Compressible flow, viscous flow, boundary layers, hydrodynamic stability, simple wave motions in fluids.

10.422B Higher Theoretical Mechanics 3 — Mechanics of Solids S1 L3T1

Prerequisites: 10.111A, 10.1113, 10.1114, 10.2111, 10.2112, 10.421B or 10.411B (DN) or 1.012. Excluded: 10.412B.

As for 10.412B Theoretical Mechanics 3 — Continuum Mechanics but in greater depth.

10.422D Higher Theoretical Mechanics 3 — Mathematical Methods F L1½T½

Prerequisites: 10.2211 or 10.2111 (DN), 10.2212 or 10.2112 (DN), 10.1213 or 10.1113 (DN), 10.1214 or 10.1114 (DN). Excluded: 10.412D.

Revision of functions of a complex variable, contour integration. Asymptotic expansions with applications to special functions. Methods of steepest descent and stationary phase. Fourier and Laplace transforms, with applications to partial differential equations and integral equations. Generalized functions. Fredholm theory for boundary value problems. Solution of boundary value problems using Green's functions and eigenfunction expansions. Solution of partial differential equations of first and second order.

10.4331 Theoretical Mechanics 3 — Transform Methods S1 L1½T½

Prerequisites: 10.1113, 10.1114, 10.2112 or equivalent. Excluded: 10.412D and 10.422D.

Fourier Transforms and their properties. Generalized functions. Application of Fourier and Laplace Transforms to the solution of partial differential equations.

10.423 Theoretical Mechanics 4

An honours program consisting of the preparation of an undergraduate thesis together with advanced lecture courses on topics chosen from fluid mechanics, solid mechanics, planetary science and special mathematical and numerical techniques applied to partial differential equations. With the permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools on topics such as optimal control theory, optimization theory, thermodynamics, numerical analysis or statistics.

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 and Engineering Handbooks.

10.022 Engineering Mathematics 2 F L2T2

Prerequisite: 10.001.

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.

10.033 Electrical Engineering Mathematics 3 — F L1½T½

Prerequisites: 10.111A, 10.1113, 10.1114, 10.2111, 10.2112.

Numerical Analysis: Interpolation, roots of equations, approximation of definite integrals. Difference equations, Z-transform. Approximate solution of ordinary differential equations. Approximate solution of matrix problems, matrix inversion, eigenvalue and eigenvector problems.

Partial Differential Equations: Characteristics. Continuous and discrete Fourier transforms. Autocorrelation. Spectral density. Laplace transform. Potential theory. Numerical solution of parabolic, elliptic and hyperbolic partial differential equations.

Optimization.

10.341 Statistics SU — F L1½T½

Prerequisite: 10.001 or 10.011.

Introduction to probability theory, random variables and distribution functions, sampling distributions, including those of t, χ^2 and F. Estimation procedures, including confidence interval estimation with an emphasis on Least Squares and surveying problems, and computer based exercises.

10.351 Statistics SM — F L1T½

Prerequisite: 10.001 or 10.011.

For students in Aeronautical, Industrial and Mechanical Engineering and Naval Architecture as part of 5.071 Engineering Analysis or 5.072 Statistics/Computing.

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.

10.361 Statistics SE — F L1½T½

Prerequisite: 10.001 or 10.011

For students in the School of Electrical Engineering.

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. Estimation by moments and maximum likelihood; confidence interval estimation. The Standard tests of significance based on the above distribution 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.

10.381 Statistics SC — S1 or S2 L1T1

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

Psychology

Psychology Level I Unit

12.100 Psychology 1 — F L3T2

Excluded: 12.001.

An introduction to 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.

Psychology Level II Units

12.200 Research Methods 2 — F L2T1

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Excluded: 12.152.

General introduction to the design and analysis of experiments; hypothesis testing, estimation, power analysis; general treatment of simple univariate procedures; correlation and regression.

12.201 Basic Psychological Processes 2 — S1 L2T2

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Excluded: 12.052.

The basic phenomena of behaviour and experience in a biological context.

12.202 Complex Psychological Process 2 — S2 L2T2

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Excluded: 12.062.

Information processing and cognitive functioning, and social bases of behaviour and personality.

12.203 Psychology 2A — F L2T2

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Co-requisites: 12.200, 12.201, 12.202. Excluded: 12.042.

Available to Course 3430 students only.

Computing, assessment and introduction to clinical practice.

12.204 Human Relations 2 — S2 L2T2

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Excluded: 12.072.

Social and personality development of the individual; human relations in the family group. Interpersonal relationships and, in particular, the handling of anxiety, aggression and communication.

12.205 Individual Differences 2 **S1 L2T2**

Prerequisite: 12.100. (Pass Conceded (PC) awarded prior to Session 2, 1983 is not acceptable.) Excluded: 12.082.

Measurement and significance of individual differences in intellectual, motivational and personality functioning. Statistics, to cover the fundamentals of hypothesis testing.

Psychology Level III Units: Group A

12.300 Research Methods 3A **S1 L2T2**

Prerequisite: 12.200. Excluded: 12.153.

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.

12.304 Personality and Individual Differences 3 **S1 L2T2**

Prerequisites: 2 Psychology Level II subjects. Excluded: 12.303.

Personality dynamics and structure and differences in ability and intelligence.

12.305 Learning and Behaviour 3 **S1 or S2 L2T2**

Prerequisites: 12.200 & 12.201. Excluded: 12.253.

The establishment and elimination of extended sequences of behaviour in complex environments. Implications of the theories and research for applied work.

12.322 Abnormal Psychology 3 **S1 L2T2**

Prerequisites: 12.200 & 12.201. Excluded: 12.603.

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

Psychology Level III Units: Group B

12.301 Research Methods 3B **S2 L2T2**

Prerequisites: 12.200 & 12.300. Excluded: 12.163.

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

12.310 Physiological Psychology 3 **S2 L2T2**

Prerequisites: 12.200 & 12.201. Excluded: 12.413.

Elementary neuropharmacology and neuroanatomy. Brain control of eating, drinking, aggression, copulation, pain perception, memory, language and functional disorders.

12.311 Perception 3 **S1 L2T2**

Prerequisites: 12.200 & 12.201. Excluded: 12.473.

Studies of infant perception, conflict between vision and other senses, certain illusions, and of the perception of size and distance generally.

12.312 Language and Cognition 3 **S2 L2T2**

Prerequisites: 12.200 & 12.202. Excluded: 12.453.

The stages involved in the reception of stimulus information from the environment, its analysis, storage, and transmission into responses. Stress on processing of language.

12.314 Motivation and Emotion 3 **S2 L2T2**

Prerequisites: 12.200 & 12.201. Excluded: 12.323.

An examination of contemporary research regarding 'drives', 'incentives' and 'emotions' as determinants of animal and human action. Theoretical perspectives cover biological and social influences.

12.320 Social Psychology 3 **S1 L2T2**

Prerequisites: 12.200 & 12.202. Excluded: 12.503.

Contemporary research areas in social psychology. Topics may include the social basis of human interaction, interpersonal relationships, social perception and cognition, and interpersonal communication.

12.321 Developmental Psychology 3 **S2 L2T2**

Prerequisite: 12.200 & 12.202. Excluded: 12.553.

The development of perception and the development of operational thought; the development of language and its relationship to the development of thought; and the development of reading.

12.324 Experimental Psychopathology 3 **S2 L2T2**

Prerequisite: 12.322.

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; driven behaviours.

12.325 Social Behaviour 3 **S1 L2T2**

Prerequisites: 12.200 & 12.202.

Research and theory in applied social psychology. Topics may include the relation of the physical setting to behaviour, cross cultural studies, and race relations.

12.330 Psychological Assessment 3 **S1 L2T2**

Prerequisites: 12.200, and 1 other Psychology Level II subject. Excluded: 12.042, 12.203, 12.373.

Principles and techniques of psychological assessment. Types of tests and their application in selection and allocation procedures.

12.331 Counselling Psychology 3 S1 L2T2

Prerequisites: 2 Psychology Level II subjects. Excluded: 12.623.

Principles and techniques of counselling in a variety of contexts. Interviewing, group process and structure, and interpersonal relations.

12.332 Behavioural Change 3

Prerequisites: 12.200 & 12.201. Excluded: 12.713.

Not offered in 1985.

Use of the methods of behavioural change in individual, group and institutional settings. Non-psychological methods of behavioural influence. A comparison of attitude and behavioural change. Definitions of problem behaviour. Ethical issues.

12.333 Ergonomics 3 S2 L2T2

Prerequisite: 12.200. Excluded: 12.663.

Aspects of human performance relevant to work design. The principles involved in designing the environment in general, and work in particular, to suit humans' capabilities.

12.334 Behaviour in Organizations 3 S2 L2T2

Prerequisites: 2 Psychology Level II subjects. Excluded: 12.653.

Theories and research methods for understanding behaviour in organizations and in the environment.

12.335 Behavioural Evaluation and Assessment 3 S2 L2T2

Prerequisite: 12.322.

Assessment and evaluation of individual behaviour and behavioural change. Problems of measurement and scale construction; objective versus subjective measures; self report, behavioural and psychophysiological measures. Interviewing and behavioural analysis; psychometric testing and case history taking.

12.340 Special Topic 3

Prerequisites: 12.300, 12.304 & 12.305.

Not offered in 1985.

An occasional elective dealing with a special field of psychology.

Psychology Level IV Units

12.400 Psychology 4 (Research-3430) F

Prerequisite: All requirements for Years 1-3 of the course.

Psychology 4 in the BSc in Psychology degree course. A supervized research thesis and course work to be determined in consultation with the Head of School.

12.401 Psychology 4 (Course Work-3430) F

Prerequisite: All requirements for Years 1-3 of the course.

Psychology 4 in the BSc in Psychology degree course. Course work and a supervized group research project to be determined in consultation with the Head of School.

12.403 Psychology 4 (Research) F

Prerequisites: 12.100, 12.200. 12.201, 12.202 and 8 Psychology Level III units, including 12.300, 12.305 and either 12.304 or 12.322 from Group A and 12.301 from Group B, with a weighted average of at least Credit, and at the discretion of the Head of School.

Psychology 4 in the Arts, and Science and Mathematics degree courses. A supervized research thesis and course work to be determined in consultation with the Head of School.

12.404 Psychology 4 (Course Work) F

Prerequisites: 12.100, 12.200, 12.201, 12.202 and 8 Psychology Level III units, including 12.300, 12.305 and either 12.304 or 12.322 from Group A, with a weighted average of at least Credit, and at the discretion of the Head of School.

Psychology 4 in the Arts, and Science and Mathematics degree courses. Course work and a supervized group research project to be determined in consultation with the Head of School.

Psychology Servicing Units

These are subjects taught within courses offered by other faculties.

For further information regarding the following unit see the Faculty of Commerce Handbook.

12.651 Psychology (Industrial Relations)

Prerequisite: Nil.

Not offered in 1985.

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 headings of 'participation' and 'democracy in industry'.

For further information regarding the following unit see the Faculty of Science section in this Handbook.

12.741 Psychology (Optometry) **F L2**

Prerequisite: 12.001 or 12.100.

Visual Perception: The nature and characteristics of visual perception. Topics to be discussed include: psychophysics, the organization of visual perception, the influence of context, and the effects of learning and motivation on perception. Throughout the course emphasis wiill be placed on 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.

Accountancy

14.501 Accounting and Financial Management 1A **S1 or S2 L2T2½**

Prerequisite: Nil.

The basic concepts of financial model building and information systems, including the double-entry recording system, the accounting cycle, income measurement and financial reporting, and an introduction to basic elements of auditing.

14.511 Accounting and Financial Management 1B **S1 or S2 L2T2½**

Prerequisite: 14.501.

Development of basic concepts introduced in 14.501 Accounting and Financial Management 1A, including corporate reporting, business finance, system design, elementary computer applications.

14.522 Accounting and Financial Management 2A **S1 or S2 L2T2½**

Prerequisites: 14.511 plus

	HSC Exam Percentile Range Required
2 unit Mathematics or	*51-100*
3 unit Mathematics or	*21-100*
4 unit Mathematics	*1-100*

The design, production and use of accounting and other quantitative information in the planning and control of organizations, with particular reference to manufacturing activities.

14.542 Accounting and Financial Management 2B **S1 or S2 L2T2½**

Prerequisite: 14.511 plus HSC results as for 14.522.

Critical examination of concepts and problems in income measurement, asset valuation and financial reporting for various forms of business undertaking with particular reference to corporate organizations, including associated aspects of auditing and taxation and methods of accounting for changing prices.

14.563 Accounting and Financial Management 3A **S1 or S2 L2T2½**

Prerequisite: 14.542.

Financial Accounting: Advanced aspects of financial accounting and reporting for business enterprises with particular reference to developments in accounting theory and practice and in professional standards, including the financial and accounting aspects of mergers, takeovers and group companies.

14.573 Accounting and Financial Management 3A (Honours) **S1 LT6**

Prerequisite: 14.542.

Includes 14.563 Accounting and Financial Management IIIA as well as additional and more advanced work in both accounting theory and in the financial management and accountability of corporate enterprises.

14.583 Accounting and Financial Management 3B **S1 or S2 L2T2½**

Prerequisite: 14.522.

Management Accounting: advanced treatment of management accounting theory and applications including statistical cost analysis, budgetary and strategic planning and decision models.

14.593 Accounting and Financial Management 3B (Honours) **S2 LT6**

Prerequisite: 14.522.

Includes 14.583 Accounting and Financial Management 3B, as well as more advanced work dealing with theoretical and research issues in management accounting.

14.601 Law in Society — S1 or S2 L2T1

Prerequisite:

	HSC Exam Percentile Range Required
2 unit A English or	*31-100*
2 unit English or	*21-100*
3 unit English or	*11-100*

The nature of law, the sources of law, the Australian legal system, legal reasoning, the administration of justice, the legal profession, selected areas of substantive law and important issues in law in our society.

14.602 Computer Information Systems 1 — S1 or S2 L2T1

Prerequisites: 14.511 plus 15.411 or approved studies in computer science.

Information systems and the organization, architecture of typical commercial application systems, the systems lifecycle, the systems analysis/design task, tools and techniques of the systems analyst, documentation techniques, internal controls and interfacing with the edp auditor, file design concepts, logic and computer hardware, commercial computer programming.

14.603 Computer Information Systems 2 — S2 L2T1

Prerequisite: 14.602.

The systems design task; forms driven, data structure and data flow based design methodologies; top-down structured design; introduction to database management techniques; the systems software environment; graphics; communications networks and software; structured programming; program design; COBOL programming.

14.605 Information Systems Implementation — S2 L2T1

Prerequisite: 14.603.

Supervised implementation of an information systems project in a commercial programming language. Advanced program design and structured techniques, interface with systems software at application implementation level, comparison of a range of programming languages, test data specification, implementation procedures.

14.607 Distributed Computer Systems — S2 L2T1

Prerequisite: 14.603

Advanced data communication concepts, computer networks, reference to international standards and common industry communictions software packages; transaction processing software and interface with data management systems; local networks; interaction between text processing and data processing; a case study based on a microcomputer network.

14.608 Database Systems — S1 L2T1

Prerequisite: 14.603.

Advanced data storage concepts, including detailed study of alternative approaches to database management systems. Management information needs and database specification in a commercial environment. Detailed evaluation, with project work, of a microcomputer based database management system. Information retrieval concepts, relational query-systems, security, control and audit considerations.

14.611 Information Systems Development — S1 L2T1

Prerequisite: 14.603 and approval by the Head of the Department of Information Systems.

A systems analysis and design case study. Information systems project management, data processing administration, on-line systems, design techniques, internal controls.

14.613 Business Finance 2 — S1 or S2 LT3

Prerequisite: Nil.

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.

14.614 Business Finance 3A — S1 L3

Prerequisite: 14.613.

Financial decision making within the framework of capital market theory. Includes diversification, risk and return, determinents of risk, efficient market hypothesis with emphasis on Australian evidence, capitalization changes and performance measures, takeovers and mergers.

14.615 Business Finance 3B — S2 L3

Prerequisite: 14.614.

Theory and analytical techniques relevant to investment analysis and management. Includes analysis and valuation of securities, properties of accounting numbers, portfolio theory and asset pricing models, capital asset returns and information, bond ratings and yields and financial distress predictions.

14.794 Honours Thesis

14.853 Advanced Systems Management

As for 14.953G. See Graduate Study: Subject Descriptions.

14.857 Operations Research for Management 1

As for 14.957G. See Graduate Study: Subject Descriptions.

14.886 Research Topics in Information Systems 1

As for 14.986G. See Graduate Study: Subject Descriptions.

14.887 Research Topics in Information Systems 2

As for 14.987G. See Graduate Study: Subject Descriptions.

14.891 Decision Support Systems

As for 14.991G. See Graduate Study: Subject Descriptions.

Economics

Department of Economics

15.001 Microeconomics 1 — S1 or S2 L2T1½

Commerce/Arts/Applied Science/Sciences prerequisite:

	HSC Exam Percentile Range Required
2 unit A English or	*31-100*
2 unit English or	*21-100*
3 unit English	*11-100*

Economics as a social science, the central role of scarcity and opportunity cost. Australian industrial structure. Efficiency concepts. Relative prices and their change through time. Demand, revenue and elasticity. Theory of exchange. Property rights, externalities and distortions. Gains from specialization and international trade. Marginal productivity, input demand. The price taking firm, profit maximization in short and long run. Taxation, protection, stabilization of markets. Imperfect markets, competition policy. Investment decisions and economic growth.

15.002 Microeconomics 2 — S1 L2T2

Commerce/Applied Science/Sciences prerequisites: 15.011 plus 15.401 or 15.411 or equivalent.
Arts prerequisite: 15.011. Co-requisites: 15.401 or 15.411 or equivalent.
Excluded: 15.012, 15.072.

Revealed preference theory of demand, index numbers and aggregation; externalities, time preference, consumer surplus and compensation concepts. Short and long-run costs, returns to scale, producer surplus and quasi-rents. Monopolistic competition, oligopoly, cartels, public enterprise. Investment criteria, benefit-cost analysis. Efficiency and equity trade-offs, microeconomic policy in a second best framework.

15.003 Macroeconomics 3 — S1 L2T2

Commerce/Arts/Applied Science/Sciences prerequisite: 15.042 or 15.052. Co-requisite: 15.412.

Macroeconomic theory and policy including an introduction to the theory of economic policy, the structure and dynamic characteristics of macro-models, recent developments in monetary theory and policy, theories of inflation and policy in a dynamic setting.

15.011 Macroeconomics 1 — S1 or S2 L2T1½

Commerce/Arts/Applied Science/Sciences prerequisite: 15.001.

The economics of output, employment and inflation, including social accounting, consumption and investment functions, the Keynesian goods market model, supply and demand for money, interactions between the goods and money markets in equilibrium and disequilibrium situations, inflation and the balance of payments.

15.042 Macroeconomics 2 — S2 L2T2

Commerce/Arts/Applied Science/Sciences prerequisites: 15.011 plus 15.401 or 15.411 or equivalent. Co-requisite 15.421 or equivalent. Excluded: 15.052, 15.062.

Extensions to the Keynesian model of income determination to include the government and overseas sectors and a more detailed examination of both demand and supply functions; money and financial institutions; an introduction to dynamic economics.

15.062 Applied Macroeconomics — S1 or S2 L2T1½

Commerce/Arts/Applied Science/Sciences prerequisite: 15.011. Excluded: 15.052.

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.

15.072 Applied Microeconomics — S1 or S2 L2T1½

Commerce/Arts/Applied Science/Sciences prerequisite: 15.011. Excluded: 15.012 and 15.002.

Structural change in the Australian economy. The effect of different market structures on firms and consumer welfare. The consequences of markets 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. The economics of non-renewable and other resources. Australia's international trade and investment and the effects of restrictions on international trade and investment.

15.143 Microeconomics 3 — S2 L2T2

Commerce/Arts/Applied Science/Sciences prerequisite: 15.002 or 15.012. Co-requisite: 15.412.

General equilibrium approach to micro-economic analysis, including aspects of welfare economics. The effects of various forms of government intervention on prices, output and international trade. Public sector investment and pricing. The implications of property rights and the effects of de-regulation of industries.

15.423 Econometrics B — S2 L2T1½

Commerce/Sciences prerequisite: 15.413, or with permission of the Head of the Department of Econometrics, 10.312C.

Identification, specification and estimation of simultaneous equation models including forecasting, policy analysis and simulation. The estimation techniques include: two-stage least squares, three-stage least squares, limited information maximum likelihood and reduced form estimation.

Students build their own models using standard computer packages.

15.666 Australia in the International Economy in the Twentieth Century — S1 or S2 L2T1½

Commerce/Applied Science/Sciences prerequisite:

	HSC Exam Percentile Range Required
2 unit A English or	*31-100*
2 unit English or	*21-100*
3 unit English	*11-100*

The international economy at the end of the nineteenth century: trade, factor flows, and payment arrangements. Problems of the international economy between the wars. The impact of World War II and the international economy in the post-war 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.

15.777 Management Strategy and Business Development — S2 L2T1½

Commerce/Applied Science/Sciences prerequisite: 15.601 or 15.666.

The strategy and structure of large scale business enterprise over the past century. An analysis of the process of growth from small family firms and partnerships to corporate enterprises and multinational corporations. The external business environment. Case studies of managerial hierarchies, investment strategy and diversification of firms in transport, mass retailing and mass production.

Biological Sciences

17.031 Biology A — S1 L2T4

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Science (Physics) or	*31-100*
2 unit Science (Chemistry) or	*31-100*
2 unit Science (Geology) or	*31-100*
2 unit Science (Biology) or	*31-100*
4 unit Science (multistrand)	*31-100*

Basic cell structure; membranes, organelles, prokaryotic and eukaryotic cells; cellular locomotion; basic biological molecules; enzymes: structure and metabolic roles, cellular compartmentalization and enzyme function; diffusion, osmosis and active transport; theory of inheritance, linkage, mutation, information transfer and protein synthesis.

Requirements for Practical Work
Equipment required for practical work is set out in the *Course Guide*, available during enrolment time at the First Year Registration Centre (Physics Building). Students must purchase this ***prior to*** the first week of session.

17.041 Biology B — S2 L2T4

Prerequisite: 17.031. Excluded: 17.021.

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.

17.012 General Ecology — S2 L2T4

Prerequisites: 17.031 & 17.041.

Evolution and environmental selection in the Australian continent; geological, palaeoclimatological, biogeographical and historical background. Functional organization of ecosystems: energy budgets, hydrological and biogeochemical cycles. Integrated structure and function of ecosystems, including cropping and management of natural resources. Aspects of microbial ecology. Students are required to attend a field camp as an integral part of the course.

Applied Geology

25.110 Earth Materials and Processes — S1 L2T4

Constitution of the Earth. The Earth and the Solar System. The interior of the Earth: the crust and its chemical composition, gravity and isostasy. Minerals and rocks, economic mineral deposits. *Earth Processes.* The origin of igneous rocks; plutonism and volcanism. The geological cycle. Weathering processes, soil formation and landforms. The origin of sedimentary rocks; transportation, deposition, lithification. Arid, glacial and periglacial processes. Geological time. Metamorphism and metamorphic rocks. Structural geology, classification and origin of faults and folds. Quaternary stratigraphic sequences, neotectonics. *Field Work* of up to two days is a compulsory part of the subject.

25.120 Earth Environments and Dynamics — S2 L2T4

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Mathematics or*	*71-100*
3 unit Mathematics or	*21-100*
4 unit Mathematics	*1-100*
and	
2 unit Science (Physics) or	*31-100*
2 unit Science (Chemistry) or	*31-100*
4 unit Science (multistrand)	*31-100*
and	
25.110.	

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Earth Environments: Introductory palaeontology, including the evolution of life, invertebrates and vertebrates. Principles of stratigraphy. The stratigraphy of New South Wales: Broken Hill, Lachlan Orogen, New England Fold Belt and Sydney Basin. Introductory stratigraphy

of Australia from the Precambrian to the Recent. The mineralogical study of rocks; techniques and significance of mineralogy. Structural geology; stereographic and statistical treatment of structural data. *Earth Dynamics:* The evolution of ocean basins; sea-floor spreading and sea-level changes. Climates of the past. Geophysical methods of exploration; seismology and earthquake prediction. Plate tectonics and continental drift. *Field Work* of up to four days is a compulsory part of the subject.

25.211 Earth Materials 1 — S1 L2T4

Prerequisite: 25.120.

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 place tectonics. *Practical:* Macroscopic and microscopic examination of rock forming and ore minerals and igneous rocks in the field and the laboratory. *Field Work* of one day is a compulsory part of the subject.

25.212 Earth Environments 1 — S1 L3T3

Prerequisite: 25.120.

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 stratigraphic distribution of invertebrates, including Foraminifera, Brachiopoda, Mollusca, Arthropoda, Protochordata and Echinodermata. Introductory palaeobotany. Palaeoecology. Biogeography. Trace fossils. Reef building organisms and the evolution of reefs. *Field Work* of up to five days is a compulsory part of the subject.

25.221 Earth Materials 2 — S2 L3T3

Prerequisite: 25.211.

Sedimentary Petrology: The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The chemically formed sedimentary rocks including the phosphates, zeolites, 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 structures in rocks. Techniques of stereographic projection of structural elements and analysis of simple fracture systems. Tectonics and tectonic analysis. *Field Work* of up to eight days is a compulsory part of the subject.

25.223 Earth Physics — S2 L2T4

Prerequisite: 25.110

Global Geophysics: Principles of gravity, geomagnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution, dynamic processes and major tectonic features of the earth. *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. *Field Work* of two days is a compulsory part of the subject.

25.2261 Mathematical Geology 1 — S2 L2T1

Prerequisite: 25.120.

Geological Statistics: Measurement scales in geology. Probability distributions and their properties; sampling and test of significance. Application of these techniques using geological data. *Geological Computing:* FORTRAN programming; text editing; control language for VAX and CYBER.

25.311 Earth Materials 3 — S1 L2T4

Prerequisite: 25.221.

Mineralogy: 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. *Geochemistry:* Some modern methods of rock and mineral analysis. Accuracy, precision and quality of geochemical data. The distribution of elements in terrestrial rocks. Norms. *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.

25.321 Earth Materials 4 — S2 L3T3

Prerequisite: 25.221.

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. *Advanced 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 are petrogenetic indicators. Practical petrography and literature studies of igneous suites. Field study. *Advanced Metamorphic Petrology:* Facies series. Metamorphic reactions. Isograds. Mineral assemblages as geobarometers and geothermometers. Fluids in metamorphism. Fabric. Relationships of deformation and recrystallization. Metamorphic petrology of Australia. Practical macroscopic and microscopic study of metamorphic rocks. *Field Work* of up to six days is a compulsory part of the subject.

25.312 Earth Environments 2 — S1 L3T3

*Prerequisite: 25.212 (**note:** it is desirable that students taking this unit have also taken 25.223).*

Stratigraphy: Stratigraphic classification. Biological and physical methods of correlation. Introduction to radiogenic methods of age determination: 14C, K/Ar, Rb/Sr and fission track methods. Definition of international stratigraphic boundaries, stratotypes and reference points. Types of sedimentary basins and continental margins. The development of the Precambrian craton of Australia. The geological evolution of eastern Australia, particularly the late Palaeozoic and Mesozoic history of the Tasman Mobile Belt. Intracratonic basins of western and southern Australia and the effects of the dispersal of

Gondwanaland. Geological evolution of the northern margin of the Australian plate, particularly the Mesozoic to Recent of Papua-New Guinea. *Palaeontology:* Theories of biological classification. Processes and theories of evolution. The origin and early history of life. Functional morphology. Practical application of palaeontology. *Field Mapping:* Geological mapping in a complicated geological terrain. Geological report writing and cartography. *Field Work* of up to eight days is a compulsory part of the subject.

25.314 Mineral and Energy Resources 1 — S1 L3T3

Prerequisite: 25.221.

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 mechanical 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 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. *Field Work* of up to four days is a compulsory part of the subject.

25.3162 Mathematical Geology 2 — S1 L2T1

Prerequisite: 25.2261.

Application of the mathematical techniques listed below to geological data processing and analysis. Analysis of variance. Introduction to matrix algebra. 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 SPSS, BMDP and other library programs.

25.324 Mineral and Energy Resources 2 — S2 L3T3

Prerequisite: 25.212.

Non-metallic Resources: Geological factors critical to the occurrence of oil, natural gas, oil shale and coal. Geochemistry of hydrocarbons and formation fluids. Typical Australian and overseas occurrences of petroleum. Techniques of petroleum exploration, assessment and development of reserves. Introduction to coal petrology. Geological controls on the formation and distribution of coal. Occurrence and economic use of non-metallic products including phosphates, bauxites, beach sands and industrial 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 and structuring of basins in tensional, compressive and strike-slip tectonic regimes. Basin evolution. *Field Work* of up to 4 days is a compulsory part of the subject.

25.325 Engineering and Environmental Geology — S2 L4T2

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 law 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 of groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area. *Geomechanics:* 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. *Coastal Geology:* Properties of sedimentary populations. Sampling practices. Measurements of grain size, grain shape and packing; analyses of measured data. Geological significance of sediment parameters. The shoreline processes Littoral and longshore drifts and net sand movement. Coastal engineering works. The estuarine environment. *Field Work* of up to three days is a compulsory part of the subject.

25.3261 Geochemical Analytical Techniques — S2 L1T1

Prerequisite: 25.311.

Modern destructive methods of rock and mineral analysis. Non-destructive methods; X-ray fluorescence spectroscopy and electron probe microanalysers.

25.3271 Advanced Structural Geology — S2 L1T1

Prerequisite: 25.221.

Advanced Structural Geology: Analysis of structural elements at the microscopic, mesoscopic and macroscopic scales. Detailed studies of the analysis of metamorphic terrains, eg Cooma Complex, Broken Hill. *Field Work* of up to three days is a compulsory part of the subject.

25.333 Exploration Geophysics — S1 L3 and S2 L1T1

Prerequisite: 25.120.

Physical properties of rocks and soils. Introduction to seismic, gravity, magnetic, electrical, electromagnetic and radiometric methods of geophysical exploration. Application of these methods in the search for mineral deposits, petroleum, coal and groundwater and in civil and mining engineering projects. Interpretation of geophysical data. *Field Work* of up to three days is a compulsory part of the subject.

25.410 Resource Geology — S1 L3T6

Exploration Geochemistry: Principles and techniques of soil, drainage and rock geochemistry as applied to mineral exploration. *Mathematical Geology:* Application of probability graphs to exploration data. Processing and interpretation of geological data using selected univariate and multivariate statistics; typical case studies in mathematical geology exemplifying these techniques. *Remote Sensing:* Principles of various remote sensing techniques including landsat and side-looking airborne radar. The techniques of image enhancement and digital processing. Applications of remote sensing in lithological mapping and tectonic analysis. Integration of remotely sensed data with conventional data sources. Practical work with the interactive computer on image analysis with particular reference to student field study areas. *Precambrian Geology:* Distribution, terminology, concepts, general features of the Archaean and Proterozoic. Archaean of Australia: Pilbara, Yilgarn. Proterozoic of Australia: Kimberleys, Broken Hill. Precambrian syntheses: tectonic, plate tectonics. Aspects of Precambrian mineralization. *Resource Economics:* Introduction to the role of earth resources in industrial society; availability of resources and consideration of grade, price, economic,

technical and political factors. Distribution, production, consumption and trade in minerals. Supply adequacy and resource assessment. Review of Australian and New South Wales mineral industry. Economics of engineering geological works. *Report Writing:* Techniques of scientific report writing, especially preparation of theses and research articles. Methods of illustrating verbal and written presentations. Guidelines to verbal presentations. *Field Work* of up to seven days is a compulsory part of the subject.

25.412 Sedimentary Basin Resources

See Sedimentary Basin Resources strand in Applied Science Course 3000 Applied Geology Year 4. Available only to programs 2501, 5831.

25.414 Mineral Resources

See Mineral Resources strand in Applied Science Course 3000 Applied Geology Year 4. Available only to programs 2501, 5831.

25.415 Engineering and Environmental Geology

See Engineering and Environmental Geology strand in Applied Science Course 3000 Applied Geology Year 4. Available only to programs 2501, 5831.

25.420 Field Project S2

A major field-laboratory project, which generally includes geological mapping, on some aspect of mineral or sedimentary basin resources, engineering or environmental geology or resource geophysics.

25.4101 Topics in Advanced Geology S1 L3

Topics in geology selected from a list of subjects available from the Head of School.

25.434 Geology Honours (Single Major)

25.5212 Sedimentology S1 L1T1

Prerequisite: 25.120. Excluded: 25.212.

As for *Sedimentology* in 25.212 Earth Environments 1. Available only to Course 3145.

25.5312 Geological Field Mapping S1 L2

Prerequisite: 25.5212. Excluded: 25.312.

As for *Field Mapping* in 25.312 Earth Environments 2. Available only to Course 3145.

25.5313 Stratigraphy

Prerequisite: 25.5212. Excluded: 25.312

As for *Stratigraphy,* in 25.312 Earth Environments 2.

25.621 Marine Geology 1 F L1T2

Prerequisites: 25.601 or both 25.110 & 25.120.

The form and nature of ocean basins; the origin, transport, distribution and deposition of suspended matter in ocean water. Principal groups of oceanic index fossils. Igneous and sedimentary rock types of the ocean floor and their significance. Tectonics of ocean basins. *Field Work* of two days is a compulsory part of the subject.

25.622 Hydrological and Coastal Surveying F L1T2

Prerequisites: Nil.

General principles of surveying, with particular reference to coastlines and off-shore techniques. Optical and electronic methods of distance measuring and position fixing. Methodology for short-term and long-term measurement of tides and flow currents. Bathymetric surveys in shallow and deep water conditions. Coastline morphologies and their relationship to the behaviour of water masses. Analysis of sedimentary systems in deltaic, estuarine and near-shore environments. Data collecting, processing and storage. Shallow-water investigations for bedrock morphologies. *Field Work* of five days is a compulsory part of the subject.

25.631 Marine Geology 2 F L1T2

Prerequisite: 25.621.

Sedimentary and tectonic processes of the ocean basins and continental margins; ocean basin stratigraphy and the environmental and chronological utility of the principal groups of index fossils. Stratigraphical history and correlation of sedimenty 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. Magnetism and palaeomagnetism. *Field Work* not exceeding two days is a compulsory part of the subject.

25.632 Estuarine Geology S1 L1T2

Prerequisite: Nil.

The physical nature of the estuarine environment; its characteristic topography, chemistry and layering of water masses; tidal behaviour. Characteristic sediments, stratigraphy of sediment bodies and distribution patterns of sediments and microfossils in estuaries. Inorganic and microbial diagenesis of estuarine sediments. Procedures for mapping, sampling and sample analysis. Mineral morphology. Statistical treatment of results. *Field Work* of four days is a compulsory part of the subject.

25.6341 Marine Mineral Deposits and Oceanic Minerals S1 L1T1

Oceanic minerals and mineral deposits: detrital, authigenic and epigenetic. Methods of exploration, assessment and exploitation, international law relating to the sea floor. Methods of subsurface analysis.

25.6342 Exploration and Seismic Methods S2 L2T1

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.

25.635 Marine Resources F L1T2

Prerequisite: 25.621. Co-requisite: 25.631.

Resources important to human civilization of a biological, fluid and mineral nature. Mining of ocean resources. Geological aspects of waste disposal and engineering works in the ocean. Tidal energy. Off-shore drilling.

25.931 Geophysics

See Geophysics strand of Applied Science Course 3000 Applied Geology Year 4. Available only to programs 2501, 5831.

25.9311 Gravity and Magnetic Methods S1 L2T1

Prerequisites: 1.001 and 10.001. It is desirable that students taking this unit have a background in 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.

25.9312 Seismic Methods S1 L2T1

Prerequisites: 1.001 and 10.001. It is desirable that students taking this unit have a background in geology.

Seismic waves. Physical/engineering properties of geological materials. Ray theory in 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.

25.9313 Electrical Methods S1 L2T1

Prerequisites: 1.001 and 10.001. 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.

25.9314 Geological Applications S1 L1T1

Prerequisite: 25.120.

A subject of ten weeks' duration. *Structural Geology:* Elements of structural geology, stereographic projection and fracture analysis. *Geology of Fuels:* Origin of coal, oil and natural gas; stratigraphic and structural consideration of oil and coalfields. *Hydrogeology:* Principles of hydrogeology; transmission of groundwater in rocks and soils. *Field Work* of one day is a compulsory part of the subject.

25.9321 Geophysical and Geological Applications S2 L1T2

Prerequisite: 25.120. Excluded: 25.6342.

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.

Geography

27.111 Applied Physical Geography 1 F L2T3

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Science (Physics) or	*31-100*
2 unit Science (Chemistry) or	*31-100*
2 unit Science (Geology) or	*31-100*
2 unit Science (Biology) or	*31-100*
4 unit Science (multistrand)	*31-100*

Excluded: 27.301, 27.311, 27.801, 27.811, 27.818, 27.828.

A systematic introduction to physical geography as a basis for applied studies. Principles of meteorology and climatology with particular emphasis on climatic controls at global and regional scales. Weather systems and forecasting methods. Climatic classification and the regional pattern of climates in Australia. Geologic and climatic factors in landforms and soils, and in the physiographic build and major landforms of Australia. Mass movement and hillslope form. River action and associated valley and channel forms. Coastal environments, processes and forms. Properties and types of soil, with emphasis on factors and processes controlling global and regional distribution. Soil profiles and laboratory measurement of soil properties. Principles of soil classification and mapping. Spatial organization of plants and animals, and factors and processes relating to that organization. Composition, structure, population dynamics and classification of vegetation. *Laboratory classes* concerned with the interpretation of various forms of data in physical geography and their representation quantitatively and graphically. *Field work* of up to five days is an integral part of the subject.

27.133 Pedology S2 L2T3

Prerequisites: 27.111 or any two units from 2.111, 2.121, 2.131, 2.141, and 27.811 or 27.111 or 27.828 or 27.311 or 25.012 or 25.022 or 27.172.

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.

27.143 Biogeography S1 L2T3

Prerequisites: 27.311/811 or 27.828 or 17.031 & 17.041 or 27.111 or 27.172.

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 man 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. Composition, structure, productivity and environmental controls of heathland, woodland, grassland and rainforest communities. Management of vegetation in different climate regimes. *Field work* of up to five days is a compulsory part of the subject.

27.153 Climatology — S1 L2T3

Prerequisites: 1.001, 27.311/811 or 27.828 or 25.110 & 25.120 or 17.031 & 17.041 or 27.111.

Physical bases for understanding microclimate. Processes of energy exchange at the earth's surface, and the atmospheric and terrestrial surface controls of the heat and mass budgets. Atmospheric diffusion. Wind profiles and atmospheric turbulence as affected by stability and surface properties. Determinants of the local and site-specific climatic environment, particularly topographic, surface cover and substrate conditions. Urban climate and climate in relation to human comfort and health. Building and constructional design aspects of climate and applications of climatology in urban and regional planning. Climatic aspects of the development and regional planning. Climatic aspects of the development and utilization of solar and wind energy sources.

27.1711 Introduction to Remote Sensing — S1 L2T2

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.

27.1712 Remote Sensing Applications — S2 L2T2

Prerequisite: 27.1711.

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.

27.172 Environmental Measurements — F L2T4

Prerequisites: 27.111; or 27.818 & 27.819; or 27.801 & 27.802; or 27.301 & 27.302.

Sampling strategies and survey methods for the collection of environmental data. Data analyses using laboratory and statistical methods. The collection and analyses of weather and climatic data, and the maintenance of meteorological stations. Methods of field surveying and instrumentation for the study of geomorphologic and hydrologic processes. Drainage basin morphometry, dynamics and function, including controls on run-off and sediment transport. The measurement of soil physical and chemical properties in the field and laboratory with special reference to plant growth and soil water and geomorphological processes. The relationships between weathering processes and soil properties. Methods of surveying, classifying and mapping soils. Measurement and description of vegetation. Vegetation survey, sampling and species abundance measure. Monitoring energy and nutrient flow and the effects of humans on ecosystems.

27.183 Geomorphology — S2 L2T3

Prerequisites: 25.110 & 25.120 or 27.311/811 or 27.828 or 27.111 or 27.172. Excluded: 27.860.

Beaches and their response to waves, currents and sediment movement. Barrier systems, lagoons and estuaries. Rock platforms. Quaternary sea level changes. Hydraulic geometry of stream channels, including effects of sediment transport and humans' activities. Hillslope form, process and associated slope materials. Methods of slope measurement, analysis and survey. Hillslope models. Systems approach, equilibrium concepts and modelling in landform studies. Field projects in coastal and fluvial geomorphology, and laboratory time is devoted to statistical exercises using data collected from maps, airphotographs and in the field.

27.432 Computer Mapping and Data Display — S2 L1T3

Prerequisites: 27.2813 & 27.2814; or 27.813.

Principles of graphic information processing. Introduction to thematic mapping and automated cartography; theoretical and practical problems in displaying and mapping data by computer. Review and application of computer mapping packages including SYMAP, SYMVU, CALFORM, GIMMS and SURFACE II.

27.652 Geographic Information Systems — S2 L2T1

An introduction to information systems of particular relevance for economic geography with special reference to computer-based systems for resource evaluation. Problems of data structures, geocoding, and spatial identifiers. Model-based information systems. Project work: case study evaluation and the development of information systems for monitoring spatial change.

27.753 Social Welfare and Urban Development — S2 L2T3

Prerequisite: 27.829 or 27.812 or 27.312. Note: This prerequisite does not necessarily apply to students enrolled in the Faculty of Applied Science.

This unit is not available to Applied Science students in 1985.

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.

27.813 Geographic Methods — S2 L2T2

Prerequisites: 27.801 & 27.802, or 27.818 & 27.819, or 27.301 & 27.302, or 27.111. Excluded: 27.2813.

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.

27.818 Australian Environment and Human Response — S1 L2T2

Prerequisite: Nil. Excluded: 27.301/801, 27.295, 27.111.

Themes selected from the mechanisms of the physical environment with particular reference to Australia and the Sydney region. *Landscape as an expression of dynamic response:* land capability and land use problems, humans as agents of landscape change. *Energy and Atmospheric Circulation over Australia:* local weather patterns and weather extremes, human responses to fire, flood, and drought hazards. *Development and Stability of Hillslopes:* soil, vegetation and drainage relationships, problems of soil erosion. *Coastal Ecosystems:* problems of demand, risk and management in the coastal zone. Lectures are supplemented with tutorials, workshops, and field tutorials. Students are required to provide some materials for workshop exercises and to contribute to the cost of field tutorials.

27.819 Technology and Regional Change — S2 L2T2

Prerequisite: Nil. Excluded: 27.302/802.

The impact of technological change on the spatial organization of human activities and regional development and disparities. The implications of technological change on population distribution, resource utilization, and settlement patterns are examined at different scales emphasizing the social consequences at the community and regional level. Examples are taken from Third World and modernized countries, with particular reference to Australian case studies.

27.824 Spatial Population Analysis — S2 L2T2

Prerequisite: 27.312/812, or 27.829. Excluded: 27.324, 27.834.

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

27.825 Urban Activity Systems — S1 L2T2

Prerequisite: 27.312/812, 27.829. Excluded: 27.835, 27.325.

The understanding of problems arising from processes of change in non-metropolitan areas, with particular reference to their effects on the functional structure of country towns in NSW. Topics include: functional classification, service provision, economic base, rural mobility decentralization and settlement policies, and urban systems.

27.826 Urban and Regional Development — S2 L2T2

Prerequisite: 27.312/812, or 27.829. Excluded: 27.836, 27.326.

Theories of urban and regional change leading to assessment of the role of planning. Emphasis on resource allocation, conflict resolution and evaluation techniques including cost-benefit analysis and environmental impact assessment. *Lectures* accompanied by seminars and workshop sessions which concentrate on methodology.

27.828 Australian Natural Environments — S2 L2T2

Prerequisite: 27.801 or 27.301 or 27.818. Excluded: 27.111, 27.311/811.

Emphasizing interdependencies of climate, hydrology, landforms, soils and vegetation. Consideration of the development of landform, soil and vegetation patterns. Classification of climates. Case studies of selected zones in Australia and comparison with neighbouring areas. Climatic analysis and mapping, and analysis of natural landscapes.

27.829 Australian Social Environments — S1 L2T2

Prerequisite: 27.802 or 27.302 or 27.819. Excluded: 27.312/812.

Focus is on the interaction between human communities and the built environment in Australia: the effects of the natural environment on the evolution of settlement patterns; detailed analysis of rural and metropolitan social environments. Emphasis on inner city, suburbia, behavioural and social area approaches, and to managerialist and structural theories of social change on areas and their communities.

27.844 Honours Geography — F

Prerequisites: Arts students must satisfy Faculty requirements for entry to the Honours Level program and must have obtained at least 60 credit points in Geography subjects, including 12 Level 1 credit points. A minimum cumulative average at Credit level is required for all Upper Level subjects taken which must include 27.880.

Details of Honours Geography for science students are available from the School of Geography office.

Students are required: **1.** To undertake an original piece of work extending throughout the year and to submit a thesis based upon it. **2.** To participate in seminars as notified by the School of Geography.

27.862 Australian Environment and Natural Resources — S1 L2T2

Prerequisite: 27.111 or 27.311/811 or 27.312/812 or 27.828 or 27.829. Excluded: 27.872, 27.362.

Offered in alternate years.

Continental and regional patterns of land, water and energy resources in Australia and its territorial waters, and natural factors affecting their development, including climate, soils and terrain; problems of limited surface and underground water resources and of conflicting demands, exemplified through particular basin studies; comparable reviews of energy, minerals and forest resources, human resources and development.

27.863 Ecosystems and Man — S2 L2T2

Prerequisite: 27.111 or 27.311/811 or 27.312/812 or 27.828 or 27.829. Excluded: 27.873, 27.363.

Not offered in 1985.

The structure and functioning of ecosystems, humans' interaction with ecosystems; Australian case studies of ecosystem management, including pastoral, cropping, forestry, coastal and urban ecosystems.

27.880 Advanced Geographic Methods — S1 L2T2

Prerequisites: 27.813 or both 27.2813 & 27.2814.

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

27.883 Special Topic — S1 or S2 L4

Prerequisite: Nil.

Admission by permission to suitable students with good Passes in at least four subjects at Upper Level. A course of individually supervized reading and assignments as an approved topic in Geography not otherwise offered.

Surveying

29.1010 Surveying 1 — S1 L2½T2½

Introduction to surveying. Revision of plane trigonometric formulae. Co-ordinate systems. Magnetic compass. Plane table surveys. Introduction to distance measurement. Tape measurement. Minor instruments. Detail surveys. Areas of regular and irregular figures.

29.2010 Surveying 2 — S2 L1½T2½

Principles of levelling. Methods, recording. Levelling instruments; testing and adjustment. Theodolites; principles and construction. Horizontal and vertical angle measurement.

29.2050 Survey Camp — S2

Co-requisites: 29.1010, 29.2010.

Detail Surveys using minor instruments, setting out using steel band and theodolite, levelling, compass and tape traversing between control.

29.441 Surveying for Engineers — S1 or S2 L2T4

Co-ordinate systems. Levelling. Theodolite and angular measurements. Distance measurements: steel band, electronic. Traversing. Tacheometry. Contour and detail surveys. Horizontal and vertical curves. Area and volume computations. Control, engineering and underground surveys. Outline of photogrammetry.

29.491 Survey Camp

A one-week field camp for students studying 29.441 Surveying for Engineers.

Optometry

31.811 Optometry 1 — F L5T5

Prerequisites: 1.001 or 1.031, 10.001 or 10.021B & 10.021C or 10.011. Co-requisites: 31.821.

Geometrical and Physical Optics: The nature of light. Interference, diffraction, polarization. Dispersion, colour. Reflection, refraction, curved surfaces. Thin lenses. Lens systems and thick lenses. Optical instruments. Limitation of beams. Photometry, colorimetry. *Mechanical Optics and Optical Dispensing:* The manufacture and properties of spectacle lens materials. The optical properties of spherical, cylindrical and spherocylindrical; prismatic effects in spectacle lenses. Bifocal and multifocal lenses. Protective lenses. Frame measurements. Optical dispensing. Spectacles, magnifiers and magnifying glasses. Lens aberrations. Lens measuring and lens testing instruments. The optics of contact lenses. *Visual Optics:* Optical system of the eye, schematic eyes, the retinal image, visual acuity. Refraction of the eye, hypermetropia, myopia, astigmatism, aphakia. Presbyopia. Anisometropia. Spectacle magnification. Theory of subjective refraction. Entoptic phenomena. Accommodation and convergence. Binocular vision, stereoscopy.

31.812 Optometry 2 — F L8T7

Prerequisites: 31.811, 31.821. Co-requisite: 31.831.

External and Internal Examination of the Eye: Case history and symptoms. Signs of local and/or general disease. Examination methods and instruments. Optometrical photography. Facial measurements and frame fitting. *Examination of Visual Functions:* Theory and practice of perimetry. Criteria of norms. Interpretation of field defects. Evaluation of light and colour sense. *Refraction:* Theory and practice of keratometry, objective and subjective refraction, prescribing special visual aids. Theory of design and construction apparatus. *Orthoptics and Pleoptics:* Assessment of binocular sensory and motor functions. Diagnosis and treatment of anomalies. Instrumentation. *Theory of Spectacle Lenses and Optical Instruments:* Advanced geometrical optics and spectacle lens design. Aberrations and their control. The elements of macroscopic and microscopic systems.

31.813 Optometry 3 — F L6

Prerequisites: 31.812, 31.831.

Industrial Optometry: Job analysis and standardization of visual requirements. Occupational visual aids. Vision screening. Industrial hazards and industrial eye protection. *Contact Lenses:* Theory and practice of prescribing haptic and corneal lenses. Instruments. *Reading Deficiency:* The reading process and its anomalies. Remedial training. Instrumentation. *Lighting:* Elements of illumination engineering. Assessment of visibility. Sight conservation. *Advanced Visual Physiology and Physiological Optics:* Recent advances in anatomy and physiology. An introduction to electrophysiology. Aetiology of refractive errors. Theories of colour perception and its anomalies. Evaluation of diagnostic tests. Theories of space perception. Distortion of stereoscopic space. Stereoptics. *Comparative Ophthalmology*

and Ocular Evolution: The anatomy and physiology of invertebrate and vertebrate visual organs. Evolution of binocular vision. *History of Optics:* Discussion of the development of optics, ophthalmology and optometry against the background of a short history of science. Optometrical and interprofessional ethics.

31.821 Anatomy and Physiology of the Eye and Visual System — F L4T2

Prerequisites: 17.031, 17.041. Co-requisites: 73.011A and 31.811.

Histology, Anatomy and Embryology of the Eye and Associated Structures: Anatomy and histology of the eye and associated tissues. The fibrous, vascular and neural tunics of the eye. The blood supply and innervation of these tissues. Visual pathways and gross anatomy of the brain. Functional architecture of the visual pathways. Motor pathways involved in ocular motility. Elementary embryology of the eye and associated structures. Developmental abnormalities of the eye. Internal and external examination of the eye using clinical techniques. Facial anatomy and frame fitting. *Vegetative Physiology of the Eye:* Corneal function: Transparency and thickness related to hydration. Ionic basis of corneal hydration. Control of intraocular pressure: Mechanisms of production and drainage of aqueous humour. Autonomic reflexes: Relation between pupil size and retinal illumination. Accommodation and the synkinetic near response. Introduction to clinical techniques for evaluation of ocular function. *Physiology of Vision:* Photochemistry of vision. Kinetics of pigment bleaching and regeneration in rods and cones. Measurement of pigment density in the living eye. Bleaching and background adaptation — psychophysics and physiology. Colour vision. Responses to neurones in the visual cells in the pretectum. Theories of parallel and hierarchical processing of visual information. Perception of spatial and temporal modulation of retinal illuminance. Ocular motility. Binocular vision, fusion and stereopsis. Introduction of issues of interest in current visual science.

31.831 Diseases of the Eye — F L3

Prerequisites: 31.811, 31.821, 73.011A. Co-requisite: 31.812.

Microbiology: Cell structure, genetics and metabolism of microbes. Classification of microbes. Growth and death of microbes. Special environments. Host-parasite relations. Introductory chemo-therapy and immunology. Pathogenic micro-organisms and parasites. Viruses. *Pathology:* Acute inflammation, chronic inflammation, repair, regeneration, haemorrhage, thrombosis, embolism, ischaemia, infarction, hyperplasia, hypertrophy, atrophy, metaplasia, neoplasia, carcinogenesis. *Diseases of the Eye:* Aetiology, pathology diagnosis and prognosis of disease of the eyelids, cornea, conjunctiva, iris, ciliary body, choroid, retina, optic nerves, lacrimal apparatus, sclera, orbit, lens, and vitreous. Glaucoma. Lesions of the visual pathways. Ocular manifestations of systemic disease.

31.841 Clinical Optometry — F L1T15½

Prerequisites: 31.812, 31.831.

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.

Biochemistry

41.101 Biochemistry — S1 L4T8

Prerequisites: 17.041, and 2.121 & 2.131, or 2.141. Excluded: 2.003J.

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 molecular mechanism of gene expression and protein synthesis. Photosynthesis. *Practical work* to amplify the lectures.

41.111 Biochemical Control — S2 L2T4

Prerequisite: 41.101.

The relationship between structure and function of enzymes, selected protein systems and hormones. Metabolic networks and control mechanisms. *Practical work* to amplify the lectures.

41.102A Biochemistry of Macromolecules — S1 L3T9

Prerequisites: 41.101 or 41.111 (students must obtain a clear pass (PS) in either of these subjects), 2.002B.

Polysaccharides and glycoproteins including bacterial cell walls. Chemistry and biology of polynucleotides. Methods of amino acid and nucleic acid sequence analysis. Protein structure and synthesis. Active centres of some proteins. Sub-unit organization of proteins. Enzyme kinetics. *Practical work* to illustrate the lectures and to provide experience in modern biochemical techniques.

41.102B Physiological Biochemistry — S2 L3T9

Prerequisites: 41.101 or 41.111 (students must obtain a clear pass (PS) in either of these subjects), 2.002B

Electron transport and oxidative phosphorylation. Mitochondrial transport and function. Interrelationships in mammalian intermediary metabolism. Biochemical control mechanisms including hormones and allosteric interactions. Biochemistry of genetic diseases. Selected aspects of differentiation and development in higher organisms. *Practical work* to illustrate the lectures and to provide experience in modern biochemical techniques.

41.102C Plant Biochemistry — S2 L2T4

Prerequisites: 41.101 or 41.111 (students must obtain a clear pass (PS) in either of these subjects), 2.002B.

The biochemistry of the major pathways characteristic of plants will be studied; topics include the energetics and carbon path of photosynthesis, glyoxalate cycle, growth hormones and regulatory phenomena, nitrogen fixation and assimilation. *Experimental work* to illustrate and amplify the lectures utilizes radioactive isotopes and a number of the newer techniques.

41.102E Molecular Biology of Higher Organisms — S2 L2T4

Prerequisite: 41.102A.

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 char-

acterization 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 α- and β-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.

41.103 Biochemistry Honours

Advanced training in selected areas of biochemistry including a supervised research program of 500 hours minimum duration that places emphasis on the use of specialized techniques relevant to the research area. *A written thesis* on the research is required.

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.

80.112 Human Structure and Function 2

In conjunction with School of Anatomy and School of Physiology and Pharmacology.

81.002 Chemistry and Biochemistry for Medical Students

Biotechnology

42.101 Introduction to Biotechnology — S2 L2T4

Prerequisites: 2.121 & 2.131, or 2.141; 17.041; 10.011 or 10.001 or 10.021B & 10.021C.

An introduction to biotechnology as a multidisciplinary subject, dealing with the application of biochemical systems or their products in industry. Industrial uses include: production of single products (such as amino acids, vitamins, antibiotics etc), single cell protein, alternate fuels from renewable resources and fermented foods and beverages; biological waste treatment; aspects of pollution control; biodeterioration and biodegradation; and principles of enzyme technology. Concepts relevant to productivity in these systems, including: thermodynamic feasibility, techniques of environmental and genetic manipulation, choice of the appropriate biological catalyst(s) for a particular process, regulation of gene activity. The laboratory component emphasizes the manipulation of different classes of microorganisms and the use of biochemical products involved in a variety of biotechnological areas.

42.102A Biotechnology A — S1 L2T4

Prerequisites: 41.101 and 42.101 or 44.101 (Pass Conceded (PC) or Terminating Pass (TP) awarded prior to Session 2, 1983, is not acceptable).

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 micro-organisms, laboratory-scale fermenter operation, microbial enzyme isolation, visits to industrial fermentation plants and industrial seminars.

42.102B Biotechnology B — S2 L2T4

Prerequisite: 42.102A (Pass Conceded (PC) or Terminating Pass (TP) awarded prior to Session 2, 1983, is not acceptable).

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 agro-industry 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.

42.102C Microbial Genetics — S1 L2T4

Prerequisites: 41.101 or 44.101. Excluded: 43.102.

A detailed study of the mutational basis of microbial variation. Mutagens; mechanisms of mutagenesis; induction, enrichment, isolation and characterization of mutants; mechanisms of repair of mutational damage. Systems of gene transfer and recombination in fungi, bacteria and bacterial viruses; the use of these systems in constructing genetic maps, and as tools for probing aspects of microbial physiology and biochemistry. Genetic control of gene expression; the operon concept and its application to specific regulatory systems. Genetic code, collinearity between a gene and its product, genes within genes, suppression of mutations. Restriction and modification of DNA; genetic engineering — its implications and prospects. Genetics of nitrogen fixation.

42.103 Biotechnology (Honours)

Advanced formal training in selected areas of biotechnology and participation in one of the school's research projects.

42.114 Fermentation Processes

Factors governing the use of micro-organisms in industrial processes, including the selection, maintenance and improvement of micro-organisms, the control of environmental factors, batch and continuous flow operational patterns, product recovery, process optimization and waste disposal. Demonstrations of the operation and control of fermenter systems and of microbial process simulation.

Botany

43.111 Flowering Plants — S1 L2T4

Prerequisites: 17.031 & 17.041.

Plant cell structure, structure and functions of the major organs in Angiosperms (flowers, roots, stems and leaves), secondary thickening and arborescence, transport systems in plants, seeds and germination. Variation in structure and function in relation to environment. Introduction to taxonomy and identification of major Australian plant families. A short field excursion is part of the subject.

43.131 Fungi and Man — S1 L2T4

Prerequisites: 17.031 & 17.041.

An introduction to the biology and taxonomy of fungi followed by a study of their economic importance to man. Includes: fungi as pathogens of plants and animals; use of fungi as food and in the production of useful chemical products; medical uses of fungi, including drugs and hallucinogens; degradation of organic matter, particularly in soils and of timber; interaction of fungi with other organisms; chemical control of fungi.

43.112 Taxonomy and Systematics — S2 L2T4

Prerequisite: 43.111.

The assessment, analysis and presentation of data for classifying organisms both at the specific and supra-specific level.

43.121 Environmental Physiology — S2 L2T4

Prerequisites: 17.031, 17.041, 2.121 & 2.131, or 2.141.

How plants function in relation to the constraints imposed on them by soil and atmospheric environments. Includes: germination, growth and development, particularly photosynthesis, respiration, inorganic nutrition, water relations, transport processes and reproductive physiology. Important practical applications of various physiological mechanisms.

43.132 Mycology and Plant Pathology — S2 L2T4

Prerequisite: 43.131.

A detailed study of the fungi, including both saprophytic and plant pathogenic species. Includes: hyphal structure and ultrastructure; morphology and taxonomy of members of major taxonomic groups; spore liberation, dispersal, deposition, germination, infection and the establishment of a host-pathogen relationship; morphogenesis of vegetative and fruiting structures; cytology, genetics; ecological considerations of fungi in specialized habitats, survival mechanisms and methods of control of plant pathogens.

43.142 Environmental Botany — S1 L2T4

Prerequisites: 17.031 & 17.041.

The soil and atmospheric environments in which plants live and a study of the interaction of plants with their environment. Energy and mass transfer. Emphasis is placed on the role of environmental science in food production.

43.152 Plant Community Ecology — S2 L2T4

Prerequisites: 43.111 and 17.012 or 27.111.

Recognition and delimitation of plant communities. Ecology of selected Australian vegetation types. Use of numerical methods and application of community concepts to palaeoecology. Field work an integral part of this course.

43.162 The Plant Kingdom — S2 L2T4

Prerequisite: 43.111.

Not offered in 1985.

This unit alternates each year with 43.112 Taxonomy and Systematics. 43.112 is given in 1984. If both units are to be included in three-year pass degree program, one should be completed in Year 2.

This unit may be taken in either Year 2 or Year 3 of the Science and Mathematics Course provided that prerequisites have been completed.

The major taxa of the Plant Kingdom with emphasis on the green plants. The evolution of basic vegetative structures, reproductive structures and genetic systems are studied. Field work part of the course.

43.172 Phycology and Marine Botany — S1 L2T4

Prerequisite: 43.111.

The biology of freshwater, marine and soil algae with particular emphasis on the marine flora of SE Australia. Field work is part of the course.

43.192 Ultrastructure — S2 L2T4

Prerequisite: 43.111 or 43.121 or 41.101 or 44.101 or 45.201 or 45.301. Excluded: 43.182.

The impact of the study of ultrastructure in biological research and teaches techniques currently used in ultrastructural research. While covering the basic ultrastructure of prokaryotes and of eukaryote cells and organelles, emphasis also on areas where ultrastructural research is at present making an important contribution to under-

standing how cells work: for example, motility, secretion, control of cell wall deposition, transport and cell communication. *Practical work:* students use transmission and scanning electron microscopes to investigate material they themselves prepare, using negative staining, ultra-microtomy and freeze-fracture; also includes optical systems in light microscopy, principles and practice of fixation and embedding tissues for light and electron microscopy; histochemistry and techniques of enzyme localization.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

43.202 Botany for Landscape Architects — S1 L2T3

Prerequisite: Nil.

How green plants function. What is known about how plants grow. Specific topics include: what happens in a plant meristem, hormone interactions and growth, transport systems in plants, water uptake and use, mineral nutrition, the role of light and leaves in photosynthesis, control of flowering process, germination and senescence. Emphasis is on the interaction between plant structure and function.

Microbiology

Level II Units

44.101 Introductory Microbiology — S1 L2T4

Prerequisites: 17.031 & 17.041.

The general nature, occurrence and importance of microorganisms. A systematic review of the major groups of microorganisms; the eucaryotic protista (micro-algae, protozoa and fungi); procaryotic protista (blue-green alfae, "higher" bacteria, typical unicellular bacteria and small bacteria-like forms); plant, animal and bacterial viruses. The relationship between microorganisms and their environment, ecological considerations. Interactions between microorganisms and higher organisms.

44.121 Microbiology 1 — S2 L2T4

Prerequisites: 44.101 & 41.101 or 2.003J.

The balanced structure of this unit makes it suitable for students majoring in microbiology and also for students who wish to enlarge their knowledge and skills in microbiology beyond those obtained in 44.101 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 medical microbiology and the role of bacteria in ecosystems.

Level III Units

44.102 General Microbiology — S1 L4T8

Prerequisites: 44.101, 44.121 (Pass Conceded (PC) awarded prior to Session 2, 1983, is not acceptable), 41.101.

Systems for the isolation, identification and taxonomic description of microorganisms; fine structure, cyto-chemistry, genetics of bacteria and viruses; metabolic requirements of microorganisms; microorganisms and their environment, growth, inhibition and death; energy-yielding and biosynthesizing systems; geotypic and phenotypic control systems.

44.112 Applied Microbiology — S2 L4T8

Prerequisite: 44.102.

Endeavours to relate the basic facts about microorganisms to a variety of practical conditions. The occurrence, importance, activity and control of microorganisms in soil, air, water and in their relationship with higher organisms (other than humans), their industrial applications including manufacture, preservation and spoilage of food and dairy products. The nature of bacterial and fungal diseases of humans, their cultural and serological diagnosis, epidemiology, treatment and prevention will be discussed in some detail.

44.122 Immunology — S2 L2T4

Prerequisites: 17.031 & 17.041, 41.101.

Basic immunology and immunological techniques. The interdisciplinary nature of the subject makes this unit suitable for students taking any major sequence in biological science and also for higher degree students who require a background training in immunology. The course includes phylogeny and ontogeny of the immune response; antigen and antibody structure, antigen-antibody reaction, immunochemistry; immunogenetics, clinical immunology; transplantation.

44.132 Virology — S2 L2T4

Prerequisite: 44.102.

The structure, replication and behaviour of animal, plant and bacterial viruses; applications of virological techniques; virus diseases of animals and plants, their epidemiology and control.

Level IV Units

44.103 Microbiology Honours F

Advanced training in selected ares of microbiology, **1.** a formal component consisting of seminars, tutorials, introductory electron microscopy and written assignments, **2.** a supervised research program in a specific area of microbiology or immunology.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Applied Science Handbook.

44.143 Microbiology AS S1 L4T6

Prerequisites: 17.031 and 17.041.

The history, general nature, occurrence and importance of microorganisms. General features of procaryotic and eucaryotic protista. Basic microbiological methodology; bacterial anatomy and cytology; cell walls, flagella pili, nucleus, inclusions, capsules, endospores. Microbial growth; methods of measuring; growth curves; batch, continuous and synchronous cultures. Microbial nutrition and metabolism; autotrophs and heterotrophs; photosynthesis, fermentation and respiration; biosynthesis. Bacterial genetics: adaptation, mutation and mutagens; conjugation; plasmids and drug resistance factors; genetic engineering concepts. Bacterial virology; lytic phages, lysogeny, transduction, phage typing. Bacterial taxonomy, ecology and diversity, basic principles and review of the major bacterial genera and groups. Yeasts and fungi; general ecology, morphology and modes of reproduction; mycotoxins. Immunology and serology: antigens, antibodies and their interactions; applications to identification. Medical microbiology; microbes as pathogens. Applied microbiology. Microbiology of soils and waters, nitrogen fixation, industrial fermentations, alcoholic beverages, single cell protein, food microbiology.

For further information regarding the following subject see the Faculty of Medicine Handbook.

80.311 Paraclinical Science

In conjunction with School of Pathology and School of Physiology and Pharmacology.

Zoology

Students are not admitted to Level III Zoology units, without special permission of the Head of School, unless Chemisty 2.001 or 2.121 and 2.131, or 2.141, has been completed.

45.101 Biometry S2 L2T4

Prerequisites: 17.031, 17.041. Excluded: 10.311A, 10.321A, 10.331.

Statistical methods and their application to biological data, including introduction to probability; the binomial, poisson, normal distributions; student's t, χ^2 and variance ratio tests of significance based on the above distributions, the analysis of variance of orthogonal and some non-orthogonal designs; linear regression and correlation. Non-linear and multiple regression. Introductory factorial analysis. Introduction to experimental design. Non-parametric statistics, including tests based on χ^2, the Kruskal-Wallis test, Fisher's exact probability test and rank correlation methods. Introduction to programming in BASIC.

45.112 Marine Ecology S1 L2T4

Prerequisites: 17.031, 17.041, 45.201 or 25.022 or 2.002D.

A study of the ecology of marine organisms with particular reference to the physical, chemical and biological environment in which they occur. Both field and laboratory practical work are included.

Students intending to enrol in this unit should register with the School of Zoology by 14 January for the February field trip.

45.121 Evolutionary Theory S1 L3T3

Prerequisites: 17.031, 17.041.

Current evolutionary theory, emphasizing the population level. Ecological genetics, evolutionary aspects of ecological niche theory, speciation, evolution of social behaviour, molecular evolution and general evolutionary genetics. Some background in genetics is desirable.

45.122 Animal Behaviour S2 L2T4

Prerequisites: 45.101, and 45.201 or 45.301.

An introduction to Ethology, the biological study of behaviour. Physiological, ecological, developmental and evolutionary aspects of behaviour are examined as important elements in the analysis of behaviour, particularly social behaviour. Both field and laboratory work are included.

45.132 Ecological Physiology S2 L2T4

Prerequisites: 45.201 or 45.301.

Not offered in 1985.

A study of 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 and temperature regulation/acclimation. Particular attention is given to Australian fauna and conditions.

45.142 Comparative Physiology S2 L2T4

Prerequisite: 45.201 or 45.301.

Basic physiology of nerves, muscles, sensory perception, blood circulation, respiration, gastrointestinal tract, kidneys and hormones. Physiology of reproduction. The control of organ systems and body functions.

45.152 Population and Community Ecology — S1 L2T4

Prerequisites: 17.041 and 10.001 or 10.011.

Examination of the dynamics of one, two or more interacting populations. Systems analysis and simulation in ecology. Theoretical and mathematical analysis of the dynamics and stability of ecosystems. Topics in the optimal management of renewable resources. Unifying concepts in ecology.

45.201 Invertebrate Zoology — S2 L2T4

Prerequisites: 17.031, 17.041.

A comparative study of the major invertebrate phyla with emphasis on morphology, systematics and phylogeny. Practical work to illustrate the lecture course. Obligatory field camp.

45.301 Vertebrate Zoology — S1 L2T4

Prerequisites: 17.031 & 17.021, or 17.041.

A 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 the lecture course. Field excursions as arranged.

45.302 Vertebrate Zoogeography and Evolution — S2 L2T4

Prerequisite: 45.301.

A geographic approach to the current distribution, abundance and types of vertebrate species in the Australian region. Particular emphasis is placed on the basic principles of speciation, the history of the Australian continent, vertebrate adaptations and changes in the distribution and abundance of the Australian vertebrate fauna under the influence of humans. Field excursions as arranged.

45.402 Insects — S1 L2T4

Prerequisites: 17.031, 17.041. Excluded: 45.202.

A comparative study of the internal anatomy and external morphology, physiology and behaviour of insects. A collection of insects is to be made. Practical work to illustrate the lectures. Field excursions as arranged.

Students intending to enrol in this unit should register with the School of Zoology by 14 January for the February field trip.

45.422 Economic Zoology — S1 L2T4

Prerequisite: 45.201 or 45.402.

A study of the biology, ecology and control of vertebrate and invertebrate animals which harm humans and their possessions. Human and domestic animal parasitology, pests on plants, diseases caused or spread by animals, chemical, biological and physical control, and side effects.

45.432 Project — S2 L2T4

Prerequisite: 45.402 or 45.201.

Not offered in 1985.

Selected aspects of insect physiology, ecology and toxicology. Treatment of topics in depth rather than breadth. Practical work illustrates the lectures and places emphasis on design and planning of experiments.

Chemical Engineering and Industrial Chemistry

48.023 Chemical Engineering Science 1 — S1 L3T2 S2 L2½T2½

Prerequisites: 1.001, 10.001.

Flow of Fluids: Introduction and units. Definitions and properties. Statics pressure distribution and measurements. Dynamics. Euler and Bernouilli equations. Momentum equations. Laminar and turbulent flow. Steady flow in pipes and equipment. Pressure losses. Flow metering. Elementary boundary layer theory. Boundary layers in pipes and on flat plates. *Dimensions and Dimensional Analysis:* Units and measures. Conversions of units and equations. Dimensions and Dimensional Analysis. Basic principles of modelling. *Heat Transfer 1:* Introduction to steady state heat transfer including conduction, convection, radiation, boiling and condensation with an emphasis on problem solving. Resistance concept in heat transfer with series and parallel combinations. *Pumps and Pumping:* Types of piping and fittings. Blow cases. Air lift pumps. Reciprocating pumps, centrifugal pumps and gear pumps. Blowers and compressors. *Material Balances:* A revision and extension of material balance calculations with more complex examples, including those arising from stagewise operation of extraction equipment. Graphical solution of multi-stage calculations. *Computations 1:* A review of the fundamentals of FORTRAN, with extension to formating, dimensioned variables and subroutines. Application to the solution of selected problems involving heat and mass balances, fluid flow and pumping.

48.024 Chemical Engineering Principles 1 — S1 L2T1 S2 L1T1

Prerequisites: 1.001, 10.001.

The following topics, from 48.023: Flow of Fluids, Heat Transfer 1, Dimensions.

48.037 Chemical Engineering Science 2 — F L5T2

Prerequisites: 2.002A, 48.023.

Mass Transfer (Theory): Molecular diffusion in gases, liquids and solids and the measurement and calculation of diffusion coefficients. Diffusion at an interface — one component unidirectional diffusion and equimole counterdiffusion under steady state conditions. Mass transfer coefficients. Estimation and application of chemical and phase equilibria. Stage calculations applied to liquid/liquid, vapour/

liquid and other mass transfer operations. The two film theory and the transfer unit concept in gas/liquid, vapour/liquid, and other operations. *Heat Transfer 2 (Theory):* An extension of the work covered in Heat Transfer 1, with an emphasis on the fundamentals of convection and condensation; unsteady state conduction; introduction to heat exchanger design. *Surface Separation Processes:* Principles of membrane processes, reverse osmosis ultrafiltration dialysis and electrodialysis. Design calculations for batch and continuous operation of reverse osmosis and ultrafiltration equipment. Principles of sorption processes such as adsorption on exchange and molecular sieves. Design of fixed bed sorption equipment. Principles and design of the surface separation processes such as foam and bubble fractionation. *Fluid-particle Systems:* Interaction between particles and fluids; drag, terminal velocity, sedimentation. Flow through porous media; pressure gradient, filtration, fluidization, dispersion; multiphase flow, irrigated packed columns. *Reactor Engineering:* Introduction to reactor design: ideal batch, steady state mixed flow; steady state plug flow, size comparisons of ideal reactors, optimization of operating conditions. Multiple reactor systems: reactors in series and parallel, mixed flow reactors of different sizes in series, recycle reactor, autocatalytic reactions. Multiple reactions: reactor design for reactions in parallel and reactions in series, series-parallel reactions. Temperature effects: heat of reaction, equilibrium constants, optimum temperature progression, adiabatic and non-adiabatic operation, product distribution and temperature. *Kinetics of Rate Processes:* Basic concepts: rate laws, correlation with driving force, linear and non-linear systems, lumped and distributed parameter systems. Experimental measurement and correlation of process rates. *Thermodynamics:* Review of first law of thermodynamics: thermochemistry; second law of thermodynamics. Auxiliary functions and conditions of equilibrium. Thermodynamic properties of fluids; thermodynamic properties of homogenous mixtures. Chemical reaction equilibria: calculation of equilibrium compositions for single reactions. Phase equilibria: the phase rule, equilibrium. *Computations 2: Digital Computation:* Introduction to Cyber control language, use of files, efficient FORTRAN programming methods. Numerical methods for solving algebraic equations, and other computer techniques. Application to the analysis and solution of selected chemical engineering problems. *Analogue computation:* An introduction to the theory and programming of analogue computers, with application to the solution of differential equations and the simulation of dynamic systems.

48.038 Chemical Engineering Principles 2 — S1 L3T1 S2 L1T1

Prerequisite: 48.024.

The following topics, from 48.037; Mass Transfer (Theory), Heat Transfer 2 (Theory), Fluid-particle Systems, Surface Separation Processes.

48.403 Polymer Science — S1 or S2 L2T1

Prerequisites: 2.002A, 2.002B, 10.031, 10.301. Co- or prerequisites: 48.001, 48.113.

Polymerization processes; stepgrowth and chain growth (free radical and ionic), stereospecific catalysts. Methods of polymerization: bulk suspension, emulsion, solution, high pressure. Industrial examples. Principles of analysis of polymers using chemical and instrumental methods. Molecular weight applied to macromolecules: number-, weight-, viscosity- and z-average weights. Molecular weight distribution. Thermodynamics of polymer solutions, theta solvent. Measurement of molecular weight. Fractionation methods. Conformation of a polymer chain. The crystalline state. The amorphous state. Stress/strain behaviour. Creep. Impact. Rubber elasticity. Dynamic mechanical properties. Principles of operation of polymer processing equipment; safety procedures. Polymer compound design.

Philosophy

First Enrolment in Philosophy

There are two Level I subjects:
52.103 Introductory Philosophy A (Session 1)
52.104 Introductory Philosophy B (Session 2)

Each of these has 1-unit value. They can be taken separately, but students normally enrol in both. However, a student can gain Upper Level status in Philosophy (qualify to enrol in Upper Level subjects) by passing in only one.

Level II

Students may not proceed to Level II work in Philosophy in their first year of study. Students in later years may proceed to Level II work after passing one Level I unit in either session.

At Level II a wide range of *half-units* and *two full units* are offered, some dealing with particular philosophical topics and others capable of being taken in sequence to give more sustained treatments of larger areas. Students may select freely among these, subject to stipulations regarding prerequisites.

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

A maximum of three units (six half-units) at Level II may be taken as part of the Science course, exclusive of General Studies. Additional units may, with permission, be substituted for a part of the General Studies requirement, in accordance with the provisions laid down in the General Studies Handbook.

Selection of Units

Although students at Level II have a wide choice of units, they are advised to plan a sequence of mutually relevant ones, taking into account the prerequisites of those they may wish to take later. Tabulated information and School recommendations are available at the School, and students needing assistance are encouraged to consult the School personally.

52.103 Introductory Philosophy A — S1 L3T1 C6

Prerequisites: Nil.

The general topic of Persons, with reference to some at least of the following: Plato's arguments for the immortality of the soul; Freud's theory of mental processes; Sartre's account of human existence; and the problem of personal identity.

Assessment: Weekly exercises, tutorial work, and on each section of the work either a one-hour or a take-home examination.

52.104 Introductory Philosophy B — S2 L23T1 C6

Prerequisites: Nil.

Topics normally include: issues in ethics and political philosophy; the nature of religion and religious belief; deduction in modern formal logic and related problems of the ambiguity of natural languages.

Assessment: Weekly exercises, tutorial work, and on each section of the work a one-hour examination.

52.219 Philosophical Foundations of Marx's Thought **S1 L3T0 C6**

Neil Harpley, Barbara Roxon

Prerequisite: Upper Level status in Philosophy. Excluded 52.373.

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

Assessment: Exercises and essays.

52.2010 Reasoning Skills **S1 or S2 L2T0 C4**

Professor C. L. Hamblin

Prerequisite: Any Level I subject. Excluded: 52.233.

Reasoning skills in which practical arguments are examined in classroom exercises; lectures on practical argument in the courtroom, politics and everyday life as compared with arguments in mathematics and theoretical science.

Assessment: Exercises, essay and class examination.

52.2020 Descartes **S1 L2T0 C4**

Ray Walters

Prerequisite: Upper Level status in Philosophy. Excluded: 52.163.

The main issues raised in the philosophy of Descartes and their importance for the development of modern philosophy. Emphasis is on the *cogito ergo sum* argument, the Cartesian method and the search for rational certainty, his theory of ideas, the body-mind problem.

Assessment: Exercises or essay and examination.

52.2021 Spinoza and Leibniz **S2 L2T0 C4**

Ray Walters

Prerequisite: 52.163 or 52.2020. Excluded: 52.303.

The main issues raised in the philosophy of the two great 17th century rationalists, with emphasis upon the development of their metaphysical systems in response to unresolved problems in the philosophy of Descartes and to contemporary scientific thinking. Their ethical views.

Assessment: Exercises or essay and examination.

52.2030 Predicate Logic A **S1 L2T0 C4**

Professor C. L. Hamblin

Prerequisite: Any Level 1 subject. Excluded: 52.153, 52.162, 52.1531.

A system of natural deduction is presented for the first order predicate calculus. Emphasis is upon construction of formal derivations, methods of showing the invalidity of formal arguments, and the evaluation of informal arguments by symbolization.

Assessment: Exercises.

52.2031 Predicate Logic B **S2 L2T0 C4**

Professor C. L. Hamblin

Prerequisite: 52.1531 or 52.2030. Excluded: 52.153, 52.1532.

A continuation of Predicate Logic A, including the theories of identity and of definite descriptions.

Assessment: Exercises.

52.2040 Greek Philosophy: Thales to Plato **S1 L2T0 C4**

Peter Gibbons

Prerequisite: Upper Level status in Philosophy. Excluded: 52.183.

The leading ideas of the Greek philosophers from Thales to Plato with special reference to the Pre-Socratics.

Assessment: To be decided in consultation with students.

52.2050 Classical Political Philosophy **S1 L2T0 C4**

Dr Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.182, 52.203.

Not offered in 1985.

The basis of political society, its various functions and its relation to the individuals in it, investigated primarily through the works of Hobbes, Locke, Rousseau and Mill. Topics include the 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: Two short essays and an examination.

52.2060 Sartre **S1 L2T0 C4**

Barbara Roxon

Prerequisite: Upper Level status in Philosophy. Excluded: 52.213.

An examination of Sartre's account of freedom, relations between persons and his social theory.

Assessment: Essays and exercises.

52.2130 British Empiricism **S2 L2T0 C4**

Neil Harpley

Prerequisite: Upper Level status in Philosophy. Excluded 52.173.

A survey of the empiricist tradition with special concentration on Locke and Berkeley.

Assessment: Exercises and essays or examination.

52.2140 Scientific Method — S1 L2T0 C4

Ray Walters

Prerequisite: Upper Level status in Philosophy. Excluded: 52.193.

The nature of empirical knowledge as exemplified in the physical and social sciences, with emphasis on the concept of explanation, the nature of induction and scientific laws, and controversies over the nature of scientific knowledge.

Assessment: Exercises or essay and examination.

52.2150 Philosophy of Law — S2 L2T0 C4

Dr Stephen Cohen

Prerequisite: Upper level status in Philosophy. Excluded: 52.105.

Selected conceptual and normative issues in the philosophy of law, centring around the broad areas of law (eg, its nature, validity, bindingness, and relation to morality), liberty, justice, responsibility (including strict and vicarious liability), and punishment.

Assessment: Essays, possibly an examination.

52.2170 Hume — S1 L2T0 C4

Neil Harpley

Prerequisite: Upper Level status in Philosophy. Excluded: 52.152, 52.563.

A study of Hume's epistemology, his discussion of arguments for the existence of God and free will.

Assessment: Essay and exercises or examination.

52.2220 Classical Greek Ethics — S1 L2T0 C4

Dr Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.523, 52.5231.

Not offered in 1985.

A systematic investigation of the moral theories of Plato and Aristotle. Beginning with the immoral and subsequent amoral position of Thrasymachus and his question in Book 1 of *The Republic*, 'Why should I be just?', the subject investigates the ways in which Plato and Aristotle each set out the problems of the nature of morality and why a person should be moral, their approaches to the solutions of these problems, and their positive moral theories.

Assessment: Two short essays and an examination.

52.2230 Theories in Moral Philosophy — S2 L2T0 C4

Dr Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.523, 52.5232.

Three moral theories central in the history and development of moral philosophy. Hume, Kant, and Mill offer differing 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 in itself and in comparison with the other two theories examined.

Assessment: Two short essays and an examination.

52.2240 Philosophical Study of Woman — S2 L2T0 C4

Neil Harpley, Barbara Roxon

Prerequisite: Upper Level status in Philosophy. Excluded: 52.283.

A discussion of crucial structures involved in women's situation.

Assessment: Exercises and essays.

52.2250 Plato's Theory of Forms — S2 L2T0 C4

Peter Gibbons

Prerequisite: Upper Level status in Philosophy. Excluded: 52.483.

A study of some dialogues of Plato, with special attention to Socratic definition and Plato's Theory of Forms.

Assessment: To be decided in consultation with students.

52.2260 Aesthetics — S2 L2T0 C4

Ray Walters

Prerequisite: Upper Level status in Philosophy. Excluded: 52.273.

An examination of the central concepts, types of judgment and theories occurring in the field of aesthetics or theory of art.

Assessment: Exercises or essay and examination.

52.2270 Social and Political Philosophy — L2T0 C4

Dr Stephen Cohen

Prerequisites: Upper Level status in Philosophy. Excluded: 52.513.

Not offered in 1985.

Largely through contemporary writings, including a number of journal articles, investigation of, eg rights, freedom, law and legislation, responsibility, liability, coercion, punishment and justice.

Assessment: Essay.

52.2330 Psychoanalysis — Freud and Lacan — S2 L2T0 C4

Barbara Roxon

Prerequisite: Upper Level status in Philosophy. Excluded: 52.573.

A discussion of psychoanalytic theory, particularly for what it shows about the relation between the individual and the social.

Assessment: Exercises and essays.

52.2360 Theories, Values and Education — S1 L2T0 C4

Martin Bibby

Prerequisite: Upper Level status in Philosophy. Excluded: 52.583.

The nature of theories of education, and the contributions to them of philosophy, psychology and sociology; values in education and the social sciences; the justification of an ordering of educational goals.

Assessment: Essay.

52.2371 Plato's Later Dialogues **S2 L2T0 C4**

Peter Gibbons

Prerequisite: 52.483 or 52.2250 (or, by permission, a course covering similar material). Excluded: 52.293.

Centred round some of Plato's later dialogues, the *Theaetetus* and *Sophist* in particular.

Assessment: To be decided in consultation with students.

52.2980 Seminar A **S2 L0T2 C4**

Excluded: 52.423.

Admission by permission, based on a student's performance in Upper Level subjects. Topics vary and are influenced by student requests. Possible topics include: contemporary ethics; contemporary moral issues; logical atomism; Wittgenstein; theories of the emotions; issues in social and political philosophy.

Assessment: Essay.

52.2990 Reading Option A **S1 or S2 C4**

Excluded: 52.413.

Admission by permission, to suitable students with good Passes in at least two subjects at Upper Level. A course of individually supervised reading and assignments on an approved topic not otherwise offered.

Assessment: Essay.

52.3010 Seminar B **S1 L0T2 C4**

Excluded: 52.433.

As for 52.2980 Seminar A.

52.3020 Seminar C **S2 L0T2 C4**

Excluded: 52.443.

As for 52.2980 Seminar A.

52.3030 Reading Option B **S1 or S2 C4**

Excluded: 52.453.

As for 52.2990 Reading Option A.

Sociology

53.001 Introduction to Sociology **F L2T1 C12**

An introduction to major issues in Sociology. There are two main themes: culture, society and institutions; and social inequality. Topics: social control, power, sexism, work and leisure, class distinctions. These are treated both factually and theoretically and are considered as they relate to the situation in Australia and in the developing countries.

Assessment: On the basis of performance in essays, written assignments, and tutorial classes.

Education

58.702 Theory of Education 1 **S2 L1½**

Educational Psychology: includes learning, cognition, individual differences and cognitive development; detailed classroom applications; experimental demonstration of phenomena where possible.

58.703 Theory of Education 2 **F L2½**

Prerequisite: 58.702.

Educational Psychology: extension of the introductory studies of learning, cognition, individual differences and cognitive development with concentration upon child development; classroom applications emphasized and phenomena experimentally demonstrated where possible. *Philosophy of Education:* exploration of philosophical questions concerning teaching and learning with particular reference to the various subjects taught in schools; issues concerning the relationships between school subjects, a connection between knowledge and the development of mind, the value of school subjects in relation to other activites which could compose education and the social and ethical context of education. Focus on logical and epistemological questions which are internal to the various teaching subjects. Students are assigned to one of the following Philosophy of Education groups: Philosophical Issues in: Mathematics and Education; Literary Appreciation and Education; History and Education; Science and Education; Curriculum and Education; Language and Education; Social Sciences and Education; Industrial Arts Education. *Sociology of Education:* includes socialization, the family, the role of education in society, inequality of educational opportunity, multi-cultural education.

58.704 Theory of Education 3 **F L3**

Prerequisite: 58.703.

Sociology of Education: Includes sociology of the school and classroom, deviance, knowledge and the curriculum, sexism, in schools, social trends and problems and their implications for education, technology work and lifelong learning. *Selected Studies in Education:* two education theory options to be selected from among a number

available; some deal with the separate disciplines of philosophy, psychology, sociology, others may draw from more than one. In any given year the options offered depend on the staff available and on student demand. *Topics may include the following:* Computer assisted instruction, the talented child, learning disabilities, social trends and problems, sociology of the school and classroom, methodology for criticism, ethical theory and moral education, science and religion in education.

58.712 Teaching Practice 1 — F 10 days

A gradual introduction to teaching in the school situation.

58.713 Teaching Practice 2 — F 15 days

Prerequisites: 58.712, 58.722 or 58.732 or 58.742 or 58.752 or 58.762. Co-requisites: 58.723 or 58.733 or 58.743 or 58.753 or 58.763.

Extensive opportunities for students to develop teaching competence; each student is placed in a high school for 15 days and works in close association with a teacher.

58.714 Teaching Practice 3 — F 15 days

Prerequisites: 58.713, 58.723 or 58.733 or 58.743 or 58.753. Co-requisites: 58.724 or 58.734 or 58.744 or 58.754 or 58.764.

Provision for further opportunities for students to develop teaching competence; each student is placed in a high school for 15 days and works in close association with a teacher.

58.732 Science Curriculum and Instruction 1 — S1 L2T1 S2 L1

Prerequisites: 1.001 or 1.011; 2.121, 2.131. Co-requisite: 58.702.

Lesson planning, management in the science classroom, laboratory safety, legal aspects; introduction to audiovisual aids, demonstrations and practical work. *Communication and Microteaching:* techniques and problems of communication, development of teaching skills by peer-group microteaching. *Classroom Issues and Strategies:* topics include mixed ability groups, streaming, individual instruction, children with special needs (eg handicapped, talented, immigrant, Aboriginal children), language in learning, discipline and class control.

58.733 Science Curriculum and Instruction 2 — S1 T4 S2 L1T4

Prerequisites: 17.031, 17.041, 25.110, 25.120; 58.702, 58.732. Co-requisite: 58.703.

Methods of teaching and problems in learning science, the roles of teacher demonstrations and pupil practical work, preparation and use of audiovisual aids, the teaching of selected topics in biology, chemistry, geology and physics. Further development of teaching skills by peer-group microteaching may be undertaken. *Classroom Issues and Strategies:* aspects relating to classroom and community including the primary school, the teacher in the school community, teachers and parents, legal responsibilities and rights, transition, unemployment, leisure, support facilities.

58.734 Science Curriculum and Instruction 3 — S1 L1T4 S2 T3

Prerequisites: 58.703, 58.713, 58.733.

Examination of NSW secondary school science syllabuses, investigation of curriculum material suitable for use in teaching secondary school science, development of teaching resources, the professional development of the science teacher, the teaching of biology, chemistry, geology and physics. *Classroom Issues and Strategies:* aspects relating to assessment and measurement including test planning, standardized tests, marking and reporting, essay-type tests, scaling of test scores, uses and effects of assessment.

58.742 Mathematics Curriculum and Instruction 1 — S1 L3 S2 L1

Prerequisites: 10.001 or 10.011. Co-requisite: 58.702.

Introduction to the application of educational studies to the teaching of the Mathematics curriculum in high schools, lesson planning and classroom management. *Communication and Microteaching:* techniques and problems of communication, development of teaching skills by peer-group microteaching. *Classroom Issues and Strategies:* includes mixed ability groups, streaming, individual instruction, children with special needs (eg handicapped, talented, immigrant, Aboriginal children), language in learning, discipline and class control.

58.743 Mathematics Curriculum and Instruction 2 — S1 L2 S2 L3

Prerequisites: 58.702, 58.742. Co-requisite: 58.703.

A continuation of the application of educational studies to the teaching of the Mathematics curriculum in secondary schools; lesson preparation and presentation, classroom organization and management, introduction to special mathematics courses being used in secondary schools, eg elective and slow learner courses, preparation for 58.713 Teaching Practice 2. Further development of teaching skills by peer-group microteaching may be undertaken. *Classroom Issues and Strategies:* aspects relating to classroom and community including the primary school, the teacher in the school community, teachers and parents, legal responsibilities and rights, transition, unemployment, leisure, support facilities.

58.744 Mathematics Curriculum and Instruction 3 — S1 L3 S2 L2

Prerequisites: 58.703, 58.713, 58.743.

The teaching of senior secondary school mathematics syllabuses, curriculum development projects in mathematics and their application in NSW, critical analysis of learning problems of school students, investigation of practical remedies for such problems. The subject is designed to complement 58.714 Teaching Practice 3, taken together these subjects provide a wide set of experiences which equip potential teachers to fit successfully into the NSW teaching environment. *Classroom Issues and Strategies:* aspects relating to assessment and measurement including test planning, standardized tests, marking and reporting, essay-type tests, scaling of test scores, uses and effects of assessment.

58.793 Advanced Education 1 — F 1CCH

Students study *one* of the following segments: *Philosophy of Education segment:* some connected issues in social and political philosohpy, and their implications for educational theory and practice. Includes: freedom, compulsion and the aims of education; neutrality

of education systems, schools, teachers and courses; and justice and equality. *Educational Psychology segment:* introduction to selected aspects of on-going research activities in educational psychology. The area is selected following discussions with staff members. *Sociology of Education segment:* more detailed and extensive examination of central topics studied in the pass strand. Consideration of selected issues to do with social theory, the nature of the sociological enterprise and sociological methods.

58.794 Advanced Education 2 **F 1CCH**

Each student engages in twenty-eight hours of supervised study appropriate to his or her proposed research, as approved by the Head of School.

58.795 Advanced Education 3 **F 4CCH**

Enrolment is subject to approval by the Head of School.

In their full-time Honours year, all students enrol in four twenty-eight-hour units of study appropriate to their research, as approved by the Head of School.

58.799 Thesis **F**

History and Philosophy of Science

Students undertaking subjects in History and Philosophy of Science are required to supplement the class contact hours by study in the Library.

Level I

62.110 Science, Technology and Social Change **S1 L2T1 C6**

Dr D. P. Miller

Prerequisites: Nil.

Relations between science, technology and society which have evolved in the 20th century. **1.** Topics which illustrate the effects of scientific and technological development on society — especially those, such as pollution and unemployment, which are apparently unintended; and **2.** Selected theories which have been proposed to explain and evaluate the nature of technological change. Topics include: the use of pesticides; the implications of microprocessor technology; the development of nuclear energy and the debate about recombinant DNA research. Theories of Galbraith, Commoner, Dickson and others — particularly in relation to the question as to whether unintended consequences of scientific and technological development can be eliminated by 'technological fixes' or whether they are inevitable in modern industrial society.

Assessment: Essay (40 percent); tutorials (30 percent); class tests (30 percent).

62.211 The Seventeenth Century Intellectual Revolution **S2 L2T1 C6**

Dr D. R. Oldroyd

Prerequisites: Nil.

The intellectual revolution, centred upon science of the 17th and early 18th centuries, which led on to the Enlightenment. The Mediaeval and Renaissance background. Bacon and Baconianism; empiricism; experimentation and the virtuosi; the idea of progress. The mechanization of the world picture; Descartes and Cartesianism; rationalism; the revival of atomism, materialism. The Copernican Revolution. Locke. Hobbes.

Assessment: Essay (40 percent), tutorials (30 percent); examination (30 percent).

Level II/III

62.022 Materials, Machines and Men **S2 L2T1 C6**

Mrs N. Allen

Prerequisite: A pass in four level I units from Table 1. Excluded: 26.564, 26.251, 62.253.

The rise of technology in its social and cultural context before, during and since the Industrial Revolution. This Revolution, which has been described as the most significant event in human history since the Agricultural Revolution of the New Stone Age, is examined in some detail, and concentrates on technology and its effects on human beings. Considers the professionalization of engineering, the spread of industrialization 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: Essays, tutorial papers and performance in class.

62.032 The Scientific Theory **S2 L2T1 C6**

Dr G. A. Freeland

Prerequisite: As for 62.022. Excluded: 62.505, 62.232.

A critical examination of the scientific theory — its origins, nature and nurture. With particular reference to selected historical examples chosen from both the physical and biological sciences, a number of philosophically interesting problems relating to scientific theories are subjected to analysis. Topics include: the principles of theory construction; perception and observation; the structure of scientific revolutions; scientific explanation; the status of laws and theoretical terms; the 'existence' of theoretical entities; relationships between theory and observation; the functions of models; the principles of theory establishment and rejection.

Assessment: One essay (33⅓ percent); tests (33⅓ percent); tutorials (33⅓ percent).

62.052 Scientific Knowledge and Political Power **S1 L2T1 C6**

Mr G. H. Bindon

Prerequisite: As for 62.022. Excluded: 62.252.

An introduction to the political dimensions of 20th century science. Topics include: growth of expenditure on science in the 20th century; attempts to define the social function of science in the inter-war years; the radical scientists' movement of the 1930s — the freedom *versus*

planning debate; science and politics in the Second World War; government patronage and political expectations in the post-war period; science and economic growth; the science-technology relationship; the rejection of *laissez-faire* in the 1960s; approaches to science policy; critiques of the role of science in contemporary society; scientists as experts; the question of social responsibility in science.

Assessment: Essays (50 percent); tutorials (50 percent).

62.062 The Social System of Science — S2 L2T1 C6

Mr G. H. Bindon

Prerequisite: As for 62.022. Excluded: 62.262.

An introduction to the social dimension of the practice of science. The production and application of scientific knowledge as an activity in constant interaction with its socio-economic, political and cultural environments. The principal features of this interaction in relation to each of the following aspects of scientific activity: the processes of research and discovery; the dissemination of research findings and their acceptance or rejection; the development or abandonment of accepted theories; and the technological applications of scientific knowledge.

Assessment: Essays and tutorial work.

62.072 Historical Origins of the American Scientific Estate — S1 L2T1 C6

Dr D. P. Miller

Prerequisite: As for 62.022. Excluded: 62.272.

The development of American scientific institutions and research from the early years of the Republic, when that country was a scientific backwater, to its present position of global dominance in terms of research resources. Questions about the historical roots of organized research in universities, industrial corporations and government organizations. The American case illustrates well the processes whereby the rapidly emerging scientific profession and its varied specialisms forged links between these sectors of society. Topics: the place of science in a young resource-rich democracy, the uses of science in Progressive ideology, and the war-born relationship of science, government and the military.

Assessment: 2 essays (60 percent); tutorial assessment (40 percent).

62.082 Science, Technology and Developing Countries — S1 L2T1 C6

Mr G. H. Bindon

Prerequisite: As for 62.022. Excluded: 62.282.

The disparities between the scientific and technical capabilities of industrialized and developing societies. The reasons for these disparities and their economic and social consequences. Aspects include: the problems of dependency; the product cycle and its impact on location of production; concepts of the 'learning curve'; aspects of technology choice; bargaining processes; transnational corporations and the 'truncation' of the industrial sector; efforts to define 'appropriate' technologies; modes of technology transfer; alternate models and policies for scientific and technological development; the role of traditional technology; the impact of modern technology on international relations. Issues: the consequences of modern science and technology for the role of the military in developing countries; food and population problems; energy use; environmental impacts; class structure, etc. The social role and function of scientific communities in less developed countries and the process of diffusion of science from the centre to the periphy and the evolution of national scientific communities and institutions are addressed through the use of case studies.

Assessment: Essay (50 percent); tutorials (50 percent).

62.103 The Discovery of Time — L2T1 C6

Dr W. H. Leatherdale

Prerequisite: As for 62.022.

Not offered in 1985.

The evolution of ideas concerning time and history, including the age and history of the earth, devoting particular attention to the period from the 17th century to the present. Consideration is given to such questions as philosophical and scientific problems about the nature of time, historiographical ideas, the authority of the scriptures, social theories, the concept of Nature, the rise of the Romantic Movement, the growth of historical consciousness, relativity and displacement in time, the intention being to provide an understanding of the intellectual setting within which history and geological theories and philosophical, physical and speculative ideas about time developed.

Assessment: 2 essays (30 percent each); tutorials (20 percent); class tests (20 percent).

62.104 The Darwinian Revolution — S2 L1T1 C6

Dr D. R. Oldroyd

Prerequisite: As for 62.022. Excluded: 62.243.

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 general climate of ideas in the 18th and early 19th centuries. Darwin's life and work in some detail, followed by a consideration of the work of Mendel and the establishment of the 'synthetic' theory of evolution. The impact of evolutionary ideas in such diverse fields of thought as religion, literature, music, political theory, epistemology, ethics, and the social and behavioural sciences.

Assessment: Examination (30 percent); tutorial exercises (40 percent); essay (30 percent).

62.106 Mind, Mechanism and Life — S1 L2T1 C6

Dr G. A. Freeland

Prerequisite: As for 62.022. Excluded: 62.302.

The development of scientific ideas concerning the nature of life, mind and behaviour. While the subject includes both a brief treatment of early ideas and reference to issues in contemporary biological and behavioural sciences, the main focus is on the period from the Proto-Scientific Revolution of the 16th century to the advent of the general purpose computer. Topics include: Vesalius and the School of Padua; the biological thought of William Harvey; machines and the mechanical philosophy; Cartesianism and the mechanization of biology; classical theories of the relationship between mind and body; neurophysiology from the 18th to the early 20th century; the mechanist-vitalist disputes; Wundt, Fechner and the rise of experimental psychology; the Freudian revolution; Pavlov and the conditioned reflex; behaviorism and its critics; mind, brain, life and the computer.

Assessment: Essay (33⅓ percent); tutorial assessment (33⅓ percent); tests (33⅓ percent).

62.109 The History of Medical Theory and Practice — S1 L2T1 C6

A/Professor W. R. Albury

Prerequisite: As for 62.022. Excluded: 62.273, 62.309, 26.568, 26.2506.

Development of theory and practice in Western Medicine from the time of Hippocrates 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, with particular emphasis on the social role of modern medicine.

Assessment: Essays, tutorial work and short class tests.

62.241 Relations Between Science and the Arts — L2T1 C6

Dr D. R. Oldroyd

Prerequisite: As for 62.022.

Not offered in 1985.

The relationships between science, literature, painting and music in the history of Western culture. 'Art' and 'Science' in the ancient world. Pythagoreanism and its cultural influences. Science, painting and architecture in the Renaissance. The Scientific Revolution and its influences on English literature. Optical theories of Newton and Goethe and their effect on literature and painting. Science, philosophy, technology and their influence on painting, literature and music in the 19th and 20th centuries. Creativity in science and the arts. Scientific and humanistic cultures in the modern world. The 'two-cultures' debate.

Assessment: Tutorial exercises (40 percent); essay (30 percent); examination (30 percent).

62.022 Introduction to the History of Ideas — L2T1 C6

Dr W. H. Leatherdale

Prerequisite: As for 62.022.

Not offered in 1985.

The discipline of the history of ideas. The relation of the History of Ideas to other disciplines such as History, Philosophy, History and Philosophy of Science, and Literature. An examination of the various kinds and roles of ideas in history. Ideas as characterizing periods and movements. Ideas as general metaphors and conceptual models. A detailed study of some examples selected from: Deism, Materialism, Nature, Platonism, Progress, Romanticism, Reason, Utilitarianism, Social Darwinism. A discussion of some recent and contemporary works dealing with current issues in the field of ideas.

Assessment: 2 essays (30 percent) each; tutorials (20 percent); class tests (20 percent).

62.285 Man, Woman and Deity — S2 L2T1 C6

Dr G. A. Freeland

Prerequisite: As for 62.022.

Conceptions of deity, from earliest times to the present, in relation to changing notions of sexuality and generation; the place of human beings in relation to their environment and the cosmos; the roles of the sexes within different cultures. Topics: archaeological evidence for early ideas concerning generation and for the relations of man to the cosmos; the Earth Mother Goddess; biology, religion and mythology; feng-shui and geomancy; the symbolism of city, temple and dwelling; religion, sexuality and generation in ancient civilizations and primitive societies, with special reference to the Australian Aborigines; the Medieval and Renaissance world views; the tyranny of the machine; conservation and stewardship in the Middle Ages; the *cultus* of the Virgin Mary in relation to scientific and social change; theories of biological generation; concepts of Deity and Nature in relation to science and the environmentalist movement; the Gaia hypothesis.

Assessment: 1 essay (33⅓ percent); 2 tests (33⅓ percent); tutorials (33⅓ percent).

62.551 The Arch of Knowledge: History of the Philosophy and Methodology of Science to 1800 — L2T1 C6

Dr D. R. Oldroyd

Prerequisite: As for 62.022. Excluded: 62.561.

Not offered in 1985.

The development of ideas concerning the nature and methods of the sciences from antiquity to 1800: Platonism and Aristotelianism; scholastic philosophy; the realist/nominalist debate; the Paduan school; Galileo and the mathematization of nature; Bacon and Baconianism; Descartes and Cartesianism; Newton and Newtonianism; Locke as an under-labourer in the Newtonian garden; criticisms of Newtonian science and Lockeian empiricist epistemology: Leibniz, Berkeley and Hume; French empiricism and philosophy of language: Condillac; Kant's Copernican Revolution and principles of Kantian philosophy.

Assessment: 2 essays (50 percent); 2 seminar presentations (50 percent).

62.552 Modern History of the Philosophy and Methodology of Science: 1800 to the Present — L2T1 C6

Dr D. R. Oldroyd

Prerequisite: 62.551 or by permission of the Head of School. Excluded: 62.543, 62.562.

Not offered in 1985.

The development of ideas concerning the nature and methods of the sciences from 1800 to the present: Herschel, Mill and Whewell (British empiricism in conflict with Kantian transcendental philosophy); Comte, Mach and 19th century positivism; Peirce, James and pragmatism; Poincaré and conventionalism; Duhem and instrumentalism; Meyerson and realism; Frege, Russell and logicism; Wittgenstein and Hanson; Einstein and the new science; Bridgman and operationism; Eddington and selective subjectivism; the Vienna Circle and logical positivism; Carnap and positivist reductionism; Hesse and modellism; Popper and falsificationism; Lakatos and 'research programs'; Feyerabend and methodological anarchism; sociologists of knowledge.

Assessment: 2 essays (50 percent); 2 seminar presentations (50 percent).

62.554 Computers, Brains and Minds: Foundations of the Cognitive Sciences — S1 L2T1 C6

Mr P. Slezak

Prerequisite: As for 62.022. Excluded: 52.564.

Introduction to contemporary discussions of the mind, thought, intelligence and consciousness. Focus on the issues which arise in connection with the so-called 'cognitive sciences' — the disciplines which include such fields as computer science, the various neurosciences, cognitive psychology, linguistics and the philosophy of mind. Stress on the recent revolutionary developments in the computer simulation of thought or 'artificial intelligence' and linguistics, since both these areas shed new light on traditional questions concerning the mind. Questions are: Can computers think? and Is the brain a machine? Exploration of the theories, methods and philosophical issues which arise from the 'computational' or 'information processing approach' to the mind.

Assessment: Essay (40 percent); tests (30 percent); tutorials (30 percent).

Level III

62.105 Research Methods in History and Philosophy of Science — F T1½ C6

A/Professor W. R. Albury

Prerequisite: 3 HPS units with an average of credit or better, or by permission of the Head of School. Excluded: 65.520.

A weekly seminar designed to prepare students to carry out Honours level research in HPS. The historiography of science, and its relations to philosophical and social studies of science, are analysed through discussion of texts representing predominant approaches to HPS during the last 30-40 years. In addition, bibliographical, editorial, and other research exercises are carried out.

Assessment: Essay, seminars and written exercises.

Level IV Honours Programs

62.014 History and Philosophy of Science Honours

Prerequisite: Completion of years 1-3 of program 6200, with marks that result in an average of Credit or better in the eight HPS units included in that program.

Candidates are required to undertake an advanced program of study in the intellectual history and/or philosophy of science. The program includes 62.105 (unless this unit has previously been completed), a seminar in Advanced Philosophy of Science, the presentation of a thesis, and such other course work as may be determined by the Head of School. Students wishing to undertake this program should contact the School of History and Philosophy of Science at the earliest opportunity.

62.024 Science Studies Honours

Prerequisite: Completion of years 1-3 of program 6200 (including 62.052, 62.062, 62.072 and 62.082), with marks that result in an average of Credit or better in the eight HPS units included in that program.

Candidates are required to undertake an advanced program of study in the social history of science and/or sociology of science and/or science policy. The program includes 62.105 (unless this unit has previously been completed), a seminar in Advanced Social Studies of Science, the presentation of a thesis, and such other course work as may be determined by the Head of School. Students wishing to undertake this program should contact the School of History and Philosophy of Science at the earliest opportunity.

Board of Studies in Science and Mathematics

68.302 Introductory Marine Science — S1 L3T1

Excluded: 25.601.

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

68.313 Physical Oceanography — S2 L2T2

Prerequisites: 10.001 or 10.011; 1.001.

The physical properties of the oceans, and their measurement. Oceanographic instrumentation. The design of small and large scale ocean experiments. Laboratory and field work.

68.451 Biological Laboratory Computing — S2 L2T4

Prerequisites: As for 10.021B. Excluded: 1.041, Programs 0600, 6806.

Concepts and problems in biology and biology-related areas amenable to the application of computers; experience in elementary BASIC programming and data analysis using large mainframes and laboratory microcomputers; use of microcomputers for collecting data from laboratory instruments, and for controlling instruments in experiments. Includes a segment taught in common with 1.041 Laboratory Computers in Physical Sciences.

68.430 Geology and Physics Honours

An honours program combining Geology and Physics in Program 0125, made by arrangement with the Heads of the two Schools.

68.601 Genetics of Behaviour 1 — S1 L2T3

Prerequisite: 17.031. Excluded: 79.402.

Introductory behaviour genetics with most examples coming from human genetics. Single gene, polygene and chromosomal genetics which illuminate normal and abnormal behaviour; mathematical treatment of data; non-human mammalian behaviour. Practical classes and limited clinical contact.

68.602 Genetics of Behaviour 2 — S2 L2T3

Prerequisite: 79.402 or 68.601. Excluded: 79.403.

The topics of 68.601 at a more advanced level. Continued emphasis on human behaviour with essential consideration of microbial and invertebrate studies. Extended mathematical treatment of data. Projects involving community contact replace some of the practical sessions.

Anatomy

70.011A Histology 1 — S1 L2T4

Prerequisites: 17.031, 17.041.

Elementary theory of light and electron microscopy. Cell morphology and cell ultrastructure. Introduction to simple histological techniques. Basic histology, including the morphological and functional properties of epithelial, connective, muscle and nervous tissues. Systematic histology, including a histological examination of the major systems of the body: cardiovascular, respiratory, lymphatic, integumentary, digestive, endocrine, urinary, reproductive and nervous (including eye and ear). Two lectures per week, each lecture followed by a 2-hour practical-tutorial class. 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.

70.011B Mammalian Embryology — S2 L2T4

Prerequisite: 70.011A.

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 organology. Comparative mammalian development. Biochemistry and embryogenesis.

70.011C Introductory Anatomy — S1 L2T4

Prerequisites: 17.031, 17.041.

Introduction to gross anatomy, based on a study of prosected specimens. Musculoskeletal, cardiovascular, respiratory, gastrointestinal, genitourinary and nervous systems. General topographical and surface anatomy. Normal variations including those related to sex and age.

70.012B Visceral Anatomy — S2 L2T4

Prerequisite: 70.011C.

The topographical anatomy of the great visceral systems — gastrointestinal, respiratory, cardiovascular, and genitourinary — and of the head and neck. Living and radiological anatomy.

70.012C Neuroanatomy 1 — S1 L2T4

Prerequisites: 70.011A, 70.011C.

The neurons, neuronal satellite cells. Functional anatomy of the central nervous system. Blood supply of central nervous system. Organs of special sense. Endocrine glands. Principles of peripheral nerve distribution.

70.013 Anatomy 4 — F

Prerequisite: Completion of the first three years of any Science program with a major in Anatomy (see Table 3).

An honours program consisting of the preparation of an undergraduate thesis together with advanced tutorial courses and participation in School seminars.

70.304 Histology 2 — S2 L2T4

Prerequisite: 70.011A. Excluded: 70.3041. (If 70.304 is taken after 70.3041, total counts only 1 unit.)

Mammalian histology, with particular reference to the human. Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry.

70.3041 Histological and Histochemical Techniques — S2 L1T2

Prerequisites: 17.031, 17.041 and either 41.101 or 45.301 or 70.011A. Excluded: 70.304.

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

70.305 Neuroanatomy 2 — S2 L1T2

Prerequisite: Credit or better in 70.012C.

In seminar format, topics in contemporary neuroanatomy, working from original papers. Includes: sensory and motor areas of the neocortex, hippocampus, cerebellum, and sense organs. Recent work on the development of the central nervous system. Recent advances in neurohistochemistry and neuroendocrinology. Students are required to undertake a substantial amount of private study.

70.306 Functional Anatomy 1 — S1 L2T4

Prerequisite: 70.011C.

Introduction to fundamental issues in the morphology and dynamics of human movement systems. Includes: physical properties of bone, muscle and connective tissue; biomechanics, movement analysis and neuromuscular control. These basic principles are applied to a detailed study of musculoskeletal components of head and neck and upper limb. Emphasis on modern analytical techniques and findings. Tutorials include detailed limb and joint dissections plus intensive study of surface and radiological anatomy.

70.307 Functional Anatomy 2 — S2 L2T4

Prerequisite: 70.306.

A continuation of 70.306. Includes: a detailed study of the musculoskeletal components of trunk and lower limb, functional morphology of muscle, biomechanics and energetics of walking and running.

Pathology

72.301 Basic and Applied Pathology — F L2T1

Prerequisites: 70.011A, 70.011C, 73.111 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.

Physiology and Pharmacology

73.111 Physiology 1A — F L2T4

Prerequisites: 17.031 & 17.041; 2.121 & 2.131, or 2.141; 10.001 or 10.011 or 10.021 B & C. Excluded: 73.121, 73.011A. Co-requisite: 41.101.

Introduction to fundamental physiological principles, dealing first with basic cellular function in terms of chemical and physical principles, and, second, with the operation of the various specialized systems in the body, for example, the cardiovascular system, whose function it is to transport materials to and from the tissues of the body; the respiratory system which must maintain the exchange of oxygen and carbon dioxide between the atmosphere and the blood; the gastrointestinal system which enables food materials to be modified by digestion and absorbed into the circulation; the kidney which is involved in the regulation of body fluid and electrolyte balance and with the excretion of the waste products of metabolism; the endocrine system which releases chemical messengers, called hormones, that are carried in the blood stream to regulate a great variety of body functions, eg metabolism and reproductive activity; the nervous system which by means of very rapidly propagated electrical impulses is responsible for all our movements, sensations, memories, emotions and consciousness itself. A substantial series of practical class experiments on these different areas of physiology is included in the course. This subject is taken by students enrolled in any of the Physiology programs.

73.121 Physiology 1B — F L2T4

Prerequisites: As for Physiology 1A except that 2.131 may be accepted as a co-requisite. Excluded: 73.111.

Covers the same general areas of physiology as Physiology 1A but in less detail and with less intensive practical courses. Physiology 1B may be taken by students not intending to study physiology at Level III.

73.011A Principles of Physiology (Optometry) — F L2T4

Prerequisites: As for Physiology 1A except that 2.131 may be accepted as a co-requisite. Excluded: 73.111.

Covers the same general areas of physiology as Physiology 1A but in less detail and with less intensive practical courses. Principles of Physiology is taken only by students in the BOptom degree course.

73.012 Physiology 2 — F L4T8

Prerquisites: 73.111, 41.101, 41.111.

A major subject offered in third year, providing a more advanced course of study in Physiology. Students spend considerable time performing laboratory experiments which illustrate various physiological principles and introduce them to the techniques used in physiological investigation. The course is orientated towards the areas of physiology constituting the major research interests of the School. It is divided into several sections which may be available in special circumstances as separate 1 and 2 unit Level III courses, including Membrane Biology, Neurophysiology and Organ Physiology, details of which are given below.

73.012A Membrane Biology — S1 L2T4

For entry consult Head of School of Physiology and Pharmacology.

The properties of cell membranes including permeation of ions, solutes and water across membranes, generation of electrical signals in nerve and muscle cells produced by ion movements, and transmission of information between cells. Stress on modern research techniques and on a critical examination of appropriate classical papers.

73.012B Neurophysiology — S1 L2T4

For entry consult Head of School of Physiology and Pharmacology.

A detailed study in two broad areas, neural mechanisms in sensation and the control of posture and movement. Includes the regulation of visceral and other autonomic effector structures and the neural substrates and correlates of certain higher functions such as speech, memory and consciousness. Directed towards the experimental analysis of nervous system function, to introduce the techniques and approaches used in neurophysiological research. Sensation: an integrated lecture and experimental course is given on somatic, visual and auditory sensory mechanisms. Laboratory work: students conduct psychophysical experiments to evaluate subjective sensory capabilities. The neural mechanisms underlying these subjective abilities are examined in animals in electrophysiological experiments which involve recording the impulse patterns from individual neurones within the sensory systems. Students are required to analyze the mechanisms employed by the nervous system to code information about specific parameters of sensory stimuli.

Lectures and experiments on motor function are directed towards an understanding of the various reflex and voluntary mechanisms controlling posture and movement. The section dealing with nervous control of visceral function is concerned mainly with regulation of cardiorespiratory activity.

73.012C Organ Physiology — S2 L4T8

Prerequisites: for 73.012A, B, C: normally as for 73.012. For entry consult Head of School of Physiology and Pharmacology.

An advanced study dealing with major physiological systems of the body and usually includes detailed segments from: the cardiovascular and respiratory systems; endocrines, kidney, fetal physiology, gastrointestinal physiology and exercise physiology. Emphasis on the functions of individual organs as well as the overall operations of particular body systems including their neural control mechanisms. Emphasis on the approaches and techniques involved in physiological research. Students are therefore required to carry out an extensive series of experiments which usually employ mammalian (including human) preparations.

73.012F Clinical Physiology — F T3

Prerequisites: 73.111; 41.101; 41.111 or 2.002B; 70.011A; 70.011C; 80.014.

This Level III subject is only available in course 3820, and only to those students not undertaking Physiology 2. The subject is intended to supplement the Level II, Physiology 1A course in order to provide an adequate grounding for double degree students in applied or clinical aspects of physiology before they enter Year 3 of the Medical Course.

Covers aspects of normal and disordered physiology in the following areas: cardiovascular and cardiorespiratory mechanisms; body fluid balance and kidney function; the endocrine system; central nervous system; gastrointestinal physiology.

73.022 Pharmacology — F L2T4

Prerequisite: 73.111 or 73.121. Co-requisites: 73.012 or 41.102A & 41.102B or two Level III Chemistry units.

Includes a study of the absorption, distribution and metabolism of drugs as well as 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. A practical class program complements the lecture program by demonstrating a variety of basic pharmacological techniques.

Honours Study

Depending on their undergraduate records students may be accepted by the Head of the School to undertake a fourth year of study towards an honours degree in Physiology or in Pharmacology. This would usually be done by students planning a career in either of these fields. During the honours year the student carries out a research project under the supervision of a staff member and submits a thesis based on the research project. The student can usually nominate the general research area in which he or she wishes to work from those being studied in the School. Within this research area the student is given a specific project by the supervisor.

Community Medicine

79.201 Population Genetics — S1 L2T3

Prerequisite: one unit of statistical methods, or theory, as approved by the Head of School.

The genetic structure of populations: demographic structure, 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; observed human population structures; computer methods.

79.202 Quantitative Methods in Human Genetics — S2 L2T3

Prerequisites: one unit of genetics and one unit of statistical methods, or theory, as approved by the Head of School.

Collection, interpretation and uses of genetical information relating to human populations: design of surveys, including twin and family studies; estimation and applications of genic and genotypic frequencies, selective values, mutation and migration rates, coefficients of kinship, inbreeding and assortative mating, effective population sizes, recombination fractions and heritabilities; segregation analysis; risks of recurrence of disease; genetical consequences of human intervention; computer methods.

79.302 Biochemical Genetics of Man S1 L2T4

Prerequisites: 41.101, 43.101.

Inherited variation of blood group antigens, serum proteins and red-cell enzymes, their possible selective roles, and their application to the study of differences between and within populations. Application of statistical techniques to analyzing population data.

Faculty of Medicine

80.014 Human Behaviour F L3

Prerequisites: No formal prerequisites. Students normally take the subject in Year 2 of Course 3820.

The research techniques, theoretical concepts and basic findings of the behavioural sciences, especially as these relate to medicine. Special emphasis is placed on the development of skills for the critical evaluation of scientific data concerning human behaviour and the oral and written expression of such evaluations. Topics include: scientific methods in behavioural sciences; the influence of heredity and environment on behaviour; human motivation and emotion; thinking and language; learning and memory; the psychology of stress; the psychophysiology of sleep; the psychology of aging; addictive behaviours; altered states of consciousness; gender differences; and the psychology of interpersonal behaviour. In addition to attending seminars, students carry out experimental practical work.

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

Graduate Study:
Faculty of Biological Sciences
Faculty of Science

Faculty of Biological Sciences and Faculty of Science Enrolment Procedures

All students, re-enrolling in 1985 or enrolling in graduate courses should obtain a copy of the free booklet *Enrolment Procedures 1985* available from School Offices and the Admissions Office. This booklet provides detailed information on enrolment procedures and fees, enrolment timetables by Faculty and course, enrolment in miscellaneous subjects, locations and hours of Cashiers and late enrolments.

Faculty of Biological Sciences

Facilities are available in each of the Schools for research leading to the degrees of Master of Science and Doctor of Philosophy. The School of Biotechnology offers a graduate diploma course in Biochemical Engineering, a graduate diploma in Biotechnology and a Master's course in Biotechnology by formal study, and the School of Psychology offers Master of Psychology and Master of Science (Psychology) 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:

41.103 Biochemistry Honours
42.103 Biotechnology Honours
43.103 Botany Honours
44.103 Microbiology Honours
12.403 Psychology 4 (Research)
45.103 Zoology Honours

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:

41.999G Biochemistry
42.999G Biotechnology
43.999G Botany
44.999G Microbiology
12.999G Psychology
45.999G 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.

Biotechnology

5320
Biochemical Engineering Graduate Diploma Course

Graduate Diploma
GradDip

The School of Biotechnology, conjointly with the School of Chemical Engineering and Chemical Technology, offers a course in biochemical engineering which leads to the award of a graduate diploma (GradDip). The course is open to graduates in the biological sciences, chemistry, chemical engineering or agriculture, and can be completed in one year of full-time or over a longer period by part-time study. It contains a component of graduate level 'bridging' subjects, designed to facilitate the introduction of graduates with a variety of backgrounds to the current practice of biochemical engineering.

The normal entrance requirement is an appropriate degree or equivalent qualification in biological sciences, chemistry, chemical engineering or agriculture. Intending students are referred to the conditions for the award of Graduate Diplomas set out later in this handbook.

		Hours per week S1	S2
Session 1			
42.211G	Principles of Biology	3	0
42.212G	Principles of Biochemistry	3	0
44.101	Introductory Microbiology	6	0
48.282G	Thermodynamics	4	0
48.284G	Mass Heat and Momentum Transfer	4	0
Session 2			
42.213G	Biochemical Methods	0	3
42.214G	Biotechnology	0	3
48.283G	Process Dynamics and Biochemical Engineering Design	0	8

5340
Biotechnology Graduate Diploma Course

Graduate Diploma
GradDip

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 will not be 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 19 hours per week, or two years part-time study, consisting of an average of 9½ 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.

		Hours per week S1	S2
Obligatory Subjects			
Full Year			
42.215G	Practical Biotechnology	7	7
Session 1			
42.102A	Biotechnology A	6	
Elective Subjects			
Full Year			
42.104G	Graduate Seminars	2	2
42.111G	Reading List in Biotechnology (Microbiology)	3	3
42.112G	Reading List in Biotechnology (Biochemistry)	3	3
42.305G	Case Studies	0	2
Session 1			
44.101	Introductory Microbiology	6	
42.212G	Principles of Biochemistry	3	
Session 2			
42.101	Introduction to Biotechnology		6
42.102B	Biotechnology B		6
44.121	Microbiology 1		6

Master of Science (Biotechnology)

The School also offers a formal graduate course at the masters' level (Master of Science (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 Graduate Degrees** set out later in this handbook.

The course consists of lectures, tutorials, practical sessions, case history studies and a supervized 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.

8260
Master of Science (Biotechnology) Graduate Course

Master of Science (Biotechnology)
MSc(Biotech)

		Hours per week S1	S2
Full Year			
42.306G	Project	7	7
Session 1			
42.303G	Biochemical Process Control	5	0
42.304G	Biodeterioration and Biodegradation	5	0
Session 2			
42.301G	Microorganism Productivity	0	5
42.302G	Enzyme Technology	0	5
42.305G	Case Studies	0	2
		17	19

Psychology

Head of School
Dr K. R. Llewellyn
Administrative Officer
Mr T. J. Clulow

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

Master of Psychology

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 I or Class II 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.

A student who does not satisfy the above requirements may be permitted to undertake a qualifying course prescribed by the Head of School, satisfactory completion of which will be accepted as meeting entrance requirements.

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. An application to register for the degree of Master of Psychology must be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the academic 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.

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 250 hours of supervized clinical practice must be completed in the first year, and a further 430 hours in the second year.

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.

8250
Master of Psychology Graduate Course—Full-time

Master of Psychology
MPsychol

Year 1		Hours per week S1	S2
Full Year			
12.231G	Professional Practice: 250 hours		
12.235G	Community Psychology	5	5
12.237G	Biological Aspects of Behavioural Disturbance	2	2
12.239G	Research and Evaluation Methods in Clinical and Community Psychology	2	2
12.240G	Graduate and Clinical Seminars	2	2

Year 1 subjects continued overleaf

		Hpw S1	S2
12.241G	Graduate Colloquium	1	1
12.242G	Research Thesis*		
12.243G	Experimental Clinical Psychology	5	5
12.244G	Psychological and Behavioural Assessment	0	2
12.245G	Behavioural Health Management	2	2
Year 2			
Full Year			
12.230G	Psychological Problems of Children	3	
12.231G	Professional Practice: 180 hours in Session 1 250 hours in Session 2		
12.235G	Community Psychology	3	
12.241G	Graduate Colloquium	1	1
12.242G	Research Thesis*		
12.243G	Experimental Clinical Psychology	3	

*Contributes approximately 40 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.

Master of Science (Psychology)

The degree is available only to students who hold the degree of Doctor of Philosophy in an approved area of psychology. In combination with the PhD, the degree is designed to train candidates for academic positions in clinical psychology and to provide the background necessary for advancement to senior posts in applied fields.

The minimum period of full-time registration for the degree is three sessions, and the minimum period of part-time registration is six sessions. Students with advanced standing may have the minimum period reduced by up to one-third of the program.

Assessment of student performance is by sessional examinations, class tests and seminar papers.

8255
Master of Science (Psychology) Graduate Course—
Full-time

Master of Science (Psychology)
MSc (Psychol)

		Hours per week S1	S2
Year 1			
12.231G	Professional Practice: 250 hours		
12.237G	Biological Aspects of Behavioural Disturbance	2	2
12.239G	Research and Evaluation Methods in Clinical and Community Psychology	2	2
12.241G	Graduate Colloquium	1	1
12.243G	Experimental Clinical Psychology	5	5
12.244G	Psychological and Behavioural Assessment	0	2
12.245G	Behavioural Health Management	2	2
12.246G	Behavioural Management in Institutions	2	2
12.247G	Graduate Seminars in Clinical Psychology	2	2
Year 2			
12.230G	Psychological Problems of Children	3	
12.231G	Professional Practice: 200 hours		
12.241G	Graduate Colloquium	1	
12.243G	Experimental Clinical Psychology	3	
12.248G	Community Psychology	3	

Note: Part-time students take half the full-time program in any one session.

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:

Faculty of Science	Graduate Diploma in Physical Oceanography
School of History and Philosophy of Science	Master of Science and Society
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	Master of Physics

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 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 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 awards are set out later in this handbook.

5530
Physical Oceanography Graduate Diploma Course

Graduate Diploma in Physical Oceanography
GradDip

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 (67.001G) worth 50% of the total accreditation for the program, the remaining 50% being comprised as indicated below.

1. Compulsory Subjects

67.001G	Experimental Project	14 credits
67.002G	Geophysical Fluid Dynamics	4 credits
67.003G	Instrumentation	1 credit
67.004G	Applied Data Analysis	2 credits

2. Elective Subjects

67.005G	Theoretical Project	7 credits
6.380G	Data aquisition and analysis in Remote Sensing	1 credit
6.387G	Programming and software in Remote Sensing	1 credit
	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).

Chemistry

Head of School
Professor P. J. Derrick
Executive Assistant to Head of School
Vacant

8770
Master of Chemistry Graduate Course

Master of Chemistry
MChem

Three programs are available, emphasizing different areas of chemistry. Each program consists of a number of lecture courses (each separately examinable), laboratory instruction and visits to laboratories. In addition each student undertakes a short research project, with a research report assessed by two examiners. The student may also be required to undergo an oral examination.

Program 2.581G Advanced Analytical Chemistry and 2.583G Analytical Science (Chemistry) are available only on a full-time basis; however, the qualifying program may be taken part-time.

Program 2.582G Food and Drug Chemistry may be taken either full-time or part-time.

Details of the programs are:

2.581G Advanced Analytical Chemistry

This program should be of interest to chemistry graduates who are involved in the practice or teaching of analytical chemistry.

1. *2.581G Advanced Analytical Chemistry Lecture Courses*

Students are required to take *all* of the following nine core courses of lectures:

(1) Analytical flame spectroscopy;
(2) Advanced electrochemical analysis;
(3) Chromatography;
(4) Analytical chemistry of pollutants;
(5) Emission, IR, Mass and XRF spectroscopy;
(6) Calculations and statistics in analytical chemistry;
(7) Chemical analysis of organic and biological materials;
(8) Operations and applications of minicomputers in chemistry;
(9) Chemical microscopy.

The lecture time for the whole course is a minimum of 140 hours.

2. *Laboratory Instruction and Visits to Laboratories*

An additional minimum of 150 hours is spent by students in selected areas of laboratory practice, instruction and visits to laboratories.

3. *Research Project*

A short research project (with report) of approximately 4 months' duration full-time (400 hours laboratory work) is selected in relation to the combined interests of the student and the supervisor.

2.582G Food and Drug Chemistry

This program involves an advanced study of the chemistry, stability, mode of action (where applicable) and analysis of food constituents, food additives and selected drugs. Entry to this program is excluded in the case of applicants who have completed the Graduate Diploma in Food and Drug Analysis (course 5510).

1. *Food and Drug Chemistry 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

The lecture time for the whole course is 132 hours. An additional 308 hours is spent by students in formal laboratory work. Students who have not previously taken an approved course in microbiology are required to complete unit 44.101 Introductory Microbiology (84 hours) in addition to the above program.

2. *Research project*

A short research project (with report) of approximately 4 months' duration full-time (400 hours laboratory work) is selected in relation to the combined interests of the student and the supervisor.

2.583G Analytical Science (Chemistry)

This program provides a more broadly based training in methods of chemical analysis than 2.581G.

1. *Formal course work*

Students are required to complete all of the following courses of lectures and associated laboratory work.

(1) Classical methods of chemical analysis
(2) Instrumental analysis
(3) Toxicology, occupational and public health
(4) Special instrumental analysis methods

The lecture time for the whole course is 98 hours. An additional 196 hours is spent in formal laboratory sessions.

2. *Project*

A short project (with report) requiring 400 hours of laboratory work, which may be either original research work or development work. The field of work will be selected considering the combined interests of the student and supervisor.

5510
Food and Drug Analysis Graduate Diploma Course

Diploma in Food and Drug Analysis
DipFDA

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 later in this handbook.

Year 1

Part-time**		**Hours per week**
2.231G	Food and Drugs 1	4
2.371G	Treatment of Analytical Data	1*
2.281G	Instrumental Techniques in Food and Drug Analysis	4
		9

Year 2

2.242G	Food and Drugs 2 Pharmacognosy and Microscopy of Crude Drugs	4
2.251G	Toxicology, Occupational and Public Health	3
44.101	Introductory Microbiology	3†
		10

*For 20 weeks.
†Offered in Session 1 only, at 6 hpw.
**Full-time students take Years 1 and 2 in the one year.

History and Philosophy of Science

Head of School
Associate Professor W. R. Albury

The School of History and Philosophy of Science offers a graduate program of coursework and research leading to the award of the degree of Master of Science and Society. The course is designed for graduates in the natural sciences, the applied sciences, technology and the social sciences or other relevant discipines, who have a special interest in or concern with problems in the contemporary relationships between science and society, government and politics. The conditions for the award of the degree are set out later in this handbook.

8780
Master of Science and Society Graduate Course

Master of Science and Society
MScSoc

The MScSoc pass program comprises 8 units of the course, which should normally be completed over 4 sessions of part-time (evening) study. A unit of the course requires 28 hours of seminar classwork and additional private study.

The following core units are common to the programs of all candidates:

62.716G Science and Society in the Twentieth Century*
62.713G Project*

Candidates may select 4 further units from the following list:

62.709G The Scientific Community
62.710G Science, Philosophy and Social Values
62.714G Knowledge, Power and Public Policy
62.715G Cause, Belief and Progress in the History of Science
62.718G Science in National Cultures: Comparative Historical Perspectives
62.720G Philosophy of Science and the Sociology of Knowledge
15.716G Science, Technology and Economic Development
26.568G Technology and Alternative Development
30.960G Technology and Organisations
53.309G Social and Technological Forecasting (2 units)
53.571G Technology and Working Life

Selected candidates may undertake a third-year MScSoc honours degree program of advanced study which includes a dissertation based on supervized research into particular aspects of the relationships between science and technology and science and its institutions.

*2 units.

Mathematics

Head of School
Professor G. Brown

The School of Mathematics 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 Graduate Course

Master of Mathematics
MMath

The Master of Mathematics 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 specializing 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 lecture courses from 10.194G, 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 supervized 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 supervized by a staff member, consisting of either a critical review of the literature in a specific field of mathematics, or a short research project. It is anticipated that students will 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 later in this handbook.

8750
Master of Statistics Graduate Course

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 study 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 later in this handbook.

The academic requirement for the degree is 24 credits.

Each candidate's program of study must be approved by the Head of the School.

Compulsory Subjects		**Credits**
10.381G	Experimental Design 1	2
10.383G	Stochastic Processes	2
10.385G	Multivariate Analysis 1	2
10.390G	Statistical Inference	2
10.392G	Project	2
Elective Subjects		
10.382G	Experimental Design 2	2
10.384G	Time Series	2
10.386G	Multivariate Analysis 2	2
10.387G	Sample Survey Design	2
10.388G	Sequential Analysis	2
10.389G	Non-Parametric Methods	2
10.391G	Special Topic* A	2
10.393G	Special Topic* B	2
10.394G	Discrete Distributions	2
10.212M	Optimal Control Theory *or*	3
10.222M	Higher Optimal Control Theory	

Up to 6 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:

8.403G	Theory of Land Use/Transport Interaction	2
8.405G	Urban Transport Planning Practice	2
8.417G	Transport and Traffic Flow Theory	4
10.212L	Optimization Methods *or*	3
10.222L	Higher Optimization Methods	
15.423	Econometrics B	2
18.771G	Simulation in Operations Research	2

*To be arranged: eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory.

Optometry

Head of School
Professor H. B. Collin

The School of Optometry 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 later in this handbook.

8760
Master of Optometry Graduate Course

Master of Optometry
MOptom

		Hours per week
31.701G	Advanced Clinical Optometry	4
	Three elective graduate subjects chosen from the list below (each 4 hours)	12
31.799G	Project	8
		24

Elective Graduate Subjects

31.702G	Advanced Physiological Optics	4
31.703G	Pleorthoptics and Binocular Vision	4
31.704G	Advanced Contact Lens Studies	4
31.705G	Advanced Contact Lens Practice	4
31.706G	Occupational Optometry	4
31.707G	Clinical Photography	4

The six 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	**1.** Advanced Contact Lens Studies **2.** Advanced Contact Lens Practice **3.** Clinical Photography
Occupational Optometry	**1.** Occupational Optometry **2.** Pleorthoptics and Binocular Vision **3.** Advanced Physiological Optics
Orthoptics	**1.** Pleorthoptics and Binocular Vision **2.** Clinical Photography

Physics

Head of School
Professor H. J. Goldsmid

Executive Assistant to Head of School
Dr J. R. Hanscomb

Administrative Officer
Mrs P. Shaw

8730
Master of Physics Graduate Course

Master of Physics
MPhysics

The School of Physics offers a graduate course leading to the award of the Master of Physics degree (MPhysics).

The Master of Physics degree course is intended for honours graduates in physics. Others may be admitted if they have submitted evidence of such academic and professional attainments as may be approved by the Faculty of Science on the recommendation of its Higher Degree Committee. Applicants with other qualifications may be admitted after completing a qualifying examination approved by the Faculty of Science.

The subject matter of the course provides an advanced training in a branch of physics, the topic of which is determined during the year preceding that in which it is offered.

Students undertaking the masters course by formal study must enrol in *one* of the following subjects:

1.801G	Energy Alternatives
1.802G	Astrophysics
1.803G	Acoustics
1.804G	Biophysics
1.805G	Applied Physics

Enrolment in any one of the above subjects normally involves at least five units of lecture material, a literature survey, and small research project.

Graduate Study:

Subject Descriptions

Identification of Subjects by Number

A subject is defined by the Professorial Board as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

Each approved subject of the University is identifiable both by number and by name as this is a check against nomination of subject other than the one intended.

Subject numbers are allocated by the Registrar and the system of allocation is based on the following guidelines:

1. The authority offering the subject, normally a School of the University, is indicated by the number before the decimal point.

2. Each subject number is unique and is not used for more than one subject title.

3. Subject numbers which have not been used for some time are not used for new subject titles.

4. Graduate subjects are indicated by a suffix 'G' to a number with three digits after the decimal point. In other subjects three or four digits are used after the decimal point.

Subjects taught are listed in full in the handbook of the faculty or board of studies responsible to the particular course within which the subjects are taken. Subject descriptions are contained in the appropriate section in the handbooks.

The identifying numerical prefixes for each subject authority are set out below.

Servicing Subjects are those taught by a school or department outside its own faculty, and are published at the end of the entry for the relevant school. Their subject descriptions are also published in the handbook of the faculty in which the subject is taught.

HSC Exam Prerequisites

Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range refer to the **1978 and subsequent Examinations.**

Candidates for enrolment who obtained the HSC in previous years or hold other high school matriculation should check with the appropriate school on what matriculation status is required for admission to a subject.

Information Key

The following is the key to the information which may be supplied about each subject: S1 (Session 1); S2 (Session 2); F (Session 1 *plus* Session 2, ie full year); S1 or S2 (Session 1 *or* Session 2, ie choice of either session); SS (single session, ie which session taught is not known at time of publication); L (Lecture, followed by hours per week); T (Laboratory/ Tutorial, followed by hours per week); Sem (Seminar, followed by hours per week) hpw (hours per week); C (Credit *or* Credit units), CR (Credit Level), DN (Distinction); R (after subject number) Broken Hill syllabus.

	School, Department etc	Faculty	Page
	*Graduate subjects also offered for courses in this handbook		
1	School of Physics	Science	193
2	School of Chemistry	Science	193
4	School of Metallurgy	Applied Science	
5	School of Mechanical and Industrial Engineering	Engineering	
6	School of Electrical Engineering and Computer Science	Engineering	
7	School of Mining Engineering	Applied Science	
8	School of Civil Engineering	Engineering	
9	School of Wool and Pastoral Sciences	Applied Science	
10	School of Mathematics	Science	194
11	School of Architecture	Architecture	
12	School of Psychology	Biological Sciences	196
13	School of Textile Technology	Applied Science	
14	School of Accountancy	Commerce	
15	School of Economics*	Commerce	197
16	School of Health Administration	Professional Studies	
17	Biological Sciences	Biological Sciences	
18	School of Mechanical and Industrial Engineering (Industrial Engineering)	Engineering	
21	Department of Industrial Arts	Architecture	
23	School of Nuclear Engineering	Engineering	
25	School of Applied Geology	Applied Science	
26	Department of General Studies*	Board of Studies in General Education	197
27	School of Geography	Applied Science	
28	School of Marketing	Commerce	
29	School of Surveying	Engineering	
30	Organizational Behaviour*	Commerce	197
31	School of Optometry	Science	197
32	Centre for Biomedical Engineering	Engineering	
35	School of Building	Architecture	
36	School of Town Planning	Architecture	
37	School of Landscape Architecture	Architecture	
38	School of Food Technology	Applied Science	
39	Graduate School of the Built Environment	Architecture	
40	Professorial Board		
41	School of Biochemistry	Biological Sciences	
42	School of Biotechnology	Biological Sciences	198
43	School of Botany	Biological Sciences	199

	School, Department etc	Faculty	Page
	*Graduate subjects also offered for courses in this handbook		
44	School of Microbiology	Biological Sciences	200
45	School of Zoology	Biological Sciences	200
46	Faculty of Applied Science	Applied Science	
47	Faculty of Engineering	Engineering	
48	School of Chemical Engineering and Industrial Chemistry*	Applied Science	200
50	School of English	Arts	
51	School of History	Arts	
52	School of Philosophy	Arts	
53	School of Sociology*	Arts	200
54	School of Political Science	Arts	
55	School of Librarianship	Professional Studies	
56	School of French	Arts	
57	School of Drama	Arts	
58	School of Education	Professional Studies	
59	Department of Russian	Arts	
60	Faculty of Arts (Bachelor of Social Science)	Arts	
61	Department of Music	Arts	
62	School of History and Philosophy of Science*	Arts	200
63	School of Social Work	Professional Studies	
64	School of German Studies	Arts	
65	School of Spanish and Latin American Studies	Arts	
66	Subjects Available from Other Universities		
67	Faculty of Science	Science	201
68	Board of Studies in Science and Mathematics	Board of Studies in Science and Mathematics	
70	School of Anatomy	Medicine	
71	School of Medicine	Medicine	
72	School of Pathology*	Medicine	201
73	School of Physiology and Pharmacology*	Medicine	201
74	School of Surgery	Medicine	
75	School of Obstetrics and Gynaecology	Medicine	
76	School of Paediatrics	Medicine	
77	School of Psychiatry	Medicine	
78	School of Medical Education	Medicine	
79	School of Community Medicine	Medicine	
80	Faculty of Medicine	Medicine	
81	Medicine/Science/Biological Sciences	Medicine	
85	Australian Graduate School of Management	AGSM	
90	Faculty of Law	Law	
97	Division of Postgraduate Extension Studies		

Physics

Not all graduate subjects are necessarily offered in any one year.

1.118G Methods of Theoretical Physics

For PhD degree, MSc and MPhysics degree course students.

1. Response functions and Green's functions. **2.** Symmetry and group theory. **3.** Many particle systems. **4.** Tensor calculus and variational techniques.

1.128G Methods of Experimental Physics

For PhD degree, MSc and MPhysics degree course students.

1. Signal processing and retrieval. **2.** Resonance spectroscopy techniques. **3.** Diffraction and scattering techniques. **4.** Electron microscopy.

1.801G Energy Alternatives

For MPhysics degree course students.

A study of energy alternatives: solar thermal and solar electric energy; energy from fossil fuels; conversions, hydrogen, nuclear fusion and fission, wind, ocean and geothermal sources of energy; political and sociological aspects of energy alternatives.

1.805G Applied Physics

For MPhysics degree course students.

A study of advanced physical instruments, data handling and control, measurement technology and materials science with special reference to physics in industry.

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.

1.927G Acoustic Theory — S1 L1½T½

2 credit points.

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.

Chemistry

2.231G and 2.242G Food and Drugs 1 and 2 (Including Pharmacognosy and Microscopy of Crude Drugs) — F L1T3

Regarded as a unit, and may be spread over two years.

Treatment of the food section develops from considerations of proximate analysis — gross determination of classes of food components — to detailed examinations within the groups for more important compounds. Conversely the course in drug work progresses from the examination of simple materials, including identification of unknowns by macro and micro procedures to the examination of compounded materials. A background section on food handling is included, while some attention is given to chemotherapy etc in the drug course.

Subject-matter covers treatment of the main classes of foodstuffs, such as: *Foods:* 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. *Drugs:* 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.

Pharmacognosy and Microscopy of Crude Drugs
A graded subject of 20 hours, progressive from relatively simple structures to the examination of adulterated mixtures. Examples from the series: hairs and textile fibres of natural origin, woods, stems, leaves, and barks. Seeds, fruits, rhizomes and roots. Flowers, dried juices and gums. Reactions of cell wall and cell contents. Steps in characterization of unknown powders, adulterants of food and drug powders.

2.251G Toxicology, Occupational and Public Health — F L1T2

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 man. 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.

2.271G Chemistry and Analysis of Foods — F L1T3

Illustrates the bases and application of analytical techniques as applied to foods. Emphasis is placed on the design of methods, on the preparation of material for instrumental analysis and on the interpretation of data. Includes: proteins and flesh foods, carbohydrates and saccharine foods, fats and oils, dairy and fermentation products, vitamins, food additives — preservatives and colouring matters, pesticide residues, metal contaminants — food microscopy.

2.281G Instrumental Techniques in Food and Drug Analysis — F L1T3

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, flueorescence spectroscopy and gas chromatography. Services 2.231G, 2.242G and 2.251G but is also suitable as a single subject for those wishing to familiarize themselves with modern tecniques.

2.371G Treatment of Analytical Data — F L1

Errors of measurement, the treatment, interpretation and comparison of sets of measurements, associated data and problems involving analysis of variance. Topics: Description of sets of measurements, 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.

2.581G Advanced Analytical Chemistry

Lectures: **1.** Analytical flame spectroscopy. **2.** Advanced electrochemical analysis. **3.** Chromatography. **4.** Analytical chemistry of pollutants. **5.** Emission, IR, mass and XRF spectroscopy. **6.** Calculations and statistics in analytical chemistry. **7.** Chemical analysis of organic and biological materials. **8.** Operations and applications of minicomputers in chemistry. **9.** Chemical microscopy.

Laboratory: Practice, instruction and visits.

Research Project.

2.582G Food and Drug Chemistry

Lectures/Laboratory: **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.

Note: The *Lecture/Laboratory* material is similar to that of 2.231G, 2.371G, 2.281G, 2.242G and 2.251G respectively, but is examined at a higher level.

Research Project.

2.583G Analytical Science (Chemistry)

Lectures/Laboratory **1.** Classical methods of chemical analysis: solution equilibria, precipitation and complex formation, gravimetric, titrimetric and spectrophotometric methods, use of organic reagents, ion exchange and solvent extraction. **2.** Instrumental analysis: advanced treatment of modern instrumental methods including molecular and atomic spectroscopy, chromatography and electrochemistry. **3.** Toxicology, occupational and public health. **4.** Special instrumental methods: theory, instrumentation and applications of X-ray fluorescence spectroscopy, inductively coupled plasma atomic emission spectroscopy and mass spectrometry. Principles of automation and data processing.

Project.

Mathematics

10.194G Advanced Mathematics Lecture Courses

Each year a selection of courses is offered in the following areas:

Algebraic geometry; algebraic topology; categorical and homological algebra; commutative algebra; group theory; Lie groups and algebras; representation theory; group theory and its physical applications; advanced quantum mechanics; differential geometry; differential equations; optimal control theory; functional analysis; applied functional analysis; operator theory; harmonic analysis; advances numerical analysis; theory of functions; finite mathematics; number theory; logic; theoretical astrophysics; history of mathematics; recent advances in mathematics; mathematical economics; optimization and control.

10.302G Regression Analysis and Experimental Design — S1 L1½T½

Prerequisite: First course in Statistics.

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.

10.303G Applied Stochastic Processes — S2 L1½T½

Prerequisite: First course in Statistics.

An introduction to processes in discrete and continuous time. Markov chains and Markov Processes, branching processes, Time Series with moving average models.

10.372G Statistical and Experimental Design

The concepts of random variables, means, variances, the common tests and confidence intervals based on the normal distribution, some simple analyses of variance.

Comparative Experiments: requirements of a good experiment, assumptions underlying the conventional models of standard designs and their analyses, purpose of randomization; how the physical circumstances of an experiment are related to its formal model on which its analysis is based; the internal estimate of error obtained from the variation left after accounting for all sources of systematic variation, these points illustrated by considering in some detail the fully randomized design, the randomized block design, the 2^2 factorial fully randomized design, and the fully randomized design with one concomitant variable.

Survey Sampling: the distinction between a survey sample and an experiment planned to compare a set of treatments, and how it affects the inferences that may be made; simple random sampling, stratified random sampling.

10.381G Experimental Design 1

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory. Multiple comparisons.

10.382G Experimental Design 2

Extensive treatment of random and mixed models. Combinatorial structure of designs, cross-over and lattice designs, response surfaces.

10.383G Stochastic Processes

Discrete parameter, continuous time Markov processes. Brief survey of birth-and-death, immigration, epidemic and predator-prey processes. Introduction to dam and storage problems. Queueing processes. Diffusion approximations.

10.384G Time Series

Spectral estimates, discrete and continuous spectra. Periodogram analysis. Probability theory, special processes. Ergodicity, harmonic analysis and linear filters. Estimation and hypothesis testing.

10.385G Multivariate Analysis 1

Likelihood ratio tests for means, variances and structure. Discriminant, principal component, canonical and factor analysis.

10.386G Multivariate Analysis 2

The general linear hypothesis and analysis of dispersion. Tests based on roots, distribution theory.

10.387G Sample Survey Design

Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multi-stage sampling.

10.388G Sequential Analysis

The sequential probability ratio test — OC and ASN functions. General theory of sequential tests. Sequential estimation.

10.389G Non-Parametric Methods

Sign test, run tests, goodness-of-fit tests. Order statistics and range. Rank-order statistics. Wilcox and signed-rank tests, one- and two-way rank analyses of variance. Rank correlation. Randomization theory and permutation tests. Paired comparisons. Censoring and truncation.

10.390G Statistical Inference

Decision theory. General theory of estimation and hypothesis testing.

10.391G Special Topic A

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory.

10.392G Project

10.393G Special Topic B

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, and other topics.

10.394G Discrete Distributions

Discrete and lattice distributions — their general properties mostly via generating functions. The structures of contagious (clustered) distributions, with a study of specific examples such as the negative binomial, Neyman and Poisson-Pascal families, together with estimation and fitting procedures.

10.401G Seiches and Tides

The equations of motion of a shallow liquid. Shallow water waves, oscillations of rectangular and circular lakes. The tides, their observation and measurement. Newton's equilibrium theory. Harmonic analysis and prediction. Local tides. Oscillations and resonance of harbours and bays.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Arts Handbook.

10.062G Advanced Mathematics General

For research workers throughout the University requiring employment of advanced mathematics. Topics vary from year to year according to demand and interest.

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

10.061G Advanced Mathematics for Electrical Engineers C3

Boundary value problems in partial differential equations. Selected topics from complex variable analysis, integral transforms, and orthogonal functions and polynomials.

10.361G Statistics C3

Probability theory, a survey of random processes with engineering applications — processes in discrete and continuous time. Markov processes, ergodicity, stationarity, auto-correlation, power spectra, estimation of auto-correlation and power spectra.

10.371G Statistics C3

Revision of probability and distribution theory, including estimation of hypothesis testing. Extension of this to include topics such as more complex probabilistic modelling, analyses of modified data (censored, truncated andd missing observations), general statistical inference (decision theory), acceptance testing, and reliability analysis (hazard functions).

32.012G Biomedical Statistics S1 L2½ T1½ C4

Statistical assessment of normal and diseased states. Statistical relationships between multiple variables used to assess disease; analysis of variance, regression, factor analysis, discriminant analysis. Progression of diseases over time. Diagnosis and assessment of treatments. Experimental design and sampling. Computation methods.

32.101G Mathematical Modelling for Biomedical Engineers S1 L3T1 C4

Model formulation and validation of ordinary and partial differential equations by analytical and numerical techniques.

Psychology

12.228G Research Project

For students who commenced the degree course before Session 1, 1980.

An individual research project in the general area of clinical or community psychology, with supporting seminars covering the selection and formulation of a problem, the choice of a design, the planning of the general methodology and the analysis of data.

12.230G Psychological Problems of Children

An essentially practical course focusing on childhood disorders, such as mental retardation, infantile autism, physical and sensory handicaps, specific learning difficulties, and hyperactivity. Methods of assessment to be studied include standardized tests of child development, behavioural check lists 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.

12.231G Professional Practice

Supervized work with clients in the School's clinic, and in approved institutions.

12.235G Community Psychology

The history, theory, concepts and practices of what has come to be called community psychology. Systematic problem-solving approaches to the resolution of human misery; the social and institutional conditions which promote human well-being. Substantive topics include: models and perspectives in community psychology; values and community intervention; evaluation and research in community psychology; social systems; theory and ecology; coping and social competence; consultation theories; various social issues, eg alcoholism and drug dependence, mental health care.

12.237G Biological Aspects of Behavioural Disturbance

A series of lectures and seminars on biological aspects of the aetiology and treatment of behavioural disturbance. Includes: behavioural genetics; organic brain syndromes; schizophrenia; depression; psychophysiology of stress; metabolic and endocrinological aspects of behavioural disturbance; nutrition and behavioural disturbance; psychopharmacology and pharmacotherapy; somatic treatments.

12.239G Research and Evaluation Methods in Clinical and Community Psychology

Problems of experimental design in the clinical field; measurement and scaling; analysis of change, including sequential analysis, and the application of the experimental methods to the individual cases. Design and evaluation of community programs.

12.240G Graduate and Clinical Seminars

A series of seminars on topics of particular relevance to the practice of clinical 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 clinical psychology are chosen in consultation with students undertaking the seminars.

12.241G Graduate Colloquium

Participation in the staff-graduate student colloquium.

12.242G Research Thesis

For students who commenced the degree course after Session 1, 1980.

A research thesis involving an investigation into some aspect of clinical or community psychology.

12.243G Experimental Clinical Psychology

1. The theoretical basis of clinical practice in individual, group, institutional, and community settings; **2.** The application of the principles of experimental psychology to the analysis of both adaptive and maladaptive patterns of behaviour; **3.** The study of a wide range of techniques of behavioural intervention.

12.244G Psychological and Behavioural Assessment

The application of the principles of experimental psychology to problems of behavioural assessment in a wide variety of situations, eg 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.

12.245G Behavioural Health Management

Lectures, practical classes and supervized clinical experience concerned with the theoretical and practical issues associated with the design, implementation and evaluation of behavioural programs for the promotion of positive mental and physical health.

12.246G Behavioural Management in Institutions

Application of the principle of behavioural acquisition, maintenance and change to the problems of designing appropriate social environments for dependent persons. Ethical and organizational problems facing psychologists working in institutions for dependent children and adults.

12.247G Graduate Seminars in Clinical Psychology

A series of seminars on topics of relevance to the practice of experimental clinical psychology. The distinctive features of psychology as both a basic discipline and an area of professional practice. The organization and regulation of psychology as a profession. Contemporary theoretical and social issues in the practice of psychology.

12.248G Community Psychology

Models and perspectives in community psychology; evaluation and research. Community intervention. Health care delivery systems.

Economics

Department of Economics

15.716G Science, Technology and Economic Development

The several functions of science and technology in development, past, present and possible future. Development economics and sociology; case studies, ranging from nineteenth century Japan to China since 1950. The place of technology in contemporary development and the role of international institutions (eg, multinational corporations) in transferrals of scientific and technical knowledge. The 'appropriateness' of introduced technique and the concept of alternative technology and alternative development patterns.

General Studies

26.568G Technology for Alternative Development S1L2

The need for alternative theories and models of development. Trends in economic development theory and development in practice. Current choice of science and technology in developing countries. The results of contemporary strategies of development and their relation to the policies of industrialized nations. The professed goals of development plans. Preferred models of development and the technology appropriate to them. The social, political and economic implications of choosing alternative goals and technologies in developing countries.

Organizational Behaviour

30.960G Technology and Organizations S2 L3

Prerequisite: 30.935G or other approved subject.

The complex relationships between technological change and organizations, workforces and skills in societies using advanced technology such as, Australia, California, Japan, Germany and Scandinavia. Students carry out projects analyzing the relationship between technological change and organizational variables; such as control and power; employment and skill formation in an industry, organization or group (eg engineers, women, immigrants); working environment, socio-technical systems, quality of working life, occupational health and safety, recurrent education, new patterns of work, industrial relations and industrial democracy.

Optometry

31.701G Advanced Clinical Optometry F T4

Clinical work on selected patients, with special emphasis on advanced techniques and new developments. All areas of optometric examination procedures are covered, 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. The assessment of new instruments, methods and treatment.

31.702G Advanced Physiological Optics F L2T2

Advanced studies in a number of areas of physiological optics. *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.

31.703G Pleorthoptics and Binocular Vision F L2T2

An integrated subject, in which binocular vision and pleorthoptics are studied from theoretical and clinical viewpoints. Clinical experience is provided by selected patients. Includes: The nature and control of eye movements and their 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, measurement, and treatment of strabismus, anomalous correspondence, eccentric fixation and amblyopia.

31.704G Advanced Contact Lens Studies F L1T3

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 Patient:* Systems and techniques for evaluating contact lens patients; new techniques for patient instruction and management. Evaluation of patient responses to lenses.

31.705G Advanced Contact Lens Practice F L1T3

The examination, evaluation and aftercare of contact lens patients.

31.706G Occupational Optometry F L2T2

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.

31.707G Clinical Photography F L2T2

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, macrophotography, microphotography. 'Invisible light' photography (ultra-violet and infra-red), photofluorography, speedlight techniques, fundus photography. Dark-room techniques, portable dark-rooms. Quantitative photographic data analysis.

31.799G Project

Biotechnology

42.104G Graduate Seminars

42.111G Reading List in Biotechnology (Microbiology)

42.112G Reading List in Biotechnology (Biochemistry)

42.211G Principles of Biology SS L3

A study of the characteristics of living systems, including a functional treatment of cytology, metabolism, bioenergetics; structure, function and characteristics of single and multicellular systems; growth; cell division; reproduction; heredity and evolution.

42.212G Principles of Biochemistry SS L3

A condensed treatment of biochemistry comprising the following aspects: the elemental and molecular composition of living organisms; the chemistry and roles of the biological elements and molecules; the thermodynamics and enzymatic catalysis of metabolism; catabolic, anabolic, amphibolic and anaplerotic processes, with emphasis on hydrolysis and synthesis of polymers, glycolysis and gluconeogenesis of glucose, b-oxidation and synthesis of fatty acids, deamination and decarboxylation of amino acids, the tricarboxylic acid cycle, electron transport and oxidative phosphorylation; metabolic regulation and integration.

42.213G Biochemical Methods SS T3

A laboratory program in practical biochemistry. The basic instrumentation and methodology of the biochemist will be introduced by practical exercises and demonstrations. A comprehensive treatment of the relevance and applicability of biochemical techniques is covered in tutorials.

42.214G Biotechnology SS L2T1

The selection, maintenance and genetics of industrial organisms; metabolic control of microbial synthesis; fermentation kinetics and models of growth; batch and continuous culture; problems of scale-up and fermenter design; control of the microbial environment; computer/fermentor interactions. Industrial examples will be selected from: antibiotic and enzyme production, alcoholic beverages, single cell protein (SCP), microbial waste disposal and bacterial leaching. *Tutorial/practical sessions* include: problem solving, instrumentation, continuous culture techniques, and mathematical modelling and simulation of industrial processes.

42.215G Practical Biotechnology F T7

Illustration, demonstration and operation of laboratory-scale and pilot-scale equipment. Visits to appropriate industries. Experimental project or critical review.

42.301G Microorganism Productivity — SS L2T3

Mechanisms of metabolic control: induction, repression and forms of activation and inhibition; microbial genetics; mutation, selection, genetic transfer and manipulation; environmental parameters; oxygen tension, pH, temperature, energy source etc. as are relevant to productivity in industrially important microorganisms.

Detailed studies: choice of substrate, screening and isolation of microorganisms, systematic application of techniques of genetic and physiological manipulation required to optimize product formation (products include for example, amino acids, nucleotides, enzymes and other macromolecules, antibiotics and other physiologically active compounds), potential strain improvement of micro-organisms involved in other industrial processes (for example, mineral leaching, single cell protein production, detoxification and waste disposal).

Laboratory component includes current techniques of micro-organism isolation and maintenance, genetic manipulation and physiological manipulation.

42.302G Enzyme Technology — SS L2T3

Enzymes in vivo; properties; roles; sources; optimization of enzyme concentration, for example by nutritional control, environmental control and by genetic manipulation. Isolation of enzymes: methods of extraction and purification; stabilizing safeguards; assay procedures; kinetics of isolated enzymes. Immobilization of enzymes: entrapment in insoluble matrices; adsorption on high molecular weight inert carriers; ionic binding to ion-exchange materials; covalent enzyme-enzyme linkage via a low molecular weight bifunctional reagent; covalent linkage to a high molecular weight support; changes in kinetic parameters and stability after immobilization; advantages and disadvantages of immobilization. Enzyme Reactor Engineering: design of batch and continuous systems, including open and closed plug flow and stirred reactors; comparison of kinetics in various designs; scale-up. Enzyme application: analysis; fabric, food and biochemical industries; medical treatment; medical diagnosis. Occupational hazards: allergic responses to enzymes; infection from pathological samples.

Methods of isolation, immobilization and application of enzymes for analytical, industrial and medical purposes will be illustrated by laboratory exercises and short projects. Practical comparison of various reactor designs will also be made.

42.303G Biochemical Process Control — SS L2T3

Biochemical reactors: range of basic designs; range of biocatalysts, from microbial conglomerates to free enzymes; heat and mass transfer; design; scale-up; sterility; kinetics; economic considerations. Techniques for efficient operation and control of batch, single-stage continuous and multi-stage continuous processes.

Use of computers: aids to understanding the effects of operating variables for process optimization and control. Detailed examples: microbial processes such as production of antibiotics, organic acids, amino acids and enzymes; enzymic processes.

Practical illustration of: sample processes such as yeast and antibiotic production; mathematical simulation by analog computation; computer control of biochemical processes.

42.304G Biodeterioration and Biodegradation — SS L2T3

Basic mechanisms of biodeterioration and biodegradation; direct and indirect attack mechanisms; co-metabolism and mixed population phenomena; factors controlling rates of degradation and recalcitrance of materials to biological attack; biological accelerators.

Detailed treatment of: biological corrosion of metals and alloys: biodeterioration of fuels, petrochemical products, synthetic materials, timber and cellulosic products, building materials etc.; degradation of rocks and minerals; biological leaching of ores and mineral processing residues.

The laboratory component includes assessment of biodegradability of common industrial materials (detergents, surface coatings, fuels, biocides etc); evaluation of protective methods; determination of biological leachability of minerals and mineral processing residues.

42.305G Case Studies — SS T2

Critical evaluation of industrial processes and research and development procedures. Includes: study of isolated and selected areas of biotechnology, detailed study and evaluation of all aspects of an industrial process from the isolation of the appropriate organism or other biological starting material to the production and use of the final products, critical evaluation of techniques arising from current research and development programs.

42.306G Project — F T7

An experimental or technical investigation or design project in the general field of biotechnology.

42.999G Alternative Higher Degree Qualifying Program

Training similar in content and standard to 42.103 Biotechnology (Honours), but designed specifically for students who cannot regularly attend the University.

Botany

Servicing Subject

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Architecture Handbook.

43.211G Botany and Ecology

Not offered in 1985.

Plant anatomy and cytology — growth and reproduction — photosynthesis, transpiration and water relations. Principles of plant classification and the use of a flora. Principal soil types, chemical and physical properties, soil profiles. Composition of selected plant communities in relation to their environment. Plant succession and climax communities with special reference to Australian conditions.

Microbiology

44.999G Alternative Higher Degree Qualifying Program

Similar in standard to 44.103 Microbiology Honours, but designed for students who cannot regularly attend the University.

Zoology

45.900G Ecological Studies in Arid Lands Management — S2 L2T4

Prerequisite: Degree with background in bioscience or equivalent.

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 Botany are prescribed to cover aspects of vegetation description and plant/environment interactions.

Chemical Engineering and Industrial Chemistry

48.283G Bioprocess Unit Operations and Equipment Design

Prerequisite or co-requisite: 48.284G or equivalent.

Engineering design and operating characteristics of plant and processes normally used, eg sterilization and air purification, dehydration drying at reduced pressure, reduced temperature preservation, radiation, product isolation, sedimentation, filtration, centrifugation, extraction, absorption, chromatography and ion exchange, absorption with reaction, electrophoresis and dialysis, aseptic design, materials of construction, effluent disposal.

48.284G Heat, Mass and Momentum Transport

A bridging subject designed to provide an introductory understanding of the mechanisms of transport processes. This subject could not be offered to a graduate with a background in chemical engineering principles. Mechanisms of molecular and turbulent transport. Heat, mass and momentum transport as rate processes. Boundary layer theory. Lift and drag coefficients. Introduction to non-Newtonian flow.

Sociology

53.309G Social and Technological Forecasting — F L2

The nature of various contemporary approaches to the forecasting of social and technological change, and the use of forecasting in particular sectors of economic, social and technological activity. Examines a number of commonly held views about the future and their connection with theories about relations between science, technology and society.

53.571G Technology and Working Life

Dr Judy Wajcman

Technology as a social and political phenomenon. Responses to technology both in the present (eg the microprocessor, nuclear energy debates) and in the past (eg Luddism). The way particular schools of social theory have conceived of technology: Marx, Weber, Frankfurt school and other relevant theoretical perspectives. Other topics include: micro-electronic technology and the labour process; nuclear energy; technology and sexism; weapons technology; and alternative technology.

History and Philosophy of Science

62.713G Project — F L1

Students are required to prepare a minor research dissertation under the supervision of a member of staff and to attend introductory seminars and occasional addresses by visiting speakers.

62.720G Philosophy of Science and the Sociology of Knowledge **S2 L2**

A discussion of recent philosophical and sociological theories concerning the nature of scientific knowledge and the role which social conditions play in its production and acceptance. Topics include: post-Kuhnian philosophies of science; neo-Marxist theories of knowledge and ideology; the 'strong program' for the sociology of knowledge; 'field' theories and the analysis of power relations in science; and epistemological problems raised by commercial and governmental direction of scientific research.

Faculty of Science

67.001G Experimental Project in Physical Oceanography **F L9**

A report of an experimental project, including recording, preparation, analysis and interpretation of field or laboratory data.

67.002G Geophysical Fluid Dynamics **F L2**

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.

67.003G Instrumentation **S1 L1**

Laboratory, moored, shipborne, airborne and space instrumentation commonly used in oceanographic experiments; their applications and limitations.

67.004G Applied Time Series Analysis **S1 L1½T½**

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.

67.005G Theoretical Project in Physical Oceanography

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.

Pathology

72.402G Principles of Disease Processes **S1 L3 C3**

Prerequisites: 73.111 or equivalent, 70.011C or equivalent.

The reaction of cells to injury, the inflammatory reaction; necrosis-vascular changes and infarction; reparative processes; fracture healing; neoplasia; reaction to implants; specific processes requiring prosthetic assistance.

Physiology and Pharmacology

Honours and Graduate Study

Depending on their undergraduate records students may be accepted by the Head of the School to undertake a fourth year of study towards an honours degree in Physiology or in Pharmacology. This would usually be done by students planning a career in either of these fields. During the honours year the student carries out a research project under the supervision of a staff member and submits a thesis based on the research project. The student can usually nominate the general research area in which he or she wishes to work from those being studied in the School. Within this research area the student is given a specific project by the supervisor.

Higher degree study for an MSc of PhD degree may also be undertaken by selected students.

Conditions for the Award of Higher Degrees

First Degrees

Rules, regulations and conditions for the award of first degrees are set out in the appropriate **Faculty Handbooks.**

For the list of undergraduate courses and degrees offered see **Disciplines of the University: Faculty (Undergraduate Study)** in the Calendar.

Higher Degrees

The following is the list of higher degrees and graduate diplomas of the University, together with the publication in which the conditions for the award appear.

For the list of graduate degrees by research and course work, arranged in faculty order, see **Disciplines of the University: Table of Courses (by faculty): Graduate Study** in the Calendar.

For the statements **Preparation and Submission of Project Reports** and **Theses for Higher Degrees** *and* **Policy with respect to the Use of Higher Degree Theses** see 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 Medicine	MD	Calendar Medicine
	Doctor of Philosophy	**PhD**	Calendar **and all handbooks**
	Master of Applied Science	MAppSc	Applied Science
	Master of Architecture	MArch	Architecture
	Master of Archives Administration	MArchivAdmin	Professional Studies

Title	Abbreviation	Calendar/Handbook
Master of Arts	MA	Arts Military Studies
Master of Biomedical Engineering	MBiomedE	Engineering
Master of Building	MBuild	Architecture
Master of the Built Environment Master of the Built Environment (Building Conservation)	MBEnv	Architecture
Master of Business Administration	MBA	AGSM
Master of Chemistry	**MChem**	**Sciences***
Master of Commerce (Honours)	MCom(Hons)	Commerce
Master of Commerce	MCom	Commerce
Master of Education	MEd	Professional Studies
Master of Educational Administration	MEdAdmin	Professional Studies
Master of Engineering Master of Engineering *without supervision*	ME	Applied Science Engineering Military Studies
Master of Engineering Science	MEngSc	Engineering Military Studies
Master of Environmental Studies	MEnvStudies	Applied Science
Master of General Studies	MGenStud	General Studies
Master of Health Administration	MHA	Professional Studies
Master of Health Personnel Education	MHPEd	Medicine
Master of Health Planning	MHP	Professional Studies
Master of Industrial Design	MID	Architecture
Master of Landscape Architecture	MLArch	Architecture
Master of Laws	LLM	Law
Master of Librarianship	MLib	Professional Studies
Master of Mathematics	**MMath**	**Sciences***
Master of Nursing Administration	MNA	Professional Studies
Master of Optometry	**MOptom**	**Sciences***
Master of Paediatrics	MPaed	Medicine
Master of Physics	**MPhysics**	**Sciences***
Master of Psychology	**MPsychol**	**Sciences§**
Master of Public Administration	MPA	AGSM
Master of Safety Science	MSafetySc	Engineering
Master of Science **Master of Science** *without supervision*	**MSc**	Applied Science Architecture Engineering Medicine Military Studies **Sciences*§**
Master of Science (Acoustics)	MSc(Acoustics)	Architecture

Title	Abbreviation	Calendar/Handbook
Master of Science and Society	**MScSoc**	**Sciences***
Master of Science (Biotechnology)	**MSc(Biotech)**	**Sciences§**
Master of Science (Building)	MSc(Building)	Architecture
Master of Science (Industrial Design)	MSc(IndDes)	Architecture
Master of Science (Psychology)	**MSc(Psychol)**	**Sciences§**
Master of Social Work	MSW	Professional Studies
Master of Statistics	**MStats**	**Sciences***
Master of Surgery	MS	Medicine
Master of Surveying Master of Surveying *without supervision*	MSurv	Engineering
Master of Surveying Science	MSurvSc	Engineering
Master of Town Planning	MTP	Architecture

Graduate Diplomas

Graduate Diploma	GradDip	Applied Science Architecture Engineering **Sciences*§**
	DipFDA	**Sciences***
	DipEd	Professional Studies
	DipIM-ArchivAdmin	
	DipIM-Lib	

*Faculty of Science.
§Faculty of Biological 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 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.

*Or department where a department is not within a school.

(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.

(4) A full-time candidate shall be fully engaged in advanced study and research except that the candidate may undertake not more than five hours per week or a total of 240 hours per year on work which is not related to the advanced study and research.

(5) Before permitting a part-time candidate to enrol, the Committee shall be satisfied that the candidate can devote at least 20 hours each week to advanced study and research for the degree which (subject to (8)) shall include regular attendance at the school* on an average of at least one day per week for 48 weeks each year.

(6) A candidate shall be required to undertake an original investigation on an approved topic. The candidate may also be required to undergo such assessment and perform such other work as may be prescribed by the Committee.

(7) The work shall be carried out under the direction of a supervisor appointed from the full-time academic members of the University staff.

(8) The work, other than field work, shall be carried out in a school* of the University except that the Committee:

(a) may permit a candidate to spend not more than one calendar year of the program in advanced study and research at another institution provided the work can be supervised in a manner satisfactory to the Committee;

(b) may permit a candidate to conduct the work at other places where special facilities not possessed by the University may be available provided the direction of the work remains wholly under the control of the supervisor;

(c) may permit a full-time candidate, who has been enrolled as a full-time candidate for at least six academic sessions, who has completed the research work and who is writing the thesis, to transfer to part-time candidature provided the candidate devotes at least 20 hours each week to work for the degree and maintains adequate contact with the supervisor.

(9) 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.

(10) No candidate shall be awarded the degree until the lapse of six academic sessions from the date of enrolment in the case of a full-time candidate or eight academic sessions in the case of a part-time candidate. In the case of a candidate who has had previous research experience the committee may approve remission of up to two sessions for a full-time candidate and four sessions for a part-time candidate.

(11) A full-time candidate for the degree shall present for examination not later than ten academic sessions from the date of enrolment. A part-time candidate for the degree shall present for examination not later than twelve academic sessions from the date of enrolment. In special cases an extension of these times may be granted by the Committee.

4. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation. **Thesis**

(2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.

(3) The thesis shall comply with the following requirements:

(a) it must be an original and significant contribution to knowledge of the subject;

(b) the greater proportion of the work described must have been completed subsequent to enrolment for the degree;

(c) it must be written in English except that a candidate in the Faculty of Arts 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 satisified 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

5. (1) There shall be not fewer than three examiners of the thesis, appointed by the Professorial Board on the recommendation of 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:

(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 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 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 be permitted to 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 Chemistry (MChem)

1. The degree of Master of Chemistry by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class 1 or Class 2 Honours in Chemistry.

Qualifications

(2) An applicant for registration with an approved degree at a standard below Honours Class 2 may be accepted following satisfactory performance at a qualifying examination approved by the Committee.

(3) In special circumstances a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register.

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

*Or department where a department is not within a school.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to present a report on a short research project (approximately 400 hours laboratory work) to be assessed by two examiners.

(4) A candidate shall not be considered for the award of the degree until the lapse of one academic year from the date of registration in the case of a full-time candidate or two academic years from the date of registration in the case of a part-time candidate.

4. Three copies of the report referred to in paragraph **3.** (3) above shall be retained by the University. The University shall be free to allow the report to be consulted or borrowed and, subject to the provisions of the Copyright Act, 1968, the University may issue the report in whole or in part, in photostat or microfilm or other copying medium. — Project

5. Having considered the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree. Satisfactory completion of the project shall be regarded as part of the final examination. — Recommendation for Admission to Degree

6. An approved candidate shall pay such fees as may be determined from time to time by the Council. — Fees

1. The degree of Master of Mathematics by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study. — **Master of Mathematics (MMath)**

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class 1 or Class 2 Honours in Mathematics. — Qualifications

(2) An applicant for registration, with an approved degree at a standard below Honours Class 2 may be accepted following satisfactory performance at a qualifying examination approved by the Committee.

(3) In special circumstances a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee. — Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register.

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to submit a report consisting of a critical review of the literature in an approved branch of Mathematics or a report on a short research project. In either case the report will be assessed by two examiners, and the candidate may be required to attend an oral examination. The report is to be presented in a form approved by the Head of the School of Mathematics.

(4) A candidate shall not be considered for the award of the degree until the lapse of one academic year from the date of registration in the case of a full-time candidate or two academic years from the date of registration in the case of a part-time candidate.

4. Having considered the examiners' reports and the candidate's other work in the prescribed course of study, the Committee shall recommend whether or not the candidate should be admitted to the degree. — Recommendation for admission to Degree

Fees

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Optometry (MOptom)

1. The degree of Master of Optometry by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Qualifications

2. (1) An applicant for registration for the degree shall have been admitted to the degree of Bachelor in the discipline of Optometry in the University of New South Wales or other approved University at a standard acceptable to the Committee.

(2) In special circumstances a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

(3) Notwithstanding any other provisions of these conditions the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as the Committee may determine.

Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two full calendar months before the commencement of the course.

(2) An approved applicant shall register as a student in either full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed annual examinations. Under the supervision of a member of the academic staff a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the annual examinations.

Recommendation for Admission to Degree

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

Fees

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Physics (MPhysics)

1. The degree of Master of Physics by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Qualifications

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class 1 or Class 2 Honours in Physics.

(2) An applicant for registration, with an approved degree at a standard below Honours Class 2 may be accepted following satisfactory performance at a qualifying examination approved by the Committee.

(3) In special circumstances a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register. Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to submit a report consisting of a critical review of the literature in an approved branch of Physics and a report on a short research project. In either case the report will be assessed by two examiners, and the candidate may be required to attend an oral examination. The report is to be presented in a form approved by the Head of the School of Physics.

(4) A candidate shall not be considered for the award of the degree until the lapse of one academic year from the date of registration in the case of a full-time candidate or two academic years from the date of registration in the case of a part-time candidate.

4. Having considered the examiners' reports and the candidate's other work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree. Recommendation for Admission to Degree

5. An approved candidate shall pay such fees as may be determined from time to time by the Council. Fees

1. The degree of Master of Psychology by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Biological Sciences (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study. **Master of Psychology (MPsychol)**

The degree shall be awarded in two grades, namely Pass and Honours. There shall be two classes of Honours, namely Class 1 and Class 2.

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class 1 or Class 2 in Psychology at a standard acceptable to the Committee; and shall have completed satisfactorily a research thesis or research project in the Honours fourth year. Qualifications

(2) An applicant for registration, with an approved degree at a standard below Honours Class 2 may be accepted following satisfactory completion of a qualifying course and examination approved by the Committee.

(3) In special cases a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

(4) Notwithstanding any other provisions of these conditions, the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as the Committee may determine.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the academic year. Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to:

(a) undertake the specified courses of advanced study;

(b) except in exceptional circumstances pass the prescribed examinations at the first attempt;

(c) submit a research thesis on an approved topic, prepared under the supervision of a member of the academic staff.

(4) The minimum period of registration before the award of the degree shall be of four sessions for full-time students, and six sessions for part-time students.

Research Thesis

4. (1) Every candidate shall submit three copies of the research thesis. All copies shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses or reports. A candidate may submit also for examination any work the candidate has published whether or not such work is related to the research thesis.

(2) It shall be understood that the University retains the copies of the research thesis submitted for examination and is free to allow the research thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the research thesis in whole or in part, in photostat or microfilm or other copying medium.

Recommendation for Admission to Degree

5. Having considered the results of the candidate's work in the prescribed course of study and the skill and competence attained in relevant aspects of practical professional work the Committee shall recommend whether or not the candidate should be admitted to the degree.

Fees

6. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Science (MSc)

1. The degree of Master of Science may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate Faculty or Board of Studies (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) An applicant for registration for the degree shall have been admitted to the degree of Bachelor in the University of New South Wales, or other approved university or tertiary institution in an appropriate school or department at a standard acceptable to the committee.

(2) In exceptional cases a person may be permitted to register as a candidate for the degree if the person submits evidence of such academic and professional attainments as may be approved by the appropriate Committee.

(3) Notwithstanding any other provisions of these conditions the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as the Committee may determine.

Registration

3. (1) An application to register as a candidate for the degree of Master of Science shall be made on the prescribed form which shall be lodged with the Registrar at least one full calendar month before the commencement of the session in which the candidate desires to register.

(2) In every case before permitting an applicant to register as a candidate the Committee shall be satisfied that adequate supervision and facilities are available.

(3) An approved applicant shall register in one of the following categories:

(a) student in full-time attendance at the University;

(b) student in part-time attendance at the University;

(c) student working externally to the University.

(4) Every candidate for the degree shall be required to submit three copies of a thesis embodying the results of an original investigation or design, to take such examinations and to perform such other work as may be prescribed by the Committee. This work shall be carried

out under the direction of a supervisor appointed by the Committee or under such conditions as the Committee may determine.

(5) At least once a year and at any other time that the Committee sees fit, the candidate's supervisor shall present to the head of school or department in which the candidate is registered a report on the progress of the candidate. The Committee shall review the report and may, if it decides as a result of its review that the progress of a candidate is unsatisfactory, cancel registration or take such other action as it considers appropriate.

(6) Unless otherwise recommended by the Committee, no candidate shall be awarded the degree until the lapse of four complete sessions from the date of registration, save that the case of a candidate who obtained the degree of Bachelor with Honours or who has had previous research experience, this period may be reduced by up to two sessions with the approval of the Committee. A candidate who is fully engaged in research for the degree shall present for examination not later than six academic sessions from the date of registration. A candidate not fully engaged in research shall present for examination not later than twelve academic sessions from the date of registration. In special cases an extension of these times may be granted by the Committee.

4. (1) A candidate for the degree be required to submit three copies of the thesis referred to in paragraph **3.** (4) which shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses. The candidate may submit also for examination any work he has published whether or not such work is related to the thesis. — Thesis

(2) For each candidate there shall be at least two examiners, appointed by the Professorial Board on the recommendation of the Committee, one of whom, if possible, shall be external to the University.

(3) 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.

5. Having considered the examiners' reports the Committee shall recommend whether or not the candidate should be admitted to the degree. — Recommendation for Admission to Degree

6. An approved candidate shall pay such fees as may be determined from time to time by the Council. — Fees

1. Where it is not possible for candidates to register under the normal conditions for the degree of Master of Science, Master of Engineering or Master of Surveying by reason of their location at centres which are distant from University Schools or where effective supervision is not practicable registration may be granted in these categories under the following conditions: — **Master of Science (MSc) *without supervision***

2. An applicant for registration shall have been admitted to a degree of Bachelor in the University of New South Wales at a standard acceptable to the Higher Degree Committee of the appropriate Faculty (hereinafter referred to as the Committee). — Qualifications

3. (1) An application to register as an external candidate for the degree of Master of Science, Master of Engineering or Master of Surveying without supervision shall be lodged with the Registrar for recommendation by the Head of School and consideration by the Higher Degree Committee of the appropriate Faculty (hereinafter referred to as the Committee) 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 at an early stage, seek the advice of the appropriate School with regard to the adequacy of the subject matter for the degree. A synopsis of the work should be enclosed. — Registration

(2) A candidate shall not be considered for the award of the degree until the lapse of six sessions in the case of honours graduates and eight sessions in the case of pass graduates from the date of graduation.

4. (1) (a) Every candidate for the degree shall be required to submit three copies of a thesis embodying the results of an investigation or design. The thesis shall be presented in a form — Thesis

which complies with the requirements of the University for the preparation and submission of higher degree theses. A candidate may submit also for examination any work the candidate has published, whether or not such work is related to the thesis.

(b) Every candidate shall submit with the thesis a statutory declaration that the material contained therein is the candidate's own work, except where otherwise stated in the thesis.

(2) For each candidate there shall be at least two examiners appointed by the Professorial Board on the recommendation of the Committee, one of whom shall be an internal examiner.

(3) If the thesis reaches the required standard, the candidate shall be required to attend for an oral examination at a time and place nominated by the Committee. The examiners may also arrange at their discretion for the examination of the candidate by written and/or practical examinations on the subject of the thesis and/or subjects related thereto.

(4) 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.

Recommendation for Admission to Degree

5. Having considered the examiners' reports the Committee shall recommend whether or not the candidate should be admitted to the degree.

Fees

6. An approved applicant shall pay such fees as may be determined from time to time by the Council.

Master of Science (Biotechnology) (MSc(Biotech))

1. The degree of Master of Science (Biotechnology) may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Biological Sciences (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Qualifications

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class 1 or Class 2 in Biological Technology or other relevant discipline.

(2) An applicant for registration with an approved degree at a standard below Honours Class 2 may be accepted following satisfactory completion of a qualifying course of not less than one year and examination approved by the Committee.

(3) In special cases a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

(4) Notwithstanding any other provisions of these conditions the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting such examinations as the Committee may determine.

Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the registrar at least two months before the commencement of the academic year.

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the specified course of advanced study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the examinations.

(4) The minimum period of registration before the award of the degree shall be two sessions for full-time students and four sessions for part-time students.

Recommendation for Admission to Degree

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Science (Psychology) by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Biological Sciences (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Science (Psychology) (MSc(Psychol))

2. (1) An applicant for registration shall hold the degree of Doctor of Philosophy in an approved area of Psychology acceptable to the Committee.

Qualifications

(2) Notwithstanding any other provisions of these conditions, the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as the Committee may determine.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the academic year.

Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the specified courses of advanced study and, other than in exceptional circumstances, pass the prescribed examinations at the first attempt.

(4) The minimum period of registration before the award of the degree shall be three 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-third of the program.

4. Having considered the results of the candidate's work in the prescribed course of study and the skill and competence attained in relevant aspects of practical professional work, the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Science and Society may be awarded at Honours (Class 1 or Class 2) or Pass level by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Science and Society (MScSoc)

2. (1) An applicant for registration for the degree shall have been admitted to a degree of Bachelor in the University of New South Wales or other approved university or tertiary education institution of acceptable standing, at a level approved by the Committee. Normally an honours degree or equivalent in science, applied science/technology, a social science or other relevant discipline, or a pass degree together with suitable professional experience would be deemed an appropriate qualification.

Qualifications

(2) In exceptional cases an applicant may be registered as a candidate for the degree by submitting evidence of such academic and professional attainment as may be approved by the Committee.

(3) Notwithstanding any other provisions of these conditions the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as it may determine.

Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the course.

(2) An approved applicant shall register as a student in part-time attendance at the University.

(3) (a) A Candidate for the Pass degree shall undertake the approved course comprising of at least eight units which normally will be taken over four sessions.

(3) (b) A candidate for the Honours degree will undertake an additional two session program of advanced study including a dissertation based on research approved by the Committee on the recommendation of the School of History and Philosophy of Science.

(3) (c) For each candidate for the Honours degree there shall be at least two examiners of the dissertation appointed by the Professorial Board on the recommendation of the Committee, one of whom shall be an internal examiner.

(4) No candidate shall be considered for the award of the degree until the lapse of four sessions in the case of a pass candidate or six sessions in the case of an Honours candidate.

(5) The progress of a candidate shall be reviewed annually by the Committee and as a result of such review the Committee may terminate the candidature or take such other action as it considers appropriate.

Recommendation for Admission to Degree

4. Having considered the candidate's results in the prescribed course of study the Committee shall recommend whether the candidate may be admitted to the degree, and, in the case of a candidate for the Honours degree, at what class.

Fees

5. An approved candidate shall pay such fees as may be determined from time to time by Council.

Master of Statistics (MStats)

1. The degree of Master of Statistics may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Qualifications

2. (1) An applicant for registration for the degree shall have been admitted to the degree of Bachelor at a standard acceptable to the Committee and with major studies in the field of Statistics, in the University of New South Wales or other approved University.

(2) In special circumstances a person may be permitted to register as a candidate for the degree by submitting evidence of such academic and professional attainments as may be approved by the Committee.

(3) Notwithstanding any other provisions of these conditions the Committee may require an applicant to demonstrate fitness for registration by carrying out such work and sitting for such examinations as the Committee may determine.

Registration

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two full calendar months before the commencement of the session in which the candidate desires to register.

(2) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed annual examinations. Under the supervision of a member of the academic staff a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the annual examinations.

(3) No candidate shall be considered for the award of the degree until a lapse of four complete sessions from the date of registration, save that in the case of a candidate who obtained the degree of Bachelor with Honours in Statistics this period may, with the approval of the Committee be reduced by up to two sessions by exemption from appropriate specified courses of study.

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

5. An approved applicant shall pay such fees as may be determined from time to time by the Council.

Fees

Graduate Diploma

1. An application for admission to a graduate diploma course shall be made on the prescribed form which should be lodged with the Registrar at least two full calendar months before the commencement of the course.

Graduate Diploma (GradDip)

2. An applicant for admission to a graduate diploma course shall be:

(1) a graduate of the University of New South Wales or other approved university; or,

(2) a person with other qualifications as may be approved by Faculty.

3. Notwithstanding clause **2.** above, Faculty may require an applicant to take such other prerequisite or concurrent studies and/or examinations as it may prescribe.

4. Every candidate for a graduate diploma shall be required to undertake the appropriate course of study, to pass any prescribed examinations, and if so laid down in the course, to complete a project or assignment specified by the Head of the School. The format of the report on such project or assignment shall accord with the instructions laid down by the Head of the School.

5. An approved applicant shall be required to pay the fee for the course in which the applicant desires to register. Fees shall be paid in advance.

Scholarships and Prizes

The scholarships and prizes listed below are available to students whose courses are listed in this handbook. Each faculty handbook contains in its **Scholarships and Prizes** section the scholarships and prizes available within that faculty. The **General Information** section of the Calendar contains a comprehensive list of scholarships and prizes offered throughout the University.

Scholarships

Undergraduate Scholarships

Listed below is an outline only of a number of scholarships available to students. Full information may be obtained from Room G20, located on the Ground Floor of the Chancellery.

Unless otherwise indicated in footnotes, applications for the following scholarships should be made to the Registrar by 14 January each year. Please note that not all of these awards are available every year.

Donor	Value	Year/s of Tenure	Conditions
General			
Bursary Endowment Board*	$200 pa	Minimum period of approved degree/ combined degree course	Merit in HSC and total family income not exceeding $6000
Sam Cracknell Memorial	Up to $3000 pa payable in fortnightly instalments	1 year	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

*Apply to The Secretary, Bursary Endowment Board, PO Box 460, North Sydney 2060, immediately after sitting for HSC.

Undergraduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
General (continued)			
Girls Realm Guild	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progress and continued demonstration of need	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**	Up to $3500 pa	1 year renewable for the duration of the course subject to satisfactory progress	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.
Universities Credit Union	$500 pa	1 year with the possibility of renewal	Prior completion of at least 1 year of any undergraduate degree course. Eligibility limited to members of the Universities Credit Union Ltd of more than one year's standing or members of the family of such members.
Science			
Chemistry			
John Ragnar Anderson Memorial Bequest	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progess	Permanent residence in Australia and eligibility for admission to the full-time degree course in Chemistry
Mathematics			
George Szekeres Award	$200 pa	1 year	Open to students entering the final year of the honours degree course in Pure Mathematics
Olivetti Australia Pty Ltd	Up to $600 pa	2 years subject to satisfactory progress	Eligibility for admission to the third year of an honours program in the School of Mathematics in Pure/Applied Mathematics, Theoretical Mechanics or Statistics and leading to the award of the degree of Bachelor of Arts, Bachelor of Science, or Bachelor of Science Diploma in Education

**Applications close 30 September each year.

Graduate Scholarships

Application forms and further information are available from the Student Enquiry Counter, located on the Ground Floor of the Chancellery. 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*; **3.** *Scholarships Guide for Commonwealth Postgraduate Students*, published by the Association of Commonwealth Universities*.

Donor	Value	Year/s of Tenure	Conditions
General			
University of New South Wales Postgraduate Scholarships	Living allowance of $6150 pa. Other allowances may also be paid.	1-2 years for a Masters and 3-4 years for a PhD degree	Applicants must be honours graduates (or equivalent). Applications to Dean of relevant Faculty.
Commonwealth Postgraduate Research Awards			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.
Commonwealth Postgraduate Course Awards	Living allowance of $7330 pa. Other allowances may also be paid.	1-2 years; minimum duration of course	Applicants must be graduates or scholars who will graduate in current academic year, and who have not previously held a Commonwealth Post-graduate Award. Preference is given to applicants with employment experience. Applications to Registrar by 30 September.
Australian American Educational Foundation Travel Grant (Fulbright)**			Applicants must be graduates, senior scholars or post-doctoral Fellows. Applications close 30 September.
Australian Federation of University Women	Amount varies, depending on award	Up to 1 year	Applicants must be female graduates who are members of the Australian Federation of University Women
The Caltex Woman Graduate Scholarships	Six State awards of $5000 each One National award valued at $20,000 pa for study at an approved overseas institution.	1 year 2 years	Applicants must be female graduates who will have completed a University degree or diploma this year and who are Australian citizens or have resided in Australia for at least seven years. Selection is based on scholastic and literary achievements, demonstrable qualities of character and accomplishments in cultural and/or sporting/recreational activities. Applications close 30 September.
Commonwealth Scholarship and Fellowship Plan	Varies for each country. Generally covers travel, living, tuition fees, books and equipment, approved medical expenses. Marriage allowance may be payable.	Usually 2 years, sometimes 3	Applicants must be graduates who are Australian citizens and who are not older than 35 years of age. Applications close with Registrar by 15 September.

*Available for reference in the University Library.
**Application forms are available from The Secretary, Department of Education, AAEF Travel Grants, PO Box 826, Woden, ACT 2606.

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
General (continued)			
The English-Speaking Union (NSW Branch)	$2000		Applicants must be residents of NSW or ACT. Awarded to young graduates to further their studies outside Australia.
Frank Knox Memorial Fellowships at Harvard University	Stipend of US$6000 pa plus tuition fees	1, sometimes 2 years	Applicants must be British subjects and Australian citizens, who are graduates or near graduates of an Australian university
Gowrie Scholarship Trust Fund	$3500 pa. Under special circumstances this may be increased.	2 years	Applicants must be members of the Forces or children of members of the Forces who were on active service during the 1939-45 War. Applications close with Registrar by 31 October.
Harkness Fellowships of the Commonwealth Fund of New York†	Living and travel allowances, tuition and research expenses, health insurance, book and equipment and other allowances for travel and study in the USA	12 to 21 months	Candidates must be: **1.** Either members of the Commonwealth or a State Public Service or semi-government Authority. **2.** Either staff or graduate students at an Australian university. **3.** Individuals recommended for nomination by the Local Correspondents. The candidate will usually have an honours degree or equivalent, or an outstanding record of achievement, and be not more than 36 years of age. Applications close 15 August.
The Rhodes Scholarship*	Approximately £3480 stg pa	2 years, may be extended for a third year	Unmarried male and female Australian citizens aged between 19 and 25 who have been domiciled in Australia at least 5 years and have completed at least 2 years of an approved university course. Applications close in early September each year.
Rothmans Fellowships Award**	$17000 pa	1 year, renewable up to 3 years	The field of study is unrestricted. Applicants must have at least 3 years graduate experience in research. Applications close in July.
Sam Cracknell Memorial	Up to $3000 pa		See above under **Undergraduate Scholarships, *General***

Biological Sciences

John Clark Memorial Award in Psychology	$1000	1 year	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 to Mr H. McCredie, Secretary of the NSW Committee, University of Sydney, NSW 2006.

*Application forms must be obtained from the Australian representative of the Fund, Mr L. T. Hinde, Reserve Bank of Australia, GPO Box 3947, Sydney, NSW 2001. These must be submitted to the Registrar by early August.

**Applications to the Secretary, Rothmans University Endowment Fund, University of Sydney, NSW 2006.

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
Science			
Contact Lens Society of Australia	$2000 pa		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	$1500 pa	1-3 years	To enable a suitable graduate to undertake a research degree in Theoretical Physics. May be held concurrently with another award.
The John Ragnar Anderson Memorial Scholarships in Chemistry	As determined by the Committee		To enable a graduate to undertake full-time study approved by the Head of School of Chemistry for the award of a higher degree. The scholarship may be held concurrently with another scholarship awarded for the same purpose. Applications to Registrar by 31 October.
The Rutherford Scholarship	Travel, fees, etc. A stipend which, if held in the UK, is approx. £3850 stg pa.	3 years	To enable graduates under 26 years of age to undertake experimental research in a branch of natural science. It is tenable at a British Commonwealth University other than the country in which the applicant graduated. Applications close mid-February.
Science Research Scholarship of the Royal Commission for the Exhibition of 1851	£3800 stg pa	Normally tenable 3 years	To enable graduates under 26 years of age to undertake research in some branch of pure or applied science, or engineering, at an overseas university. Applicants must be British Commonwealth citizens or citizens of the Republics of Ireland, Pakistan or South Africa. Applications close mid-February.
Shell Scholarship in Science or Engineering	Approximately £4000 stg pa plus travelling expenses	2 years, sometimes 3	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 to Registrar by 25 September.

Prizes

Undergraduate University Prizes

The following table summarizes the undergraduate prizes for this Faculty 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.

Donor/Name of Prize	Value $	Awarded for
General		
Sydney Technical College Union Award	150.00 and medal	Leadership in the development of student affairs, and academic proficiency throughout the course
University of New South Wales Alumni Association	Statuette	Achievement for community benefit – students in their final or graduating year
School of Accountancy		
Australian Society of Accountants	75.00 75.00 100.00	14.501 Accounting and Financial Management 1A 14.522 Accounting and Financial Management 2A 14.563 Accounting and Financial Management 3A and 14.583 Accounting and Financial Management 3B
Chamber of Manufactures of New South Wales	50.00	14.703 Advanced Auditing
Coopers and Lybrand	200.00	14.542 Accounting and Financial Management 2B
Corporate Affairs Commission	100.00	14.803/14.903G Regulation of Accounting
Datec Pty Ltd	200.00	14.605 Information Systems 3B
	150.00	Best honours thesis related to information systems design, data management or management science techniques used for commercial applications
Esso Australia Ltd	500.00	Overall outstanding achievement in the subjects 14.501 Accounting and Financial Management 1A, 14.511 Accounting and Financial Management 1B, 14.522 Accounting and Financial Management 2A, 14.542 Accounting and Financial Management 2B
Greenwood, Challoner & Co	100.00	14.742 Business Law 2
Hungerford, Hancock & Offner	100.00	14.563 Accounting and Financial Management 3A
IBM	150.00	Highest aggregate mark in any two of the following subjects: 14.603 Computer Information Systems 2 14.605 Information Systems Implementation 14.607 Distributed Computer Systems 14.608 Database Systems
Law Book Co Ltd	75.00 Books	14.511 Accounting and Financial Management 1B
Peat, Marwick, Mitchell and Company	200.00	14.805/14.905G EDP Auditing
Logica Australia Pty Ltd	200.00	14.583 Accounting and Financial Management 3B
Price Waterhouse	250.00	General Proficiency in Accounting and Financial Management subjects

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Accountancy (continued)		
Schroder Darling & Company Limited	200.00	14.613 Business Finance 2
Rod Sinden Memorial	250.00	14.794 Honours thesis on an accounting topic
Taxation Institute of Australia	100.00	14.783 Taxation Law
John Menzies McKellar White Memorial	200.00	14.859/14.959G Advanced Studies in Taxation
E. S. Wolfenden Memorial	200.00	14.563 Accounting and Financial Management 3A
Arthur Young & Co	60.00	14.613 Business Finance 2
School of Anatomy		
The Gray's Point Prize in Anatomy	50.00	Highest aggregate mark in Year 1 of Anatomy
Jane Skillen in Anatomy	40.00	Outstanding merit in all branches of Anatomy
The Prize in Practical Anatomy	100.00	Practical Anatomy (including Radiological Anatomy) – Year 2 of the medical course
The Winifred Dickes Rost	50.00	Outstanding merit in Anatomy in the final year of the Bachelor of Science degree course
School of Biotechnology		
Mauri Foods	175.00	Best result in the Level 2 Biotechnology subject
	175.00	Best result in one of the Level 3 Biotechnology subjects
	175.00	Best result in the Biotechnology honours degree program
School of Chemical Engineering and Industrial Chemistry		
Abbott Laboratories Pty Ltd	100.00	Bachelor of Engineering degree course in Chemical Engineering – Year 4
The Australian Gas Light Company's in Chemical Engineering	100.00	Subject selected by Head of School
Australian Paper Manufacturers Ltd	100.00	48.163 Instrumentation and Process Control in Industrial Chemistry
	100.00	48.163 Instrumentation and Process Control in Chemical Engineering
Chamber of Manufactures of New South Wales	50.00	Subject selected by Head of School
Chemical Technology Society	25.00	Bachelor of Science degree in Industrial Chemistry
	25.00	Bachelor of Science degree course in Industrial Chemistry, Years 1 and 2 or Stages 1 to 4
CSR Limited	50.00	Subject within the discipline of Industrial Chemistry, selected by Head of School
Esso Australia Ltd	200.00	Best performance in Year 2 Chemical Engineering

Donor/Name of Prize	Value $	Awarded for
School of Chemical Engineering and Industrial Chemistry (continued)		
Institution of Chemical Engineers	100.00 and medal	Best result for the thesis in the final year, or equivalent part time stage, of the Bachelor of Engineering degree course
Shell	100.00	General proficiency in Year 2 or its part-time equivalent in either the Chemical Engineering course or the Industrial Chemistry course
	100.00	General proficiency in Year 3 or its part-time equivalent in either the Chemical Engineering course or the Industrial Chemistry course
	100.00	General proficiency in Year 4 or its part-time equivalent in either the Chemical Engineering course or the industrial Chemistry course
	100.00	For a student who, in the opinion of the Head of School, has performed some meritorious activity of note either inside or outside the University
Simon-Carves Australia	21.00	48.135 Thermodynamics
Stauffer Australia Limited	100.00	Subject selected by Head of School
Western Mining Corporation Ltd	150.00	48.036 Chemical Engineering Laboratory 1
	150.00	48.044 Chemical Engineering Laboratory 2
School of Chemistry		
ACI Australia Limited	60.00	Subject selected by Head of School
Chamber of Manufactures of New South Wales	50.00	
CSR Chemicals Ltd	200.00	Chemistry Honours
Inglis Hudson Bequest	15.00	2.002B Organic Chemistry I
Jeffery Bequest	100.00	2.043L Chemistry and Enzymology of Foods
Merck Sharp & Dohme (Aust) Pty Ltd	52.50	Chemistry – Level II subjects in the Science and Mathematics Course
	52.50	Chemistry – Level III subjects in the Science and Mathematics Course
The Nestlé Co (Aust) Ltd	175.00	Subject selected by Head of School
RACI Analytical Chemistry Group	150.00	2.013D Advanced Analytical Chemistry
UNSW Chemical Society Parke-Pope	50.00	Subject selected by Head of School
UNSW Chemical Society George Wright	50.00	
School of Economics		
Australian Finance Conference	75.00	15.083 Public Finance

School of Economics Prizes continued overleaf

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Economics (continued)		
Economic Society in Economics	100.00 and three years' membership of the Economic Society	Final year in Bachelor of Arts degree course with honours in Economics, Bachelor of Commerce degree course with honours in Economics or Bachelor of Commerce degree course with honours in Economics and Econometrics
The Statistical Society of Australia (New South Wales Branch)	100.00 and one year's free membership of the Society	General proficiency throughout the Bachelor of Commerce degree course in Econometrics
School of Electrical Engineering and Computer Science		
Austral Crane	37.50	Bachelor of Engineering degree course in Electrical Engineering, Year 3
	37.50	Power or Control elective
Chamber of Manufactures of New South Wales	50.00	Subject selected by Head of School
Electricity Supply Engineers Association of New South Wales	100.00	Overall performance including proficiency in Electric Power Distribution in Year 3 full-time or equivalent part-time degree course
IBM	150.00	6.611 Computing 1
J. Douglas Maclurcan	40.00 Book order	Control Systems
The Wilfred Holmes Memorial Award	150.00	A student eligible to enter the final year of the degree course and who is deemed to be in necessitous circumstances
School of Mathematics		
Applied Mathematics	50.00	Excellence in Level III Applied Mathematics subjects
Head of School's	50.00	Excellence in at least 5 Mathematics units in Year 2
IBM	150.00	Final year of an honours degree course
ICI Theory of Statistics IV	100.00	Best performance in 10.323 Theory of Statistics 4
I. P. Sharp Associates	75.00	Excellence in Higher Theory of Statistics 2
J. R. Holmes	50.00	Excellent performance in at least 4 pass-level (up to 1 pass-level unit may be replaced by a higher-level unit) Pure Mathematics Level III units taken over no more than two consecutive years
Pure Mathematics	50.00	Best performance in Level III Pure Mathematics subjects

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Mathematics (continued)		
School of Mathematics	30.00	Best performance in 10.011 Higher Mathematics 1
	30.00	Best performance in basic Year 2 Higher Mathematics units
	30.00	Excellence in at least 5 Mathematics units in Year 2
Statistical Society of Australia (New South Wales Branch)	50.00 and one year's free membership of the Society	General proficiency – Theory of Statistics subjects
Theoretical Mechanics	50.00	Excellence in Level III Theoretical Mechanics subjects
W. D. & H. O. Wills (Aust) Ltd Theory of Statistics 3	200.00	Best performance in Theory of Statistics 3 or Higher Theory of Statistics 3
School of Metallurgy		
Alcan Australia Ltd	100.00	Subject selected by Head of School
Austral Crane	150.00	
Australian Institute of Metals	50.00 and one year's membership of the Institute	
Australian Welding Institute	30.00 Book order	
The Broken Hill Proprietary Co Ltd	150.00	
Chamber of Manufactures of New South Wales	50.00	
Western Mining Corporation Ltd	150.00	Best overall performance in Year 3 full-time (or its equivalent part-time) in Bachelor of Engineering (or Bachelor of Science (Technology)) degree course
	150.00	Best overall performance in Year 4 full-time (or its equivalent part-time) in the Bachelor of Engineering (or Bachelor of Science (Technology)) degree course
Zinc Corp Ltd	100.00	Subject selected by Head of School
School of Optometry		
Australian Optometrical Association	200.00	Subject selected by Head of School
Bausch & Lomb Soflens	Diagnostic set of contact lenses valued at 700.00	31.841 Clinical Optometry
Bryan Powell	100.00	Colour vision section of 31.841 Clinical Optometry

School of Optometry Prizes continued overleaf

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Optometry (continued)		
Contavue	Trial fitting set of contact lenses	Best essay or project on contact lenses
Filmer Sceats Memorial	30.00	31.812 Optometry 2
G. Nissel & Co Aust Pty Ltd	Trial fitting set of contact lenses	31.813 Optometry 3 and 31.841 Clinical Optometry — Contact Lenses sections
Hoya Australia Pty Ltd	250.00	Highest academic record in the Optometry degree course
Hydron (Australia) Pty Ltd	75.00	31.813 Optometry 3
	75.00	Optometry Year 4
International Optics	30.00	Subject selected by Head of School
The Keith Woodland Memorial	75.00	Binocular vision component of 31.813 Optometry 3 and 31.841 Clinical Optometry
L. G. Darcey Memorial	30.00	31.811 Optometry 1
Martin Wells Pty Ltd	200.00	31.821 Special Anatomy and Physiology
	200.00	31.831 Diseases of the Eye
	200.00	Final Year Essay
Optical Products Pty Ltd	100.00	Subject selected by Head of School
Optometric Vision Research Foundation	100.00	Research project in the final year
Optometrists' Association of NSW	50.00	Subject selected by Head of School
Optyl (Australia) Pty Ltd	100.00	31.812 Optometry 2 — practical work
Theo Kannis	250.00	31.841 Clinical Optometry
School of Physics		
ETP-Oxford	200.00	Student(s) who prepare the most meritorious design study of an optical system in 1.713 Advanced Laser and Optical Applications
The Gordon and Mabel Godfrey	100.00	Best performance in a selection of Theoretical Physics Level III units chosen from 1.5133, 1.5233, 1.5333, 1.5433, 1.5533
	100.00	Excellence in 1.504 (Year 4 of the honours degree course in Theoretical Physics)
	300.00	Student who has completed Year 3 and is entering the final year of the Honours degree course in Theoretical Physics
Head of School's in Physics	30.00	Most creditable Year 4 honours thesis
Australian Institute of Physics	100.00 and one year's membership of the Institute	Highest aggregate marks in three of the units 1.0133, 1.0143, 1.023, 1.0333, 1.0343 and 1.043

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Physics (continued)		
Laser Electronics	200.00	Excellence in the laboratory work in 1.763 Laser and Optical Technology Laboratory 1
Physics Staff for Applied Physics	30.00	Best performance in a selection of Year 3 units chosen from 1.0533, 1.0543, 1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.713, 1.763
Physics Staff for Physics 1	50.00	Best performance in 1.001
Physics Staff for Physics 2	50.00	Highest aggregate mark in 1.002, 1.012, 1.022 and 1.032
Physics Staff for Physics 4 Honours	50.00	Highest mark in 1.104, 1.304 or 1.504
Physics Staff for Theoretical Physics	30.00	Highest aggregate marks in three half-units of 1.1133, 1.5133, 1.5233, 1.5333, 1.5433 and 1.5533
Quentron Optics	200.00	Excellence in 1.713 Advanced Laser and Optical Applications
Radiation Research	200.00	Excellence in the laboratory work in 1.773 Laser and Optical Technology Laboratory 2
School of Psychology		
Australian Psychological Society	100.00	A Year 4 Psychology subject selected by Head of School
Milon Buneta	50.00	Best Psychology Year 2 performance by a student in the Bachelor of Science degree course in Psychology
Psychology Staff	80.00	Psychology Year 2

Graduate University Prizes

Donor/Name of Prize	Value $	Awarded for
School of Biotechnology		
Mauri Brothers & Thomson (Aust) Pty Limited	175.00	Best overall performance in the Master of Science (Biotechnology) degree course
School of Chemistry		
Smith Kline and French	100.00	Best performance in the Graduate Diploma in Food and Drug Analysis course

Graduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Optometry		
Hydron Contact Lens	A trial fitting set of contact lens	31.705G Advanced Contact Lens Theory and Practice
Theo Kannis	250.00	31.701G Advanced Clinical Optometry

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Lecturers

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David John Miller, BSc PhD *N.S.W.*, DipEd *Syd.*, MAIP, MAmPS, MAAPT
John Robert Smith, BSc PhD *N.S.W.*
John William Vanstan Storey, BSc *LaT.*, PhD *Monash*
Betty Louise Turtle, BSc *Adel.*, PhD *A.N.U.*
Joseph Albert Wolfe, BSc *Qld.*, PhD *A.N.U.*

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Paul Michael O'Halloran, BA *Macq.*, MEd *N.S.W.*

Senior Tutors

Ian Richard Dunn, BSc BA *Melb.*, MIEEE
Edward Peter Eyland, BSc MPhysics *N.S.W.*, BD *Lond.*
Martin Desmond Knight, BSc *N.S.W.*

Tutors

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Michael Philip Goldsworthy, MSc *N.S.W.*
Paul McNamara, BSc *N.S.W.*
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Department of Applied Physics

Associate Professor

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Victor Raymond Howes, BSc PhD *Lond.*

Department of Theoretical Physics

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Robert John Stening, MSc *Syd.*, PhD *Qld.*, DipTertEd *N.E.*, FRMetS

Lecturers

Michael Allister Box, BSc *Monash*, PhD *Syd.*, GradAInstP
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Tutor

Roderick Ian Sutherland, BSc *LaT.*, MSc PhD *N.S.W.*

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The University of New South Wales Kensington Campus 1985

Theatres

Biomedical Theatres E27
Central Lecture Block E19
Classroom Block (Western Grounds) H3
Rex Vowels Theatre F17
Keith Burrows Theatre J14
Main Building Theatrette K14
Mathews Theatres D23
Parade Theatre E3
Science Theatre F13
Sir John Clancy Auditorium C24

Buildings

Affiliated Residential Colleges
New (Anglican) L6
Shalom (Jewish) N9
Warrane M7
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Arts (Morven Brown) C20
Banks F22
Barker Street Gatehouse N11
Basser College C18
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Dalton F12
Robert Heffron E12
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Commerce (John Goodsell) F20
Dalton (Chemistry) F12
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Gymnasium B5
House at Pooh Corner N8
International House C6
Io Myers Studio D9
John Goodsell (Commerce) F20
Kanga's House O14
Kensington Colleges C17 (Office)
Basser C18
Goldstein D16
Philip Baxter D14
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Mathews F23
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Industrial Engineering J17
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Metallurgy E8
Morven Brown (Arts) C20
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Newton J12
NIDA D2
Parking Station H25
Philip Baxter College D14
Robert Heffron (Chemistry) E12
Sam Cracknell Pavilion H8
Shalom College (Jewish) N9
Sir Robert Webster
(Textile Technology) G14
Squash Courts B7
Swimming Pool B4
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University Regiment J2
University Union
(Roundhouse) — Stage I E6
University Union
(Blockhouse) — Stage II G6
University Union
(Squarehouse) — Stage III E4
Wallace Wurth School of Medicine C27
Warrane College M7
Wool and Pastoral Sciences B8

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Botany D26
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Centre for Remote Sensing K17
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Chemical Engineering and
Industrial Chemistry F10
Chemistry E12
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Commerce (Faculty Office) F20
Committee in Postgraduate Medical
Education B27
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Computing Services Unit F21
Drama B10
Economics F20
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Computer Science G17
Energy Research, Development and
Information Centre B8b
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Fees Office C22
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German Studies C20
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History and Philosophy of Science C20
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Industrial Engineering J17
Institute of Rural Technology B8b
Japanese Economic Management
Studies Centre G14
Kanga's House O14
Kindergarten (House at Pooh Corner) N8
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Lost Property F20
Marketing F20
Mathematics F23
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Music B11b
National Institute of Dramatic Art
C15 and D2
Nuclear Engineering J17
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Physics K15
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Political Science C20
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Russian C20
Science and Mathematics Course
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Spanish and Latin American Studies C20
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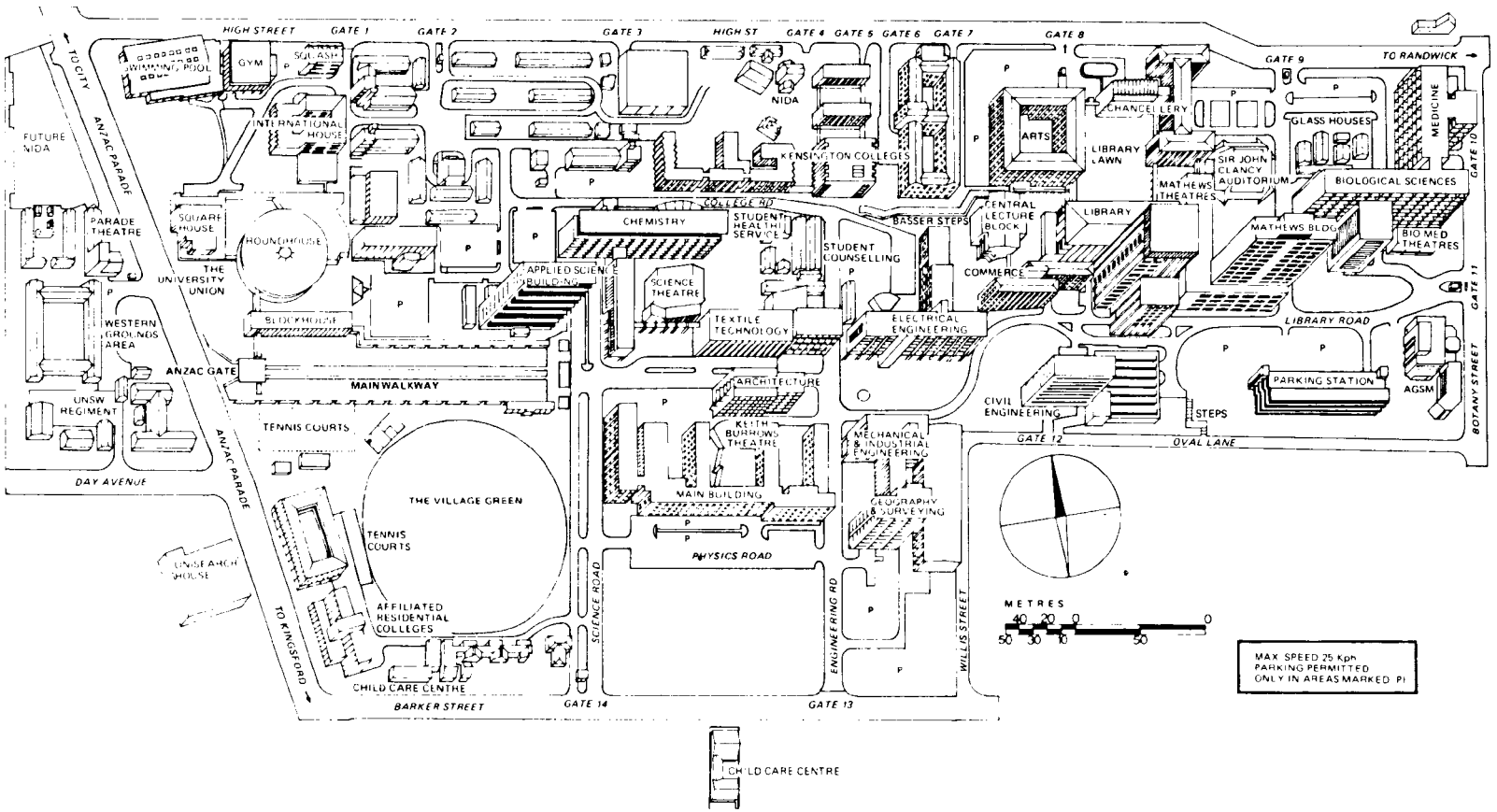
Student Counselling and Research E15c
Student Health E15b
Student Records C22
Students' Union E4 and C21
Surveying K17
Teachers' College Liaison Office F15b
Tertiary Education Research Centre E15d
Textile Technology G14
Town Planning K15
University Archives C22
University Press A28
University Union (Blockhouse) G6
Wool and Pastoral Sciences B8a
Zoology D26


HIGH STREET
GATE 1
GATE 2
GATE 3
HIGH ST
GATE 4
GATE 5
GATE 6
GATE 7
GATE 8
GATE 9
TO RANDWICK
TO CITY
ANZAC PARADE
SWIMMING POOL
GYM
SQUASH
INTERNATIONAL HOUSE
NIDA
KENSINGTON COLLEGES
CHANCELLERY
ARTS
LIBRARY LAWN
GLASS HOUSES
MEDICINE
GATE 10
FUTURE NIDA
PARADE THEATRE
SQUARE HOUSE
ROUNDHOUSE
THE UNIVERSITY UNION
COLLEGE RD
CHEMISTRY
STUDENT HEALTH SERVICE
BASSER STEPS
CENTRAL LECTURE BLOCK
LIBRARY
SIR JOHN CLANCY AUDITORIUM
MATHEWS THEATRES
BIOLOGICAL SCIENCES
MATHEWS BLDG
BIO MED THEATRES
GATE 11
APPLIED SCIENCE BUILDING
SCIENCE THEATRE
STUDENT COUNSELLING
COMMERCE
BLOCKHOUSE
TEXTILE TECHNOLOGY
ELECTRICAL ENGINEERING
LIBRARY ROAD
WESTERN GROUNDS AREA
ANZAC GATE
MAIN WALKWAY
ARCHITECTURE
PARKING STATION
AGSM
BOTANY STREET
GATE 12
CIVIL ENGINEERING
STEPS
OVAL LANE
UNSW REGIMENT
TENNIS COURTS
KEITH BURROWS THEATRE
MECHANICAL & INDUSTRIAL ENGINEERING
DAY AVENUE
THE VILLAGE GREEN
MAIN BUILDING
GEOGRAPHY & SURVEYING
TENNIS COURTS
UNISEARCH HOUSE
PHYSICS ROAD
METRES
AFFILIATED RESIDENTIAL COLLEGES
TO KINGSFORD
SCIENCE ROAD
ENGINEERING RD
WILLIS STREET
CHILD CARE CENTRE
BARKER STREET
GATE 14
GATE 13
MAX SPEED 25 Kph
PARKING PERMITTED
ONLY IN AREAS MARKED P
CHILD CARE CENTRE

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For fuller details about the University — its organization, staff membership, description of disciplines, scholarships, prizes, and so on, you should consult the Calendar.

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