SCIENTIA

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The University of New South Wales

Sciences

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

1983
Faculty Handbook

How to use this Handbook

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

General Information (the India coloured pages) 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.

Graduate Study is about higher degrees.

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 unit values, credit hours, teaching hours per week, sessions when taught

Financial Assistance to Students is a list of scholarships and prizes, available at undergraduate and graduate level in the faculty.

Staff list.

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

Information in this Handbook has been brought up to date
as at 13 September 1982, but may be amended without
notice by the University Council.

Contents

Subject Descriptions

Board of Studies in Science and Mathematics

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 663 0351 and ask for the extension. Alternatively you may dial 662 and then the extension number. This prefix should only be used when you are certain of the extension that you require as callers using 662 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 Deputy Registrar (Student Services), Mr Peter O'Brien, and his Administrative Assistant, Mrs Anne Beaumont, are located on the first floor of the Chancellery. They 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 they are especially concerned with the problems of physically handicapped and disabled students. Enquire at room 148E, phone 2482.

The Assistant Registrar (Admissions and Examinations), Mr Jack Hill, is located on the ground floor of the Chancellery. General enquiries should be directed to 3715. For information regarding examinations, including examination timetables and clash of examinations, contact the Senior Administrative Officer, Mr John Grigg, phone 2143.

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, academic statements, graduation ceremonies, prizes, release of examination results and variations to enrolment programs, phone 3711.

The Adviser for Prospective Students, Mrs Fay Lindsay, is located in the Chancellery and is available for personal interview. For an appointment phone 3453.

The Assistant Registrar (Careers and Employment), Mr Jack Foley, is located in the Chancellery. Enquiries should be directed to 3259.

The Off-campus Housing Officer, Mrs Judy Hay, is located in Room 148E in the Chancellery. For assistance in obtaining suitable lodgings phone 3260.

Student Loans enquiries should be directed to Mrs Judy Hay, Room 148E in the Chancellery, phone 3164.

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 2679, 2678 or 2677.

The Student Counselling and Research Unit is located at the foot of Basser Steps. For assistance with educational or vocational problems ring 3681 or 3685 for an appointment.

The University Librarian is Mr Allan Horton. Library enquiries should be directed to 2048.

The Chaplaincy Centre is located in Hut E15a at the foot of Basser Steps. For spiritual counselling phone Anglican – 2684; Catholic – 2379; Greek Orthodox – 2683; Lutheran – 2683; Uniting Church – 2685.

The Students' Union is located on the second floor of Stage III of the University Union, where the SU President, Secretary-Treasurer, Education Vice-President, Welfare-Research Officer, Director of Overseas Students and a full-time solicitor employed by the Students' Union are available to discuss any problems you might have.

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 (14 weeks)	7 March to 15 May *May Recess:* 16 May to 22 May 23 May to 19 June *Midyear Recess:* 20 June to 24 July
Examinations	21 June to 6 July
Session 2 (14 weeks)	25 July to 28 August *August Recess:* 29 August to 4 September 5 September to 6 November *Study Recess:* 7 November to 13 November
Examinations	14 November to 2 December

Faculty of Medicine

First and Second Years	As for other faculties	
Third and Fourth Years	Term 1 (10 weeks)	24 January to 3 April
	Term 2 (9 weeks)	11 April to 15 May
	May Recess: 16 May to 22 May 23 May to 19 June	
	Term 3 (9 weeks)	27 June to 28 August
	Term 4 (10 weeks)	5 September to 13 November
Fifth Year	Term 1 (8 weeks)	24 January to 20 March
	Term 2 (8 weeks)	28 March to 22 May
	Term 3 (8 weeks)	30 May to 24 July
	Term 4 (8 weeks)	1 August to 25 September
	Term 5 (8 weeks)	4 October to 27 November

January

Monday 3	Public Holiday
Tuesday 4	Last day for applications for review of results of *annual* examinations
Friday 14	Last day for acceptance of applications by Admissions Office for transfer to another undergraduate course within the University
Monday 31	Australia Day – Public Holiday

February

Thursday 3	Enrolment period begins for new undergraduate students and undergraduate students repeating first year
Monday 21	Enrolment period begins for second and later year undergraduate students and graduate students enrolled in formal courses
Monday 28	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 7	**Session 1 begins** – all courses except Medicine III, IV and V
Wednesday 9	List of graduands for April/May ceremonies and 1982 prize-winners published in *The Sydney Morning Herald*
Monday 14	Last day for notification of correction of details published in *The Sydney Morning Herald* on 9 March concerning April/May graduation ceremonies
Friday 18	Last day for acceptance of enrolment by new undergraduate students (late fee payable thereafter)
Thursday 31	Last day for acceptance of enrolment by undergraduate students re-enrolling in second and later years (late fee payable thereafter)

April

Friday 1	Good Friday – Public Holiday
Saturday 2	Easter Saturday – Public Holiday
Monday 4	Easter Monday – Public Holiday
Friday 22	Last day for undergraduate students to discontinue without failure subjects which extend over Session 1 only
Monday 25	Anzac Day – Public Holiday

May

Monday 2	*Confirmation of Enrolment* forms despatched to all students
Wednesday 11	Last day for acceptance of corrected *Confirmation of Enrolment* forms
Friday 13	Last day for undergraduate students completing requirements for degrees at the end of Session 1 to submit *Application for Admission to Degree* forms
Monday 16	**May Recess begins**
Thursday 19	Publication of provisional timetable for June/July examinations
Sunday 22	**May Recess ends**
Friday 27	Last day for students to advise of examination clashes

June

Tuesday 7	Publication of timetable for June/July examinations
Monday 13	Queen's Birthday Holiday
Sunday 19	**Session 1 ends**
Monday 20	**Midyear Recess begins**
Tuesday 21	Examinations begin

July

Wednesday 6	Examinations end
Monday 18	Examination results mailed to students
Tuesday 19	Examination results displayed on University noticeboards
Tuesday 13 to Friday 22	Students to amend enrolment programs following receipt of June examination results
Sunday 24	**Midyear Recess ends**
Monday 25	**Session 2 begins** Last day for applications for review of June assessment results

August

Thursday 4	Foundation Day – no classes held
Friday 5	Last day for students to discontinue without failure subjects which extend over the whole academic year
Monday 29	**August Recess begins**

September

Sunday 4	**August Recess ends**
Tuesday 6	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
Wednesday 7	List of graduands for October graduation ceremonies published in *The Sydney Morning Herald*
Friday 9	Last day for undergraduate students to discontinue without failure subjects which extend over Session 2 only
Monday 12	Last day for notification of correction of details published in *The Sydney Morning Herald* on 7 September concerning October graduation ceremonies
Monday 19	*Confirmation of Enrolment* forms despatched to all students
Wednesday 28	Last day for acceptance of corrected *Confirmation of Enrolment* forms
Friday 30	Last day for applications from undergraduate students completing requirements for degrees at the end of Session 2 to submit applications for *Application for Admission to Degree* forms
	Last day to apply to UCAC for transfer to another tertiary institution in New South Wales

October

Monday 3	Eight Hour Day – Public Holiday
Thursday 6	Publication of provisional examination timetable
Friday 14	Last day for students to advise of examination timetable clashes
Thursday 27	Publication of examination timetables

November

Sunday 6	**Session 2 ends**
Monday 7	**Study Recess begins**
Sunday 13	**Study Recess ends**
Monday 14	Examinations begin

December

Friday 2	Examinations end
Monday 19	Examination results mailed to students
	List of graduands in Medicine for February graduation ceremony published in *The Sydney Morning Herald*
Tuesday 20	Examination results displayed on University noticeboards
Sunday 25	Christmas Day
Monday 26	Boxing Day – Public Holiday
Tuesday 27	Public Holiday

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Faculties other than Medicine

Session 1 (14 weeks)	5 March to 13 May
	May Recess: 14 May to 20 May
	21 May to 17 June
	Midyear Recess: 18 June to 22 July
Examinations	19 June to 5 July
Session 2 (14 weeks)	23 July to 26 August
	August Recess: 27 August to 2 September
	3 September to 4 November
	Study Recess: 5 November to 11 November
Examinations	12 November to 30 November

Faculty of Medicine

First and Second Years	As for other faculties	
Third and Fourth Years	Term 1 (10 weeks)	23 January to 1 April
	Term 2 (9 weeks)	9 April to 13 May
	May Recess: 14 May to 20 May	
		21 May to 17 June
	Term 3 (9 weeks)	25 June to 26 August
	August Recess: 27 August to 2 September	
	Term 4 (10 weeks)	3 September to 11 November
Fifth Year	Term 1 (8 weeks)	23 January to 18 March
	Term 2 (8 weeks)	26 March to 20 May
	Term 3 (8 weeks)	28 May to 22 July
	Term 4 (8 weeks)	30 July to 23 September
	Term 5 (8 weeks)	2 October to 25 November

January

Monday 2	Public Holiday
Monday 16	Last day for applications for review of results of annual examinations
Friday 13	Last day for acceptance of applications by office of the Admissions Section for transfer to another undergraduate course within the University
Monday 30	Australia Day – Public Holiday

February

Monday 20	Enrolment period begins for second and later year undergraduate students and students enrolled in formal courses

March

Monday 5	Session 1 begins – all courses except Medicine III, IV and V

April

Friday 20 to Monday 23	Easter – Public Holiday
Wednesday 25	Anzac Day – Public Holiday

Organization of the University

Rapid development has been characteristic of the University of New South Wales since it was first incorporated by an Act of Parliament in 1949, under the name of the New South Wales University of Technology.

In 1982 the University had 19,016 students and over 3,600 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', 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 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 six 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. 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 these and similar matters are presented to Council for its consideration and adoption.

The Faculties/Boards of Studies

The dean, who is also a professor, is the executive head of the faculty or board of studies. Members of each faculty or Board meet regularly to consider matters pertaining to their own areas of study 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

Once courses of study have been approved they come under the control of the individual schools (eg the School of Chemistry, the School of Mathematics). 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.

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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 two Pro-Vice-Chancellors, Professor Ray Golding and Professor Athol Carrington, together with the Deans and the three heads of the administrative divisions.

General Administration

The administration of general matters within the University comes mainly within the province of the Registrar, Mr Ian Way, the Bursar, Mr Tom Daly, and the Property Manager Mr Peter Koller.

The Registrar's Division is concerned chiefly with academic matters such as the admission of students, and the administration of examinations as well as the various student services (health, employment, amenities, and counselling).

The Bursar's Division is concerned with the financial details of the day-to-day administration and matters to do with staff appointments, promotions, etc.

The Property Division is responsible for the building program and the 'household' services of the University, including electricity, telephones, cleaning, traffic and parking control and maintenance of buildings and grounds.

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, as the faculties have their own rules for the conduct of open meetings.

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 not published in the faculty handbooks. Separate lists are issued early in the year and are available at key points on the campus.

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) are availabe from individual schools.

Co-operative Bookshop

Membership is open to all students, on initial payment of a fee of $10, refundable when membership is terminated.

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 3476.

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. Fees are payable on a session basis. 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 residents 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 sponsors a wide range of sporting and social activities. 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 the Catholic association 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-eight clubs.

The Association office is situated on the 3rd floor, Squarehouse, E4, lower campus, and can be contacted on extension 2673. 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 an annual 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. See the General Information section of the Faculty Handbooks for details.

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 in 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.

Deputy Registrar (Student Services)

The Deputy Registrar (Student Services), Mr Peter O'Brien, and his Administrative Assistant, Mrs Anne Beaumont, are located on the first floor of the Chancellery.

They 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, they are especially concerned with the problems of physically handicapped and disabled students.

All enquiries should be made either at room 148E or by telephoning extension 2482 (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 38 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. The 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 3271; Grounds Bookings 2235; Sports Association 2673.

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, 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 3271.

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 3685 or 3681 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 3259 or 3630; long vacation industrial training 2086.

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 2679, 2678 or 2677 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 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.

A full-time President, elected each year by popular ballot, directs the entire administration of the Students' Union and its activities, assisted by a Secretary-Treasurer.

Other officers are the Education Vice-President who works towards the implementation of Students' Union education policy; the Welfare-Research Officer concerned with helping students with problems they may encounter in the University; the Electronic Media Officer; 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. A noticeboard for casual job vacancies.
2. Organization of orientation for new students.
3. Organization of Foundation Day.
4. The University's two child care centres.
5. Publication of the student paper *Tharunka*.
6. A free legal service run by a qualified lawyer employed by the Students' Union Council.
7. A video service with access for students to equipment and advice.
8. The Nuthouse which deals in bulk and health foods.
9. Secondhand Bookshop for cheap texts.
10. CASOC (Clubs and Societies on Campus) which provides money from the SU for affiliated clubs and societies on campus.
11. Provision of a bail fund.

The SU office is located on the Second Floor, Stage III, the Union.

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

The library at the Broken Hill Division in the W.S. and L.B. Robinson University College building (telephone 6022/3/4).

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 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 compulsory 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 full range of facilities provided by the Union includes a cafeteria service and other dining facilities, a large shopping centre, (including clothing shop and delicatessen); travel service; banking, pharmaceutical, optometrical and hairdressing facilities; showers; common, games, reading, meeting, music, practice, craft and dark rooms. The Union also has shops on Campus which cater for student needs, including art materials and calculators. Photocopying, sign printing, and stencil cutting services are also available. The Union also sponsors special concerts (including lunchtime concerts) and conducts courses in many facets of the arts including weaving, photography, creative dance and yoga. Full information concerning courses is contained in a booklet obtainable from the Union's program department.

The University Union should not be confused with the Students' Union or Students' Representative Council as it is known in some other universities. This latter body has a representative function and is the instrument whereby student attitudes and opinions are crystallized and presented to the University and the community.

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 incomes 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

● Master's 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.

Tertiary students receiving an allowance, and prospective tertiary students, will be sent application forms in January 1983. Forms are also available from the Admissions Section or the Careers and Employment Section, or from the Director, Department of Education, 59 Goulburn Street, Sydney, NSW 2000 (telephone 218 8800). Continuing students should submit applications as soon as examination results are available. New students should do so as soon as they are enrolled. All students should apply by 31 March 1983, otherwise benefits will not be paid for the earlier months of the year.

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. Repayment usually commences after graduation or upon withdrawal from the course. 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, in 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, in the Chancellery.

Fund for Physically Handicapped and Disabled Students

The University has a small fund (started by a generous gift from a member of staff who wishes to remain anonymous) available for projects of benefit to handicapped and disabled students. Enquiries should be made at the office of the Deputy Registrar (Student Services), Room 148E, in 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 5 pm, Monday to Friday. During enrolment it is also open for some part of the evening.

Information may be obtained here about 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. 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.

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.

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.

Details of the procedure to be followed by students seeking entry to first year undergraduate degree courses at the University may be obtained from the Student Enquiry Counter or the Universities and Colleges Admissions Centre.

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 eighteen institutions in the state including the three universities in the Sydney Metropolitan area (Macquarie University, the University of New South Wales and the University of Sydney) are required to lodge a single application form with the Universities and Colleges Admissions Centre, Challis House, 10 Martin Place, Sydney 2000 (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 three universities and fifteen 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 1983

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 office of the Deputy Registrar (Student Services) (Room 148E, 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 1983 must lodge an application for selection with the Universities and Colleges Admissions Centre, GPO Box 7049, Sydney 2001, by 1 October 1982.

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 1 October 1982.

4. Restrictions Upon Re-enrolling

Students who in 1982 have infringed the rules governing re-enrolment should not attempt to re-enrol in 1983 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.

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 (18 March 1983) 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 (1 April 1983) 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 (5 August 1983) 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 to the office of the Deputy Registrar (Student Services) (Room 148E, the Chancellery) 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 to the office of the Deputy Registrar (Student Services) (Room 148E, the Chancellery) 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 (29 April 1983). 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 (2 September 1983).

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 $28

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 1982 and are therefore subject to an increase in 1983.

University Union annual subscription $80

Sports Association annual subscription $17

Students' Union Annual Subscription

Students enrolling in full-time courses $22
Students enrolling in part-time courses or as
miscellaneous students $17

Miscellaneous Fund annual fee $28

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 $11

Review of examination results for each subject $11

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*.

(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†.

(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.

*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.

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

(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 1, 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:

31 March 1983 for Session 1 only and whole year subjects;

19 August 1983 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 (22 April or 9 September)

(b) for whole year subjects, the end of the second week of Session 2 (5 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 possible student activities fee refunds in the case of complete withdrawal from a course.

Details of the refunds which may be available may be obtained from the Student Enquiry Counter, the Chancellery.

(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 (22 April or 9 September) will be incorporated in the *Confirmation of Enrolment Program* notice forwarded to students on 2 May or 20 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.

Private Overseas Students

Private overseas students should visit the Commonwealth Department of Education immediately on first arrival in Australia. The address is Sydney Plaza Building, 59 Goulburn Street, Sydney.

Private overseas students continuing their studies should confirm their enrolment with the Commonwealth Department of Education as early as possible each year in order to ensure that arrangements for the extension of their temporary entry permits can be made.

All private overseas students must advise the Department if they change their term residential address during the year. Telephone enquiries should be directed to (02) 218 8979, and country students may reverse the charge for the call.

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 14 January 1983.

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 1982 of their intention to transfer.

Admission with Advanced Standing

Any person who makes 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 a student transfers from another university such student shall not in general be granted standing in this University which is superior to what he has in the University from which he transfers;

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 applicant, shall not be such as will permit the applicant to qualify for the degree or award for which he seeks to register without completing the courses of instruction and passing the examinations in at least those subjects comprising .the latter half of the course, save that where such a program of studies would involve the applicant repeating courses of instruction in which the Board deems the applicant 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 applicant to qualify for

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the degree or award for which he seeks to register by satisfactory completion of a program of study deemed by the Board to be less than that required of a student in full-time attendance in the final year of the course in which the applicant seeks 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 applicant seeks to transfer for work done in the course from which the student transfers.

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, then a student who merely completes 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.

Provisional timetables indicating the dates and times of examinations are posted on the University noticeboards.

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 an 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 will be 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 to a student whose overall performance warrants consideration in a subject where the mark obtained is slightly below the standard required for a pass.

A pass conceded in a subject will normally allow progression to another subject for which the former subject is a prerequisite. In a particular subject, however, a subject authority may specify that a pass conceded is insufficient to meet a particular subject prerequisite. Such information is recorded in the appropriate faculty handbooks.

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 are included in the examination timetable and change of address forms are obtainable at the Student Enquiry Counter, the Chancellery. Both forms can be accepted up to Friday 24 June for Session 1 results and Friday 25 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. Applications made more than seven days after the final examination in a subject will only be considered in exceptional circumstances.

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 in 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. The examination paper will be available for reading ten minutes before commencement.

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 Examinations Section 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.

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 Students 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 they 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 their 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 examinations 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.

*See Schedule A immediately below.

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 Professorial 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 exclude 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 that 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 the program where the unit value for each subject in a course is defined as follows:

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, 3330	Elective subjects: UV 0
			All other subjects: appropriate UV corresponding to credit points*
		3320	Elective subjects: UV 0
		3360, 3380	All other subjects: UV equal to the allocated hours*
Arts	18 first-level credit points	3400, 3410	
Biological Sciences	2 subjects (or their Science unit or Arts credit-point equivalent)	3430	
Commerce	Three subjects	3490-3595 FT in both sessions	
	Two subjects	3490-3595 PT in either session	
Engineering	Half the program	3600-3750	One-session subjects: UV 1
			Two-session subjects: UV 2
Law	Half the program	4710-4790	One-session subjects: UV 1
			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 General Studies: UV 1
Military Studies	Half the program	BA, BSc	All subjects: UV 1
		BE	All subjects: appropriate weighted mark*

Faculty/Board of Studies	Minimum Requirement	Course	Unit Values (UV)
Professional Studies	Half the program	4030, 4040	All subjects: UV 1
		4070-4080	One-session subjects: UV 1
			Two-session subjects: UV 2
Science	Half the program	3910, 3950	All subjects: appropriate UV*
			General Studies: UV 1
Science and Mathematics	Half the program	3970	All subjects: appropriate UV*
			General Studies: UV 1

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 Enrolment Details form 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 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 December.

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

*For details see the appropriate Faculty Handbook.

an additional 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 2 May and 19 September. It is not necessary to return these forms unless any of the information recorded is incorrect. Amended forms must be returned to the Student Records and Scholarships Office within fourteen days. Amendments notified after the closing date will not be accepted unless exceptional circumstances exist and approval is obtained from the Registrar. Amended forms returned to the Registrar will be acknowledged in writing within fourteen days.

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 25 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 2998).

Further Information

Lost Property

All enquiries concerning lost property should be made to the Superintendent on extension 3892 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.

Vice-Chancellor's Official Welcome to New Students

All students initially enrolling in the University are officially welcomed by the Vice-Chancellor and Principal at the following times:

Full-time Students
In the Faculties of Architecture, Arts, Biological Sciences, Commerce, Law:

Thursday 3 March 1983
11 am in the Clancy Auditorium

In the Faculties of Applied Science, Engineering, Medicine, Professional Studies, Science, and the Board of Studies in Science and Mathematics:
Friday 4 March 1983
10 am in the Clancy Auditorium

Part-time Students
All courses:
Tuesday 8 March 1983
7.00 pm in the Clancy Auditorium

Meeting for Parents of New Students

Friday 4 March 1983
7.30 pm in the Clancy Auditorium

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 under-graduate 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/Medicine, 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 Robyn Mulholland, 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 1983 or enrolling in graduate courses should obtain a copy of the free booklet *Enrolment Procedures 1983* 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 (SM83). 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 central 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, inter-library 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 Psychology Society

The Psychology Society aims to provide activities both educational and social for students of psychology, and, more generally, to act as an intermediary body between students and staff. While psychology is one of the most popular subjects available, many students have only a vague conception of psychology and are unsure where their courses will lead them.

One of the aims of the Psychology Society is to provide information relevant to these matters. In a large School it is difficult to develop contacts between students of different years and staff. The Society attempts to provide opportunities for such contact, to foster staff-student relations and to act in the interest of psychology students as a whole. Accordingly, we hope to provide staff-student luncheons, informal discussions and theatre parties. On the educational side there are film showings and occasional talks and seminars (eg on careers, course requirements). An activities fee enables the committee 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 H. M. Hudson, School of Economic and Financial Studies, Macquarie University, North Ryde, NSW 2113.

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 M. Augee
‡ School of Anatomy	Dr I. J. Tork (Year 2 and Year 3)
	Professor F. W. D. Rost (Year 4)
‡ School of Applied Geology	Mr G. J. Baldwin
‡ School of Biochemistry	Professor W. J. O'Sullivan
‡ School of Biotechnology	Dr N. W. Dunn
‡ School of Botany	Associate Professor J. H. Palmer
‡ School of Chemistry	Mr W. J. Dunstan
‡ School of Community Medicine	Dr A. E. Stark
‡ School of Electrical Engineering	Dr G. McMahon
and Computer Science	
‡ School of Geography	Mr N. Lonergan
‡ School of History and Philosophy of Science ...	Dr D. R. Oldroyd
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	Mr B. P. McBrien
‡	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); Economics (Commerce); Electrical Engineering and Computer Science, Mechanical and Industrial Engineering (Engineering); Anatomy, Community Medicine, Physiology and Pharmacology (Medicine); Education (Professional Studies); and the Department of General Studies (Board of Studies in General Education).

The Deans of the Faculty of Science (Professor V. T. Buchwald) and of the Faculty of Biological Sciences (Professor E. O. P. Thompson)† serve alternately as Dean responsible for the Board.

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 Robyn Mulholland.

‡ See text of introduction, on previous page.

* See Staff, listed later in this handbook.

† For 1982-83.

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 man's material conditions and in widening his imaginative horizons and his understanding of the universe.

9. To provide opportunities for the development of a student's motivation and social maturity, and an awareness of his own capabilities in relation to a choice of career which will be fruitful to himself 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.
- 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 below 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 prerequisites 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 more than 6 Level III units in a 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, 10.011 Higher Mathematics I or 10.021B and 10.021C†;

(3) *not less than* four units from Level III or as specified in 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 1;

(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;

3. 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.

Students are required:

- to have completed Years 1, 2 and 3 of the specific program and to have satisfied prerequisite requirements as specified in Table 3.
- 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.
- to have completed relevant subjects normally with better than passing grades.
- to have the approval of the appropriate head of school at the end of Year 3.

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 studies for the pass degree, he has satisfied the prerequisites for proceeding to honours level laid down by the School or Schools concerned.

† 10.021A may be substituted for 10.021C if specified in an individual program.

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 double 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*

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.
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 programs 7001, 7002, 7003, 1270, 4170, 4570, 6270, 7073
Biochemistry	see programs 4101, 0241, 4142, 4143, 4144, 4145, 4162, 4170, 4173
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 programs 4201, 0242, 4142, 4244
Botany	see programs 4306, 4309, 2543, 2743, 4143, 4344, 4345, 4543, 6243
Chemistry	see programs 0201, 0202, 0203, 0204, 0225, 0241, 0242, 0261, 0262, 7302
Chemical Physics	see programs 6851, 6852, 6853
Community Medicine	units available in some programs (the identifying number is 79)
Computer Science	see programs 0601, 0610, 0611, 6860, 0161, 0261, 1061
Genetics	see program 6840
Geography	see programs 2701, 2703, 2725, 2743
Geology	see programs 2501, 2502, 2503, 2510, 0125, 0225, 1025, 2725, 2543, 6225
History and Philosophy of Science	see programs 6200, 6201, 6225, 6243, 6245, 6270, 0162, 0262, 4162
Marine Science	see programs 6831, 6832, 6833, 6834
Mathematics	see programs 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1061, 2510, 0610, 0611
Metallurgy	see programs 0401, 0402, 0403
Microbiology	see programs 4401, 4402, 4403, 4404, 4144, 4244, 4344
Philosophy	units available in some programs (the identifying number is 52)
Physics	see programs 0101, 0102, 0103, 0105, 0106, 0125, 0161, 2503, 2510, 0162, 6201, 6851, 6852, 6853
Physiology	see programs 7301, 7302, 7303, 7312, 7345, 7073, 4173
Psychology	see programs 1201, 1270, 7312
Zoology	see programs 2543, 4501, 4502, 4508, 4509, 4514, 4543, 4145, 4345, 4570, 6245, 7345

In addition to Course 3970 programs are also included for Courses 3725 (Science/Electrical Engineering), 3730 (Science/Civil Engineering), 3820 (Science Medicine), 4070 (Mathematics Education), 4080 (Science Education), 4770 (Science/Law).

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

Physics

It is appropriate that Physics should be allocated the first entries in this handbook since the subject is at the very basis of all science and technology. This is reflected in the various programs which the School offers and which range from those designed for the intending professional physicist to the many areas in which Physics combines with other disciplines. The following table serves to illustrate this fact and to summarize the several avenues open to the student for the study of Physics.

Professional Training in Physics	Physics with other Disciplines
Program	Program (or Course)
0101 Physics	0125 Physics/Geology
0102 Physics (Single Major)	0161 Physics/Computer Science
0103 Applied Physics	
0105 Theoretical Physics	0162 Physics and Science Policy Studies
0106 Biophysics	2503 Geophysics
	2510 Geology with Physics and Mathematics
	6201 History and Philosophy of Science/Physics
	6851 ⎫
	6852 ⎬ Chemical Physics
	6853 ⎭

Physics in other Courses

3170 Textile Physics
3725 Electrical Engineering with Physics
3730 Civil Engineering with Physics and Mathematics
4770 Law with Physics
5801 ⎫
5802 ⎬ Education with Physics
5803 ⎟
5805 ⎭

Professional Training
Of these various programs all, except for 0102*, are designed to enable a student to proceed to Year 4 (Honours) and thence into professional employment or to the higher degrees MSc PhD. Program 0101 provides the greatest degree of flexibility in the choice of units. 0103 and 0105 recommend certain units (particularly in Year 3) which it is considered will best equip the student for entry into industry or will enable him to specialize in the theoretical rather than the experimental aspects of the subject. The Biophysics program is more akin to those in the right hand column above and provides for earlier specialization leading to a career in biomedical physics.

Since Physics is expressed in the language of Mathematics a good grounding in this area is essential and students are encouraged to select higher level mathematics units wherever possible.

The subject descriptions of the units may be found in the latter 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 in astrophysics, solid state physics and materials science, lasers and their applications, biophysics, etc.

Physics with other Disciplines
The right hand column above lists those programs which have been arranged with other Schools. Several of these can lead to honours in Physics or to joint honours with other Schools, eg 0125, 0161, 6201, 6853, 3725, 5801, so it must not be thought that the only avenue to specialization in Physics is via the professional programs 0101 etc.

Students should also bear in mind that prerequisites and co-requisites 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 has a special interest but which is not a recommended one in the program.

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* In certain circumstances students completing program 0102 may be accepted into honours physics. Further detail is available from the School.

0101
Physics

Year 1
1.001 or 1.011
10.001 or 10.011*
1 General Studies elective††
Choose 2 units from:
2.111, 2.121, 2.131, 2.141
Choose 2 Level I units from:
1.041
5.010
6.611
10.081
17.031, 17.041
25.110, 25.120

Year 2
1.002, 1.012, 1.022, 1.032
10.1113*, 10.1114*, 10.2111*, 10.2112*
1 General Studies elective
Choose 2 units from:
1.042, 1.052, Level II units in Table 1†

Year 3
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043
1 General Studies elective
Choose at least 3 units from:
Level III physics units in Table 1, 10.111A*, 10.212A*, 10.412D*, including at least one of: 1.0533, 1.0543, 1.763‡

Year 4
1.104

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* Students are encouraged to select higher level mathematics units where applicable.
†† Enrolment in General Studies may be deferred until later years but two electives must be satisfactorily completed for degree requirements.
† Students are reminded that for some recommended Level III mathematics units, 10.111A is a prerequisite.
‡ Students wishing to specialize in Laser and Advanced Optical Technology should consult the School to ascertain additional requirements.

0102
Physics
Single Major†

Year 1
1.001 or 1.011
10.001 or 10.011
1 General Studies elective††
Choose 4 Level I units from Table 1 *and/or* Table 2 for program 0102

Year 2
1.012, 1.022, 1.032
10.2111 & 10.2112
1 General Studies elective
Choose 4 units from Table 1 *and/or* Table 2 for program 0102*

Year 3
1.0133, 1.023, 1.0333, 1.043
1 General Studies elective
Choose at least 4 units from Table 1 *and/or* Table 2 for program 0102 to include at least *one* Level III Physics unit*

†† See footnote to program 0101.

† Under exceptional circumstances students taking this program may be eligible for transfer into Year 4 of program 0101 or 0103 provided a satisfactory level is attained in a number of mathematics units. Students should consult the School of Physics for further details.

* Students are advised that unit 1.002 is compulsory and must be taken in either Year 2 or Year 3.

0103
Applied Physics

Year 1
1.001 or 1.011
10.001 or 10.011*
1 General Studies elective††
Choose 2 units from:
2.111, 2.121, 2.131, 2.141
Choose 2 Level I units from:
1.041
5.010
6.611
10.081
17.031, 17.041
25.110, 25.120

Year 2
1.002, 1.012, 1.022, 1.032
10.1113*, 10.1114*, 10.2111*, 10.2112*
1 General Studies elective
Choose 2 units from:
1.042, Level II units in Table 1**

Year 3
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043
1 General Studies elective
Choose at least 3 units from:**
1.0533, 1.0543, 1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.713, 1.763, 1.773
including at least *one* of:
1.0533, 1.0543, 1.763‡

Year 4
1.304

* †† ‡ See footnote to program 0101.
** Consideration is given to the choice of units of an applied nature offered by other Schools (eg engineering) which may be listed in Table 1 or in the handbooks of other Boards and Faculties. Students must consult the School of Physics in the first instance.

0105
Theoretical Physics

Year 1
1.001 or 1.011
10.001 or 10.011*
1 General Studies elective††
Choose 2 units from: 2.111, 2.121, 2.131, 2.141
Choose 2 Level I units from Table 1 and/or Table 2 for program 0105

Year 2
1.002, 1.012, 1.022, 1.032
10.111A*,
10.1113*, 10.1114*, 10.2111*, 10.2112*
1 General Studies elective
Choose 1 unit from:
1.042, 1.052
10.211E*, 10.331*, 10.411A*

Year 3
1.0133, 1.0143, 1.1133, 1.023, 1.0333, 1.043
10.412D*
1 General Studies elective
Choose at least 2 units from:**
1.5133, 1.5233, 1.5333, 1.5433, 1.5533, 1.0343, 1.1633

Year 4
1.504

* †† See footnote to program 0101.

** With the approval of the School of Physics certain Level III mathematics units may be substituted for some of the units listed.

0106
Biophysics

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011*
17.031, 17.041†
1 General Studies elective††

Year 2
1.012, 1.022, 1.032
2.002B
10.1113*, 10.1114*, 10.2111*, 10.2112*
73.111** or 73.121
1 General Studies elective

Year 3
1.023, 1.0333, 1.1433, 1.1533
Choose 1½ units from Level III Physics units in Table 1***
Choose 2 units from:
1.041, Level II/III mathematics units in Table 1
Choose 1 unit from Level II/III biological units in Table 1
1 General Studies elective

Year 4
1.604

† Students with 2 unit biology HSC may take 1.041 in place of 17.041.

††* See footnote to program 0101.

** Entry to 73.111 requires the approval of the Head of School of Physiology and Pharmacology. If approved, the co-requisite 41.101 is waived.

*** Recommended Physics units are 1.002, 1.0133, however in this program unit 1.002 will be implemented in 1984.

0125
Physics/Geology

Year 1
1.001 or 1.011
2.121 & 2.131 or 2.141
10.001 or 10.011*
25.110, 25.120
1 General Studies elective††

Year 2
1.012, 1.022, 1.032
10.2111*, 10.2112*, 10.1113*, 10.1114*
1 General Studies elective
Choose 3 units from 25.211, 25.221, 25.212, 25.223

Year 3
1.0133, 1.023, 1.0333, 1.043, 1.002‡
1 General Studies elective
Choose 4 units from 25.311, 25.313, 25.326, 25.312, 25.314, 25.321, 25.324, 25.325

Year 4
25.414 or 1.104 or 1.304
or
68.430 (a combined Geology and Physics program by arrangement with Heads of the two Schools)

†† * See footnote to program 0101.

‡ Unit 1.002 will be implemented in 1984 in this program. For 1983 only, this unit is replaced by 1.0143 and 1.0343 and the corequisite of 1.002 specified for 1.0343 does not apply.

0161
Physics/Computer Science

Year 1
1.001 or 1.011
10.001 or 10.011*
6.611
1 General Studies elective††
Choose 3 units from Table 1**

Year 2
1.012, 1.022, 1.032
6.621, 6.641
10.2111*, 10.2112*, 10.1113*, 10.1114*
1 General Studies elective
Choose 1 unit from:
1.042, 1.052, 6.631***, 10.111A*

Year 3
1.002‡, 1.0133, 1.023, 1.0333
1 General Studies elective
Choose 5 units from:**
Level III Physics units in Table 1, 1.042, 6.631***, 10.212A*, 10.412D*, 10.612 including at least one Level III Computer Science unit in Table 1 or 2

Year 4
1.104** or 1.304** or 1.504**

†† * See footnote to program 0101.

**Students intending to proceed to Year 4 are required to choose appropriate units. This choice is determined by the requirements of programs 0101, 0103 and 0105. Students are required to consult the School of Physics. It is also advised that quota restrictions apply to Computer Science Level III units. Application must be made in writing to the Head of School of Electrical Engineering and Computer Science before the end of Session 2 in the preceding year.

‡ See footnote to program 0125.

*** 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.

0162
Physics and Science Policy Studies§†

Year 1
1.001 *or* 1.011
10.001 *or* 10.011
Choose 4 Level I units from Table 1 *and/or* Table 2 for program 0162
*1 General Studies elective***††

Year 2
1.012, 1.022, 1.032
10.2111, 10.2112
62.022, 62.052, 62.062
Choose 1 unit from:
62.012, 62.032

Year 3
1.0133, 1.023, 1.0333, 1.043, 1.002‡
*½ General Studies elective***
Choose 3 units from:
62.012, 62.032, 62.013, 62.033, 62.072 62.082, 62.093
Choose 1 unit from:
15.001, 15.703, 15.753, 10.212A *or* 10.412D

Year 4
62.024

§ This program is intended for students wishing to major in Physics and at the same time acquire an understanding of the social dimensions of science and the role of science in the economy. It also provides elements of a training in science policy studies, important for those wishing to engage in administration and policy-making in science and technology. Honours students will complete a thesis concerned with an aspect of science policy.

† Under exceptional circumstances students taking this program may be eligible for transfer into Year 4 of program 0101 or 0103 or 0105.

** 26.251, 26.2506, 26.561, 26.564, 26.817 may not be included in the program.

†† See footnote to program 0101.

‡ See footnote to program 0125.

2510
Physics & Mathematics/Geology

See 2510 Geology with Physics & Mathematics

Chemistry

The School of Chemistry is divided into five departments (Physical, Organic, Inorganic, Analytical and Nuclear and Radiation Chemistry) 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.

The course programs leading to a major in Chemistry are programs 0201 Chemistry (single major), 0202 Chemistry, 0203 Chemistry (double major), 0204 Chemistry/Chemical Engineering Science, 0225 Chemistry/Geology, 0241 Chemistry/Biochemistry, 0242 Chemistry/Biotechnology, 0261 Chemistry/Computer Science, 0262 Chemistry with Science Studies and 7302 Chemistry/Physiology.

The School also offers a program in the Faculty of Science called Pure and Applied Chemistry (Course 3910) similar to 0203 and described later in this Handbook.

Program 0201 provides the opportunity for greater concentration on units offered by the School of Chemistry than is provided by program 0202. It also offers increased options in chemistry subjects in Year 3 (Level III units), whereas program 0202 allows for a wider choice from other selected fields in the Science and Mathematics Course. With either it is possible to study chemistry and another branch of science to an advanced level. For example, a combination of Level III Chemistry and Mathematics units provide a useful basis for later specialization in X-ray crystallography or theoretical chemistry. Program 0225 contains a combination of Level III Chemistry and Geology units and is designed for those who wish to specialize later in geochemistry. In Program 7302 a combination of 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.

Program 0203 is designed for major specialization in Chemistry at Level II and Level III and should be selected by students who wish to devote their studies at Level III almost entirely to chemical topics. (This program is similar to the Pure and Applied Chemistry Course 3910, in the Faculty of Science).

Programs 0241 and 0242 are designed for those students who wish to undertake a co-major in Chemistry and Biochemistry or Biological Technology. The choice and direction of Honours and graduate work is thereby widened and such work may be undertaken in any of the fields covered by the co-major.

Program 0204 enables the inclusion of some elements of Chemical Engineering in Year 3 as well as Level III Chemistry units, whilst Program 6834 Marine Science and Programs 6851 and 6852 Chemical Physics also involve a substantial study of chemistry. Program 0261 includes Computing Science in each of Years 1, 2 and 3.

The programs are 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 1 Chemistry units (2.121, 2.131, 2.141) specified in the Chemistry programs. 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.

All Chemistry programs have a common first year of study which includes chemistry, physics, mathematics and an elective. It is thus not mandatory for a student to make a final choice of program before the commencement of Year 2. There is further, though limited, choice between programs after the prescribed Level II units have been completed.

Most of the Chemistry programs lead to studies 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 his 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'.

0202
Chemistry*

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
2.002A, 2.002B
1 General Studies elective
Choose at least 5 units from Table 1 including at least one of:
2.042C and 2.002D

Year 3
1 General Studies elective
Choose 8 Level III units from Table 1 including only 4 Chemistry units

Year 4
2.004

* See footnote to program 0201.

†† See footnote to program 0101.

0201
Chemistry*
Single major

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
1 General Studies elective††
Choose 2 Level I units from Table 1

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

Year 3
1 General Studies elective
Choose 8 units from Table 1 including 4 Level III Chemistry units

Year 4
2.004

* Students wishing to undertake a co-major in Chemistry and History and Philosophy of Science are advised that they may do so by enrolling in 0201 or 0202 and choosing appropriate History and Philosophy of Science units from Table 1. In such cases, 26.561, 26.564 and 26.817 may not be included in the choice of General Studies electives.

†† See footnote to program 0101.

0203
Chemistry
Double major

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 is described in detail later in this handbook (Faculty of Science) and enables specialization in Chemistry.

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
Choose 2 Level I units from Table 1
1 General Studies elective††

Year 2
2.002A, 2.002B, 2.042C, 2.002D, 2.003H
1 General Studies elective
Choose 2 units from Table 1

Year 3
2.003B, 2.003C, 2.003D, 2.013A
1 General Studies elective
Choose 4 other Chemistry Level III electives from Table 1

Year 4
2.004

†† See footnote to program 0101.

0204
Chemistry/Chemical Engineering Science

Year 1
1.001 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
1 General Studies elective††
Choose *either*
1. 5.030 and 1 Level I unit from Table 1, *or*
2. 2 Level I units from Table 1

Year 2
2.002A, 2.002B, 2.042C, 2.002D
10.031
or
10.111A and 10.2111 and 10.2112*
48.023
1 General Studies elective
Choose *either*
1. 5.030 *or*
2. 1 Level II unit from Table 1

Year 3
48.037
1 General Studies elective
Choose 4 Level III Chemistry units from Table 1
Choose two units from Table 1

Year 4
2.004

* Students electing 10.111A and 10.2111 and 10.2112 need not make an election under Year 2 clauses **1.** and **2.**

†† See footnote to program 0101.

0225
Chemistry/Geology

Year 1
1.001 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or 10.021B & 10.021C
25.110, 25.120
1 General Studies elective††

Year 2
2.002D, 2.042C
25.211, 25.221, 25.212
1 General Studies elective
Choose 2 units from: 2.002A, 2.002B, 2.003E, 2.003H & 25.223

Year 3
25.311, 25.314, 25.321, 25.326
1 General Studies elective
Choose 4 units from: 2.003B, 2.003C, 2.003D, 2.003E, 2.003H, 2.013D, 2.043A

Year 4
2.004 *or* 25.414

†† See footnote to program 0101.

0241
Chemistry/Biochemistry

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
2.002A, 2.002B, 2.042C, 2.002D
41.101, 41.111
1 General Studies elective

Year 3
41.102A
1 General Studies elective
Choose *either* 41.102B *or* both 41.102C and 41.102D
Choose 4 Chemistry Level III units from Table 1

Year 4
41.103 *or*
2.004

†† See footnote to program 0101.

0242
Chemistry/Biotechnology

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
2.002A, 2.002B
41.101
42.101
44.101
1 General Studies elective
Choose 1 unit from:
2.042C, 2.002D

Year 3
42.102A, 42.102B
1 General Studies elective
Choose 6 units from Table 1 including 4 Chemistry Level III
units; all should be Level III if proceeding to Year IV

Year 4
2.004 *or*
42.103

†† See footnote to program 0101.

0261
Chemistry with Computer Science

Year 1
1.001 *or* 1.011
2.121 *and* 2.131, *or* 2.141
10.001 *or* 10.011
6.611
Choose 1 level I unit from Table 1*
1 General Studies elective††

Year 2
2.002A, 2.002B, 2.042C, 2.002D
6.621, 6.641
10.331**
Choose 1 unit from Table 1***
1 General Studies elective

Year 3
6.646
Choose 4 Level III Chemistry Units†
Choose 3 units††† from Table 1 or Table 2‡
1 General Studies elective

Year 4
2.004

* The unit 1.041 is recommended.

** Or other approved unit of statistics.

*** The unit 6.631 is recommended. It is a prerequisite for 6.632 and 6.613.

† Students must consult the School of Chemistry for approval of their choice of Level III Chemistry units, before the end of Session 2 in the preceding year.

†† See footnote to program 0101.

††† Students intending to proceed to Year 4 must choose appropriate units, as approved by the School of Chemistry.

‡ Quota restrictions apply to Computer Science Level III units. Application must be made in writing to the Head of School of Electrical Engineering and Computer Science before the end of Session 2 in the preceding year.

0262
Chemistry and Science Policy Studies§

Year 1
1.001 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
1 General Studies elective††
2 Level I units from Table 1

Year 2
2.002A, 2.002B, 2.042C, 2.002D
62.022, 62.052, 62.062
Choose 1 unit from Table 1

Year 3
4 Chemistry Level III units from Table 1
½ *General Studies elective**
Choose 3 units from:
62.012, 62.013, 62.032, 62.033, 62.072, 62.082, 62.093
Choose 1 unit from:
15.001, 15.703, 15.753

Year 4
2.004 *or*
62.024

§ This program is intended for students wishing to major in Chemistry and at the same time acquire an understanding of the social dimensions of science and the role of science in the economy. It also provides elements of a training in science policy studies, important for those wishing to engage in administration and policy-making in science and technology. Honours students will complete a thesis in either Chemistry or an aspect of science policy.

* 26.251, 26.2506, 26.561, 26.564, 26.817 may not be included in program.

†† See footnote to program 0101.

7302
Chemistry/Physiology

See 7302 Physiology/Chemistry

Metallurgy

0401
Physical Metallurgy

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
2.002A
4.402, 4.512
1 General Studies elective
Choose 4 Level II units from Table 1 or 3 Level II units from Table 1 and 1 unit from Table 2 for program 0401

Year 3
4.403, 4.703, 4.522
1 General Studies elective
Choose 4 Level III units from Table 1 or 3 Level III units from Table 1 and 1 Level III unit from Table 2 for program 0401

Year 4
4.004

†† See footnote to program 0101.

0402
Chemical Metallurgy

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
2.002A
4.302, 4.602, 4.412
1 General Studies elective
Choose 4 Level II units from Table 1 or 3 Level II units from Table 1 and 1 Level II unit from Table 2 for program 0402

Year 3
4.303, 4.613*, 4.422
7.023*
1 General Studies elective
Choose 4 Level III units from Table 1 or 3 Level III units from Table 1 and 1 unit from Table 2 for program 0402

Year 4
4.004

* Students not proceeding to Honours may substitute another Level II or Level III unit from Table 1 for 4.613 and 7.023.
†† See footnote to program 0101.

0403
Metallurgy
Double major

Students wishing to take more than 4 Level III Metallurgy units are required to transfer to the four year Metallurgy BSc degree course (3120) before the commencement of Year 2. If Year 2 studied in the Science and Mathematics course is similar to Year 2 of Course 3120 the transfer may still be made before the commencement of Year 3.

The Metallurgy BSc degree course is described in detail in the Faculty of Applied Science Handbook and enables specialization in Metallurgy.

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
1 General Studies elective††
Choose *either:*
25.110, 25.120
or
5.010 *and* 5.030

Year 2
2.002A
4.302, 4.402, 4.502, 4.602, 4.802
10.031
25.541
1 General Studies elective

Year 3
4.303, 4.403, 4.613, 4.703, 4.813,
7.023
1 General Studies elective

Year 4
4.024, 4.054, 4.314, 4.324, 4.414, 4.424, 4.504

†† See footnote to program 0101.

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 majors (programs 0601 (Computer Science), 0610 (Computing Science/Mathematics), or 0611 (Computing Science/Statistics)) enrol in their first year in program 6806. Students in program 6806 may also have the alternative of entering program 1401 (Commercial Information Systems with Computer Science) at the end of their first year. Acceptance into programs 0601, 0610, 0611 or 1401 is based on academic performance in Year 1 or Year 2.

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 program in Electrical Engineering which leads to the award of the two degrees of BE and BSc (see under Course 3725 and the Faculty of Engineering Handbook). Students may also major in Computing 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.

0601
Computer Science

Year 1*
10.001 *or* 10.011
6.611
1 General Studies elective††
Choose 5 units from:
1. Table 1 *&/or*
2. The BA course** *&/or*
3. Table 2 for program 0601**

Year 2
6.621, 6.631, 6.641
1 General Studies elective
Choose 5 units from:
1. Table 1 *&/or*
2. The BA course** *&/or*
3. Table 2 for program 0601**

Year 3†
Choose 4 Level III Computer Science units
1 General Studies elective
Choose 3 units from:
1. Table 1 *&/or*
2. The BA course** *&/or*
3. Table 2 for program 0601**

Year 4
6.606

* In Year 1 students must enrol in Program 6806. Enrolment in Year 2 of Programs 0601, 0610 and 0611 is based on academic performance in Year 1.

†† See footnote to program 0101.

** 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. 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.)

† Students intending to proceed to honours in Computer Science should choose 8 Level III units including 6.613, 6.632, 6.642 and 6.643.

0610
Computer Science/Mathematics

Year 1*
10.001 *or* 10.011
6.611
1 General Studies elective††
Choose 5 units from:
1. Table 1 *&/or*
2. The BA course** *&/or*
3. Table 2 for program 0601**

Year 2

6.621 6.631, 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)
1 General Studies elective
Choose 2 units from:
1. Table 1 &/or
2. The BA course* &/or
3. Table 2 for program 0601*

Year 3†

1 General Studies elective
Choose at least 7 units including 4 (or 3) Level III Computer science units and 3 (or 4) Level III Mathematics units

Year 4

6.606

* ** † See footnotes to program 0601.

†† See footnote to program 0101.

0161
Computer Science/Physics

See 0161 Physics/Computer Science

0261
Computer Science/Chemistry

See 0261 Chemistry with Computer Science

1061
Computer Science/Mathematics

See 1061 Mathematics and Computing

See also

1401
Commercial Information Systems with Computer Science

0611
Computer Science/Statistics

Year 1*

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

Year 2

6.621, 6.631, 6.641
10.311A (or 10.321A), 10.311B (or 10.321B), 10.111A (or 10.121A), 10.1113 (or 10.1213)
Choose 1 Level II unit from Table 1
1 General Studies elective

Year 3†

1 General Studies elective
Choose at least 7 units including 4 (or 3) Level III Computer Science units and 3 (or 4) Level III Statistics units

Year 4

6.606, or 10.323 if 4 Level III Higher Statistics units have been successfully taken

* ** † See footnotes to program 0601.

†† See footnote to program 0101.

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 interests in the areas of applied statistics, stochastic processes, biometry, inference, design of experiments, sequential analysis, discrete distributions, nonparametrics and statistical computing.

Programs of Study

Programs 1001–1010 (Mathematics)
These are general Mathematics programs which are chosen by students wishing to major in Mathematics with most of the supporting subjects being Science subjects.

There are four specific programs in this group each available at pass level (3 years) or at honours level (4 years). These are in Pure Mathematics, Applied Mathematics, Statistics and Theoretical and Applied Mechanics. There is also a three year program leading to a combined major in Applied Mathematics and Theoretical and Applied Mechanics. Students are able to combine courses in Pure Mathematics, Applied Mathematics, Theoretical Mechanics, Theory of Statistics and Computer Science in accordance with their future interests. Such combinations of courses are particularly suitable for students intending to become secondary school teachers.

Programs 1011–1019 (Mathematics and Liberal Studies)
The Mathematics and Liberal Studies programs are aimed at encouraging students to see mathematics in a cultural and social setting. By combining mathematics units with suitable arts units, particularly those in Philosophy and History and Philosophy of Science, it is hoped that these programs will bring together the exactitude of mathematics with the freer creativity of the arts. It is expected that students would do History of Mathematics in their third year to provide an opportunity to bring together much of the 'mathematics' and 'liberal studies' of their earlier courses.

The liberal studies may be combined into a broad mathematics sequence or if students wish to specialize, then Pure Mathematics, Applied Mathematics, Theoretical Mechanics or Theory of Statistics sequences are available at pass or honours level.

Interdisciplinary Programs
Program 1061, Mathematics and Computing, will be particular interest to students who wish to combine a mathematics major with a substantial component of computing.

Programs 1020 and 1021, Applied Mathematics (Economic Optimization) includes subjects offered by the School of Economics, as well as mathematics subjects with a particular emphasis on optimization, optimal control, and related areas. This program is intended for students who are good at mathematics and interested in applications of mathematics to economic problems, particularly problems of economic planning and macroeconomic modelling. The degree is a mathematics degree, but there is enough economics in it to provide a very good introduction for work in the area of mathematical economics and its applications. Program 1021 is the honours version of 1020.

Programs 1022 and 1023, Mathematics of Management include 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. These programs are 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 these courses 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.

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.

Mathematics/Computer Science

See 0610 Computer Science/ Mathematics

1001
Mathematics

Year 1
10.001 *or* 10.011
1 General Studies elective††
Choose 6 units* from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001 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)
1 General Studies elective
Choose 5 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 3
Choose 4 Level III§ Mathematics units other than 10.612 from Table 1 (or choose 5 if only 3 Level II Mathematics units taken)
1 General Studies elective
Choose 3 (*or* 2) units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

†† See footnote to program 0101.

* It is strongly recommended that two of these units be 10.081 and 6.611.
** Up to 8 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 Head of the School of Mathematics.

§ Not to include more than one Level II/III unit.

1002
Pure Mathematics

Year 1
10.001 *or* 10.011
1 General Studies elective††
Choose 6 units* from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001 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)
1 General Studies elective
Choose 5 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 3
10.1111, 10.1112, 10.1121, 10.1128
Choose 2 units from:
10.1123, 10.1124, 10.1125, 10.1126, 10.1127, 10.1521, 10.1522, 10.1523
1 General Studies elective
If only 3 Level II Mathematics units taken in Year 2 choose 1 further Level II or Level III Mathematics unit
Choose 3 (*or* 2) units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Note: 3rd Year Higher Pure Mathematics Units may be substituted for equivalent pass units with the approval of the Head of School of Mathematics.

†† See footnote to program 0101.

** † See footnotes to program 1001.

1003
Pure Mathematics Honours

Year 1
10.011
1 General Studies elective
Choose 6 units* from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001 except 14.501

Year 2
10.121A, 10.1213, 10.1214, 10.2211, 10.2212
1 General Studies elective
Choose 5 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 3
10.122B
Either 10.1321, 10.1322, 10.1323, 10.1324, 10.1325, 10.1326, or 10.1421, 10.1422, 10.1423, 10.1424, 10.1425, 10.1426
1 General Studies elective
Choose 3 units from:
1. Table 1, &/or
2. The BA course**†, &/or
3. Table 2† for program 1001, at least 1 of which must be a mathematics unit and at least 2 of which must be Level III units.

Year 4
10.123

†† See footnote to program 0101.

* ** † See footnotes to program 1001.

Note: Where higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

1004
Applied Mathematics

Year 1
10.001 *or* 10.011
1 General Studies elective††
Choose 6 units* from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001 except 14.501

Year 2
10.2111 *(or* 10.2211), 10.2112 *(or* 10.2212), 10.111A *(or* 10.121A), 10.1113 *(or* 10.1213), 10.1114 *(or* 10.1214), 10.2113‡ *(or* 10.2213‡), 10.2115‡‡ *(or* 10.2215‡‡)
1 General Studies elective
Choose 4 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 3
10.212A *(or* 10.222A), 10.212L *(or* 10.222L), 10.212M *(or* 10.222M)
One unit from the Theory of Statistics Level III units or from the Theoretical Mechanics Level III units
1 General Studies elective
Choose 3 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

* ** † See footnotes to program 1001.

‡ These ½ units are strongly recommended but not essential. If not taken, one additional Mathematics unit at Level II or Level III must be taken in either Year 2 *or* Year 3.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1005
Applied Mathematics Honours

Year 1
10.011
1 General Studies elective††
Choose 6 units* from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001 except 14.501

Year 2φ
10.121A, 10.1213, 10.1214, 10.2211, 10.2212, 10.2213‡, 10.2215‡ ‡‡
1 General Studies elective
Choose 4 units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 3
10.222A, 10.222M
Choose 1 unit from:
10.222L, 10.222C, 10.222F
Choose 1 further Higher Level III§ Mathematics unit
1 General Studies elective
Choose 3 Level III§ units from:
1. Table 1 &/or
2. The BA course**† &/or
3. Table 2† for program 1001

Year 4
10.223

Note: Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

†† See footnote to program 0101.
* ** † § See footnotes to program 1001.

‡ These units are strongly recommended but not essential to be taken. If not taken one additional mathematics unit at Level II or Level III must be taken in either Year 2 or Year 3.

‡‡ If already taken, 10.2114 and 10.2115 are acceptable in place of 10.2115 and 10.2215 respectively.

φ Students should consult with a Professor of the Department before finalizing their Year 3 enrolment (see also * footnote for Table 3).

1006
Statistics

Year 1
10.001 *or* 10.011
1 General Studies elective††
Choose 6 units* from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001 except 14.501

Year 2
10.111A (*or* 10.121A), 10.1113 (*or* 10.1213), 10.1114 (*or* 10.1214), 10.2112 (*or* 10.2212), 10.311A (*or* 10.321A), 10.311B (*or* 10.321B)
1 General Studies elective
Choose 2½ units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 3
Choose 4 units from:
10.312A (*or* 10.322A), 10.312B (*or* 10.322B), 10.312C (*or* 10.322C), 10.312D (*or* 10.322D), 10.312E (*or* 10.322E)
1 General Studies elective
Choose 3 Level III Mathematics *and/or* Computer Science units from Table 1

†† See footnote to program 0101.
* ** † See footnotes to program 1001.

1007
Statistics Honours

Year 1
10.011 *or* 10.001
1 General Studies elective††
Choose 6 units* from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001 except 14.501

Year 2
10.121A (*or* 10.111A), 10.1213 (*or* 10.1113), 10.1214 (*or* 10.1114), 10.2212 (*or* 10.2112), 10.321A, 10.321B
1 General Studies elective
Choose 2½ units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 3
Choose 4 units from:
10.322A, 10.322B, 10.322C, 10.322D, 10.322E
1 General Studies elective
Choose 3 Level III Mathematics *and/or* Computer Science units from Table 1

Year 4
10.323

Note: Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

†† See footnote to program 0101.
* ** † See footnotes to program 1001.

0611
Statistics/Computer Science

See 0611 Computer Science/Statistics

1008
Theoretical Mechanics

Year 1
10.001 *or* 10.011
1.001 *or* 1.011
1 General Studies elective††
Choose 4 units* from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001 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), 10.411A (*or* 10.421A), 10.411B (*or* 10.421B)
1 General Studies elective
Choose 3 units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 3
10.412A (*or* 10.422A), 10.412D (*or* 10.422D)
1 General Studies elective
Choose 2 units from:
10.212A (*or* 10.222A), 10.212L (*or* 10.222L), 10.212M (*or* 10.222M), (10.1125 and 10.1126) (*or* 10.1425 and 10.1426), 10.412B (*or* 10.422B)
Choose 3 units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

†† See footnote to program 0101.
* ** † See footnotes to program 1001.

1009
Theoretical Mechanics Honours

Year 1
10.011, 1.001 (or 1.011)
1 General Studies elective††
Choose 4 units* from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001 except 14.501

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.421A, 10.421B
1 General Studies elective
Choose 3 units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 3
10.422A, 10.422B, 10.222C, 10.422D
1 General Studies elective††
Choose 2 units from:
10.412A, 10.222A (or 10.212A), 10.222M (or 10.212M), 10.2213 (or 10.2113), 10.2215‡‡ (or 10.2115‡‡), 10.122B, (10.1425 and 10.1426), (10.1125 and 10.1126)
Choose 1 unit from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 4
10.423
1 General Studies elective

Note: Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

†† See footnote to program 0101.

* ** † See footnotes to program 1001.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1010
Applied Mathematics and Theoretical Mechanics

Year 1
10.001 (or 10.011), 1.001 (or 1.011)
1 General Studies elective††
Choose 4 units* from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001 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), 10.411A (or 10.421A), 10.411B (or 10.421B), 10.2113 (or 10.2213), 10.2115‡‡ (or 10.2215‡‡)
1 General Studies elective
Choose 2 units from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

Year 3
10.412A (or 10.422A), 10.412D (or 10.422D), 10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M)
Choose one other Level III Mathematics unit from Table 1.
1 General Studies elective
Choose 1 unit from:
1. Table 1 *&/or*
2. The BA course**† *&/or*
3. Table 2† for program 1001

†† See footnote to program 0101.

* ** † See footnotes to program 1001.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1011
Mathematics and Liberal Studies§

Year 1
10.001 *or* 10.011
Choose 6 units* ** from:
1. Table 1† *&/or*
2. The BA course§

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 5 units from:
1. Table 1† *&/or*
2. The BA course§

Year 3
Choose 4 Level III‡ Mathematics units other than 10.612 from Table 1 (or Choose 5 if only 3 Level II Mathematics units taken)
Choose 5 (or 4) units from:
1. Table 1† *&/or*
2. The BA course§

Note: The program consists of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.

* Except for mathematics units, not more than 2 Level I units may be taken in one subject.

** It is strongly recommended that two of these units be 10.081 and 6.611.

† Geography, History and Philosophy of Science, and Philosophy shall be 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 equal 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 those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

‡ Not to include more than one Level II/III unit.

1012
Pure Mathematics and Liberal Studies§

Year 1
10.001 or 10.011
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

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 5 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.1111, 10.1112, 10.1121, 10.1128
Choose 2 units from:
10.1123, 10.1124, 10.1125, 10.1126, 10.1127, 10.1521, 10.1522, 10.1523
If only 3 Level II Mathematics units were taken choose 1 further Level II or Level III Mathematics unit
Choose 5 (or 4) units from:
1. Table 1† &/or
2. The BA course§

Note: 1. The program consists of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.
2. 3rd year Higher Pure Mathematics Units may be substituted for equivalent pass units with the approval of the Head of School of Mathematics.

* ** † § See footnotes to program 1011.

1013
Pure Mathematics Honours and Liberal Studies§

Year 1
10.011
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

Year 2
10.121A, 10.1213, 10.1214, 10.2211, 10.2212
Choose 5 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.122B
Either 10.1321, 10.1322, 10.1323, 10.1324, 10.1325, 10.1326, or 10.1421, 10.1422, 10.1423, 10.1424, 10.1425, 10.1426
Choose 5 units from:
1. Table 1† &/or
2. The BA course§, at least 1 of which must be a mathematics unit

Year 4
10.123

Note: 1. The first three years of the program consist of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.
2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

* ** † § See footnotes to program 1011.

1014
Applied Mathematics and Liberal Studies§

Year 1
10.001 or 10.011
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

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), 10.2113‡ (or 10.2213‡), 10.2115‡ ‡‡ (or 10.2215‡ ‡‡)
Choose 4 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M)
Choose 1 unit from:
the Theory of Statistics Level III units or from the Theoretical Mechanics Level III units
Choose 5 units from:
1. Table 1† &/or
2. The BA course§

Note: The program consists of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.

* ** † § See footnotes to program 1011.

‡ This unit is strongly recommended but not essential. If not taken one additional Mathematics unit at Level II or Level III must be taken in either year 2 or year 3.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1015
Applied Mathematics Honours and Liberal Studies§

Year 1
10.011
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

Year 2
10.121A, 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2215‡‡
Choose 4 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.222A, 10.222L, 10.222M
Choose 2 further Higher Level III‡ Mathematics units one of which must not be a Pure Mathematics unit and one of which is recommended to be 10.122B
Choose 4 units from:
1. Table 1† &/or
2. The BA course§

Year 4
10.223

Note: 1. The first three years of the program consist of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.
2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

* ** † § ‡ See footnotes to program 1011.

‡‡ If already taken 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1016
Statistics and Liberal Studies§

Year 1
10.001 or 10.011
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

Year 2
10.111A (or 10.121A), 10.1113 (or 10.1213), 10.1114 (or 10.1214), 10.2112 (or 10.2212), 10.311A (or 10.321A), 10.311B (or 10.321B)
Choose 2½ units from:
1. Table 1† &/or
2. The BA course§

Year 3
Choose 4 units from:
10.321A (or 10.322A), 10.321B (or 10.322B), 10.321C (or 10.322C), 10.312D (or 10.322D), 10.312E (or 10.322E)
Choose 3 Level III Mathematics and/or Computer Science units from Table 1
Choose 2 units from:
1. Table 1† &/or
2. The BA course§

Note: The program consists of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.

* ** † § See footnotes to program 1011.

1017
Statistics Honours and Liberal Studies§

Year 1
10.011 or 10.001
Choose 6 units* ** from:
1. Table 1† &/or
2. The BA course§

Year 2
10.121A (or 10.111A), 10.1213 (or 10.1113), 10.1214 (or 10.1114), 10.2212 (or 10.2112), 10.321A, 10.321B
Choose 2½ units from:
1. Table 1† &/or
2. The BA course§

Year 3
Choose 4 units from:
10.322A, 10.322B, 10.322C, 10.322D, 10.322E
Choose 3 Level III Mathematics and/or Computer Science units from Table 1
Choose 2 units from:
1. Table 1† &/or
2. The BA course§

Year 4
10.323

Note: 1. The first three years of the program consist of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.
2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

* ** † § See footnotes to program 1011.

1018
Theoretical Mechanics and Liberal Studies§

Year 1
10.001 or 10.011
1.001 or 1.011
Choose 4 units* ** from:
1. Table 1† &/or
2. The BA course§

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), 10.411A (or 10.421A), 10.411B (or 10.421B)
Choose 3 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.412A (or 10.422A), 10.412D (or 10.422D)
Choose 2 units from:
10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M), 10.412B (or 10.422B), (10.1125 and 10.1126), (10.1425 and 10.1426)
Choose 5 units from:
1. Table 1† &/or
2. The BA course§

Note: The program consists of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.

* ** † § See footnotes to program 1011.

1019
Theoretical Mechanics Honours and Liberal Studies§

Year 1
10.011
1.001 or 1.011
Choose 4 units* ** from:
1. Table 1† &/or
2. The BA course§

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.421A, 10.421B
Choose 3 units from:
1. Table 1† &/or
2. The BA course§

Year 3
10.422A, 10.422B, 10.222C, 10.422D
Choose 2 units from:
10.412A, 10.212A (or 10.222A), 10.222M (or 10.212M), 10.2213 (or 10.2113), 10.2215‡‡ (or 10.2115‡‡), 10.122B, (10.1425 and 10.1426), (10.1125 and 10.1126)
Choose 3 units from:
1. Table 1† &/or
2. The BA course§

Year 4
10.423

Note: **1.** The first three years of the program consist of at least 25 units of which not less than eight nor more than ten units may be from Level I; there is no General Studies requirement.
2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

* ** † § See footnotes to program 1011.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1020
Applied Mathematics (Economic Optimization)

Year 1
10.001 or 10.011
15.001, 15.011
1 General Studies elective††
Choose 4 units from:
1. Table 1 &/or
2. **The BA course &/or
3. Table 2 for program 1020 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), 10.2113 (or 10.2213), 10.2115‡‡ (or 10.2215‡‡)
15.002, 15.042
1 General Studies elective
Choose either 10.331 and 1 unit from:
1. Table 1 &/or
2. **The BA course &/or
3. Table 2 for program 1020
or
Choose both:
10.311A, 10.311B
or
Choose both:
10.321A, 10.321B

Year 3
10.212L (or 10.222L), 10.212M (or 10.222M)
15.003, 15.413, 15.423
Choose 2 Level III* Mathematics units from Table 1 if 10.331 was chosen and otherwise choose 1 Level III* Mathematics unit from Table 1 excluding 10.312C and 10.322C

Note: Only 2 General Studies electives are required in this program. Each of 14.601, 15.601 and 15.611 (Table 2) may be substituted for a General Studies elective but may not then count as a qualifying unit.

* The two half units 10.1125 and 10.1126 are recommended.

** Six credit points at Level I or 4 credit points at Upper Level equals 1 unit.

†† See footnote to program 0101.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1021
Applied Mathematics Honours (Economic Optimization)

Year 1
10.011
15.001, 15.011
1 General Studies elective††
Choose 4 units from:
1. Table 1 &/or
2. *The BA course &/or
3. Table 2 for program 1021 except 14.501

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2215‡‡, 10.331 or both 10.311A and 10.311B or both 10.321A and 10.321B
15.012, 15.052
1 General Studies elective

Year 3
10.222A, 10.222L, 10.222M, 10.122B
15.013, 15.033, 15.413, 15.423

Year 4
10.233
15.024, 15.034

Note: **1.** Only 2 General Studies electives are required in this program. Each of 14.601, 15.601 and 15.611 (Table 2) may be substituted for a General Studies elective but may not then count as a qualifying unit.
2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

* Six credit points at Level I or 4 credit points at Upper Level equals 1 unit.

†† See footnote to program 0101.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1022
Mathematics of Management**

Year 1
10.001 or 10.011
14.501, 14.511
15.001, 15.011
1 General Studies elective††
Choose 2 units from:
1. Table 1 &/or
2. Table 2 for program 1022

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), 10.2113 (or 10.2213), 10.2115‡‡ (or 10.2215‡‡), 10.311A (or 10.321A)
14.522, 14.602
Choose at least one of:
14.542, 14.603, 14.613
15.042
1 General Studies elective

Year 3
14.583
Choose at least 4 Level III mathematics units from Table 1, of which at least 2 shall be selected from:
10.212A (or 10.222A), 10.412D (or 10.422D), 10.212L (or 10.222L), 10.212M (or 10.222M), 10.311B (or 10.321B), 10.312A (or 10.322A)
Choose at least one unit from:
14.604, 14.608, 14.614, 14.615
Choose any remaining units from:
1. Table 1 &/or
2. Table 2 for program 1022

Note: Only 2 General Studies electives are required in this program. Each of 14.601, 15.601 and 15.611 (Table 2) may be substituted for a General Studies elective but may not then count as a qualifying unit.

** Enrolment in this program requires approval of the Chairman of the Board of Studies in Science and Mathematics and the Head of the School of Accountancy.

†† See footnote to program 0101.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1023
Mathematics of Management**
Honours Program

Year 1
10.011
14.501, 14.511
15.001, 15.011
1 General Studies elective††
Choose 2 units from:
1. Table 1 &/or
2. Table 2 for program 1023

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2215‡‡, 10.331*
14.532, 14.552
Choose *either*
15.062 and 15.072
or
15.042 and 15.002
1 General Studies elective

Year 3
10.222A, 10.222L, 10.222M, 10.122B
14.573, 14.593
Choose 1 Level III unit from:
1. Table 1 &/or
2. Table 2 for program 1023

Year 4

10.233

14.852

14.851 *or* one Accountancy Honours Option

Note: **1.** Only 2 General Studies electives are required in this program. Each of 14.601, 15.601, 15.611 (Table 2) may be substituted for a General Studies elective but may not then count as a qualifying unit.

2. Where Higher units are specified, suitable ordinary units may, in exceptional circumstances and at the discretion of the Head of School of Mathematics, be accepted as equivalent.

†† See footnote to program 0101.

** Enrolment in this program requires approval of the Chairman of the Board of Studies in Science and Mathematics and the Head of the School of Accountancy.

* May be taken in Year 3.

‡‡ If already taken, 10.2114 and 10.2214 are acceptable in place of 10.2115 and 10.2215 respectively.

1025
Mathematics/Geology

Year 1

1.001 *or* 1.011

2.121 & 2.131, *or* 2.141

10.001 *or* 10.011

25.110, 25.120

1 General Studies elective††

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)

25.211, 25.221, 25.212, 25.223

1 General Studies elective

Choose 1 unit from:

10.211E, 10.411B & 10.331

Year 3

Choose 4 level III mathematics units from Table 1

25.311, 25.313, 25.326

1 General Studies elective

Choose 1 unit from:

25.312, 25.314, 25.321, 25.324 & 25.325

Year 4

25.414 *or* 10.123* *or* 10.223* *or* 10.423*

†† See footnote to program 0101.

* Provided students have taken appropriate Higher Mathematics units in earlier years.

1061
Mathematics and Computing

Year 1

10.001 (*or* 10.011)

6.611

5 further units from Table 1 (10.081 is strongly recommended)

1 General Studies elective††

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)

6.621

6.641

Choose 2 further units from Level II Mathematics Subjects *or* 6.631 *or* Level II Information Systems*, and 1 unit from Table 1 to make 8 units in all

1 General Studies elective

Year 3

10.612

4 further units from Level III Mathematics units in Table 1

1 unit from Level III Computer Science

1 further unit from *either* Level III Mathematics *or* Level III Computer Science**, or Level III Information Systems*

Note: Students with appropriate units in Years 1, 2 and 3 may transfer to one of the honours programs 1003, 1005 or 1009 in Year 4. Students with this in mind should consult with a Professor of the relevant Department as early as possible.

* Quotas may apply to some Information Systems units. Application must be made in writing to the Head of the School of Accountancy before the end of the second session in the preceding year.

** Quotas may apply to some Computer Science Level III units. Application must be made in writing to the Head of the School of Electrical Engineering and Computer Science before the end of the second session in the preceding year.

†† See footnote to Program 0101.

2510
Mathematics & Physics/Geology

See 2510 Geology with Physics & Mathematics

Mathematics/Marine Science

See 6831 Marine Science (Physical Oceanography) and attached note relating to dual major with Mathematics

Mathematics/Marine Science Honours

See 6831 Marine Science (Physical Oceanography) and attached note relating to dual major with Mathematics

Psychology

In the Science and Mathematics course there are three programs which lead to a major in Psychology after 3 years or to honours after 4 years. These programs are 1201 Psychology, 1270 Psychology/Anatomy and 7312 Physiology/Psychology. 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 leads to careers in research, teaching and applied fields such as personnel selection and management, vocational guidance, advertising and clinical practice.

Students who are seeking to become occupational therapists should enrol in program 1270 Psychology/Anatomy (program 6801 in year 1). The Cumberland College of Health Sciences recognises the completion of this program as an appropriate prerequisite for admission to its Gradute Diploma in Occupational Therapy course.

1201
Psychology

Year 1
10.001 or 10.011
or
10.021B and 10.021C
12.100
1 General Studies elective††
Choose 4 Level I units from Table 1 or Table 2 for program 1201

Year 2
12.200
Choose 2 units from:
12.201, 12.202, 12.204, 12.205
1 General Studies elective
Choose 5 units from Table 1

Year 3
1 General Studies elective
Choose at least 7 units from Table 1 including at least 4 Level III Psychology units*

Year 4
12.403 or 12.404

†† See footnote to program 0101.

* Students taking honours in Psychology must have completed 8 Level III units of Psychology including 12.300, 12.305 and either 12.304 or 12.322 from Group A. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.301 from Group B.

1270
Psychology/Anatomy**

Year 1*
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B and 10.021C
12.100
17.031, 17.041
1 General Studies elective††

Year 2
12.200, 12.201, 12.202
70.011A, 70.011C
73.121 or 73.111§
1 General Studies elective
Choose*** 70.011B or 70.012B or 70.304 or choose 1 unit from Table 1

Year 3
70.012C, 70.306, 70.307
1 General Studies elective††
Choose at least 4 Psychology Level III units†, or
Choose*** 4 Psychology Level III units and 70.011B or 70.012B or 70.304 or 70.305

Year 4
12.403 or 12.404 or 70.013***

* In Year 1, students must enrol in program 6801. Enrolment in Year 2 of program 1270 is based on academic performance in Year 1.

** The Cumberland College of Health Sciences recognizes the completion of this program as an appropriate prerequisite for admission to its Graduate Diploma in Occupational Therapy course.

†† See footnote to program 0101.

*** Students taking Honours in Anatomy must have completed at least 4 Anatomy units at Level III. This requires one elective unit chosen from 70.011B, 70.012B, 70.304, or 70.305.

§ Entry to 73.111 requires the approval of the Head of the School of Physiology and Pharmacology.

† Students taking Honours in Psychology must have completed 8 Level III units of Psychology including 12.300, 12.305 and either 12.304 or 12.322 from Group A. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.301 from Group B.

7312
Psychology/Physiology

See 7312 Physiology/Psychology

1401
Commercial Information Systems with Computer Science

See 6860 Commercial Information Systems with Computer Science

Geology

2501
Geology
Double major

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120
1 General Studies elective††

Year 2
25.211, 25.221, 25.212, 25.223
1 General Studies elective
Choose 3 units from Table 1

Year 3
25.311, 25.321, 25.312, 25.313, 25.314, 25.324, 25.325, 25.326
1 General Studies elective

Year 4 (offered 1982)
25.411
Plus
either
25.412
or
25.413

†† See footnote to program 0101.

2502
Geology
Single major

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120
1 General Studies elective††

Year 2
25.211, 25.221, 25.212, 25.223
1 General Studies elective
Choose 3 units from Table 1

Year 3
25.311, 25.312, 25.326, plus one of the following:
25.313, 25.314, 25.321, 25.324, 25.325
1 General Studies elective
Choose 4 units from Table 1

Year 4
25.414

†† See footnote to program 0101.

2503
Geophysics

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
25.110, 25.120
1 General Studies elective††

Year 2
1.002, 1.012, 1.022, 1.032
10.2111, 10.2112, 10.331
25.212, 25.223
1 General Studies elective

Year 3
25.9311, 25.9312, 25.9313,
25.9314, 25.932, 25.313
1 General Studies elective
Choose 4 units from Table 1 selecting at least 2 units from:
1.042, 1.0333, 1.3533, 1.133, 1.0343, 1.713, 1.043

Year 4
25.414

†† See footnote to program 0101.

2510
Geology with Physics and Mathematics

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
25.110, 25.120
1 General Studies elective††

Year 2
1.002, 1.012, 1.022, 1.032
10.2111, 10.2112, 10.331
25.212, 25.223
1 General Studies elective

Year 3
10.2113, 10.2115
25.312, 25.313, 25.325, 25.326, 25.6342
Choose 2½ units from 1.042, 1.133, 1.3533, 1.0343, 1.043, 1.713, 1.0333
1 General Studies elective

Year 4
25.414

†† See footnote to program 0101.

55

2543
Geology with Botany & Zoology

Year 1
2.121 & 2.131
10.001 *or* 10.011
10.021B & 10.021C
17.031 & 17.041
25.110 & 25.120
1 General Studies elective††

Year 2
25,211, 25.221, 25.212
43.111
45.101, 45.201, 45.301
1 General Studies elective
Choose 1 unit from:
17.012
43.112* (*or* 43.162*), 43.131

Year 3
25.311, 25.312, 25.326
45.302
1 General Studies elective
25.324 *or* 25.325
Choose 2 units from 43.152, 43.162* (*or* 43.112*), 43.172,
45.112, 45.121, 45.402

Year 4
25.414

†† See footnote to program 0101.

* These subjects are offered in alternate years; 43.112 requires the waiving of the co-requisite 43.101.

0125
Geology/Physics

0225
Geology/Chemistry

1025
Geology/Mathematics

2725
Science Geography/Geology

Geography

2701
Science Geography

Year 1
10.001 *or* 10.011
or
10.021B + 10.021C
27.111*
or
27.801* & 27.802*
1 General Studies elective††
Choose 4 Level I units from Table 1

Year 2
27.811*, 27.812*, 27.2813, 27.2814
1 General Studies elective
Choose 4 units from Table 1 including not more than 2 Level I units

Year 3
1 General Studies elective
Choose 8 units including at least 4 Level III units from Table 1 including at least 3 units from:
27.153, 27.143, 27.183, 27.133 (*or* 27.863), 27.872

Year 4
27.604

* Students who choose 27.111 instead of 27.801 and 27.802 in Year 1 should omit 27.801 and 27.811 from their program and complete 27.802 and 27.812 in Years 2 and 3 respectively.

†† See footnote to program 0101.

2703
Science Geography with Geology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B + 10.021C
25.110, 25.120
27.111
or
27.801* & 27.802*
1 General Studies elective††

Year 2
1.001
25.211, 25.221, 25.212
27.811*, 27.812*, 27.2813, 27.2814
1 General Studies elective

Year 3
25.311, 25.312
27.183, 27.133
1 General Studies elective
Choose 3 units from:
Either
25.325 (*or* 25.314), 27.153, 27.143, 27.862

Year 4
27.604

* Students who choose 27.111 instead of 27.801 and 27.802 in Year 1 should omit
27.801 and 27.811 from their program and complete 27.802 and 27.812 in Years 2
and 3 respectively.

†† See footnote to program 0101.

2725
Science Geography/Geology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120
27.111
or
27.801* & 27.802*
1 General Studies elective††

Year 2
1.001
25.211, 25.221, 25.212, 25.223
27.811*, 27.2813, 27.2814
1 General Studies elective

Year 3
27.183, 27.133, 27.812*
25.311, 25.312, 25.326
Choose 1 unit from:
25.313, 25.314, 25.321, 25.324, 25.325, 25.326
1 General Studies elective
Choose 1 unit from:
27.153, 27.143, 27.862

Year 4
27.604 *or* 25.414

* Students who choose 27.111 instead of 27.801 and 27.802 in Year 1 should omit
27.801 and 27.811 from their program and complete 27.802 812 in Year 2.

†† See footnote to program 0101.

2743
Science Geography/Botany

Year 1
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
27.111
or
27.801* & 27.802*
1 General Studies elective††
Choose 2 units from:
2.111, 2.121, 2.131, 2.141

Year 2
1.001
27.811*, 27.812*, 27.2813, 27.2814
43.101, 43.111
1 General Studies elective
Choose 1 Level II unit from Table 1

Year 3
27.153, 27.143
43.112 *or* 43.162, 43.142
1 General Studies elective
Choose 3 units from:
27.183, 27.133
43.102, 43.152, 43.172

Year 4
27.604 *or* 43.103

* Students who choose 27.111 instead of 27.801 and 27.802 in Year 1 should omit
27.801 and 27.811 from their program and complete 27.802 and 27.812 in Years 2
and 3 respectively.

†† See footnote to program 0101.

Biochemistry

Biochemistry means 'chemistry of life' 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 basic, rather than descriptive level.

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, their reactivities and 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 are offered at a more advanced level: 41.102A Biochemistry of Macromolecules; 41.102B Physiological Biochemistry; 41.102C and D Plant Biochemistry; 41.102E Molecular Biology of Higher Organisms.

Program 4101 Biochemistry leads to a single major in Biochemistry. The program contains provision for considerable choice of non-biochemical units. Frequently Biochemistry is studied with another discipline as co-major. These programs cater for students' interests and outline how to achieve a double major. Thus there are available Biochemistry courses co-majoring with Chemistry (0241), Biotechnology (4142), Microbiology (4144), Zoology (4145), Science Policy Studies (4162), Anatomy (4170) and Physiology (4173). Program 4101 Biochemistry single major, could be used to take two minors, eg Chemistry and Microbiology or Chemistry and Botany, with Biochemistry.

In Year 4 the Honours course in Biochemistry (41.103) offers the opportunity for students to carry out a project and to receive training in research techniques.

4101
Biochemistry

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.041
1 General Studies electivett
Choose 2 Level I units from Table 1

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

Year 3
41.102A
Choose at least 6 units from Table 1, including either 41.102B and/or both 41.102C and 41.102D; all should be at Level III if proceeding to Honours
1 General Studies elective

Year 4
41.103

tt See footnote to program 0101.

0241
Biochemistry/Chemistry

See 0241 Chemistry/Biochemistry

4142
Biochemistry/Biotechnology

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.041
1 General Studies electivett
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
42.101
44.101
1 General Studies elective
Choose 1 unit from Table 1

Year 3
41.102A
42.102A, 42.102B
1 General Studies elective
Choose 4 units from Table 1 including either
41.102B &/or both 41.102C and 41.102D; all should be Level III if proceeding to Year IV

Year 4
41.103 or
42.103

tt See footnote to program 0101.

4143
Biochemistry/Botany

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.041
1 General Studies electivett
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
43.111
1 General Studies elective
Choose at least 2 units from:
43.101, 43.131, 17.012

Year 3
41.102A, 41.102C, 41.102D
43.122
1 General Studies elective
Choose 3 Level III Botany units

Year 4
41.103 *or* 43.103

†† See footnote to program 0101.

Year 2
2.002B
41.101, 41.111
45.101, 45.201, 45.301
1 General Studies elective
Choose one unit from:
2.002A, 2.002D, 2.042C
17.012
43.101

Year 3
41.102A, 41.102B
1 General Studies elective
Choose 4 Level III Zoology units from Table 1

Year 4
41.103 *or*
45.103

†† See footnote to program 0101.

4144
Biochemistry/Microbiology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
44.101, 44.121
1 General Studies elective
Choose 1 unit from Table 1

Year 3
41.102A
44.102, 44.112
1 General Studies elective
Choose *either* 41.102B *or* both 41.102C and 41.102D

Year 4
41.103 *or* 44.103

†† See footnote to program 0101.

4145
Biochemistry/Zoology

Year 1
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††
Choose 2 Level I units from Table 1

4162
Biochemistry and Science Policy Studies§

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
41.101, 41.111
2.002B
62.052, 62.062
Choose 1 unit from:
62.012, 62.022, 62.032
Choose 1 unit from Table 1

Year 3
41.102A
41.102B *or* both 41.102C + 41.102D
*½ General Studies elective**
Choose 3 units from:
62.012, 62.032, 62.033, 62.072, 62.082, 62.093, 62.106,
Choose 1 unit from:
15.001, 15.703, 15.753

Year 4
41.103 *or*
62.024

§ This program is intended for students wishing to major in Biochemistry and at the same time acquire an understanding of the social dimensions of science and the role of science in the economy. It also provides elements of a training in science policy studies, important for those wishing to engage in administration and policy-making in science and technology. Honours students may complete a thesis in either Biochemistry or an aspect of science policy.

* 26.251, 26.2506, 26.561, 26.564, 26.817 may not be included in program.

†† See footnote to program 0101.

4170
Biochemistry/Anatomy†

Year 1*
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††
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
70.011A, 70.011C
1 General Studies elective
73.121 or 73.111** *or* choose 1 or 2 units from:
2.002A, 2.002D, 2.042C, 70.011B

Year 3
41.102A, 41.102B
70.012B, 70.304
1 General Studies elective
Choose 2 units from:
70.011B, 70.305, 70.306, 70.307, 70.012C

Year 4
41.103 *or* 70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 4170 is based on academic performance in Year 1.

** Entry to 73.111 requires the approval of the Head of the School of Physiology and Pharmacology.

† Owing to timetabling difficulties this program may take longer than minimum time to complete.

†† See footnote to program 0101.

4173
Biochemistry/Physiology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
73.111
1 General Studies elective
Choose 2 units from Table 1

Year 3
41.102A, 41.102B
73.012
2 General Studies electives

Year 4
41.103 *or* 73.103

†† See footnote to program 0101.

Biotechnology

Students wishing to undertake training in biotechnology may do so by combining such training with a major in microbiology (Program 4244), biochemistry (Program 4142), chemistry (Program 0242) or another discipline (Program 4201).
All four programs can be extended to a fourth (honours) year which comprises further formal training, as well as research, in biotechnology. Alternatively, students with no previous training in biotechnology may undertake the honours year provided they have completed the necessary background training in biochemistry and microbiology. In such cases, Level III biotechnology units constitute the formal component of the honours year.

4201
Biotechnology (General)

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B *and* 10.021C
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
41.101
42.101
44.101
1 General Studies elective
Choose 3 units from Table 1

Year 3
42.102A, 42.102B
1 General Studies elective
Choose 6 units from Table 1, at least two of which are Level III; all should be Level III if proceeding to Year IV

Year 4
42.103

†† See footnote to program 0101.

0242
Biotechnology/Chemistry

See 0242 Chemistry/Biotechnology

4142
Biotechnology/Biochemistry

See 4142 Biochemistry/Biotechnology

4244
Biotechnology/Microbiology

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B and 10.021C
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
41.101
42.101
44.101, 44.121
1 General Studies elective
Choose 2 units from Table 1

Year 3
42.102A, 42.102B
44.102, 44.112
1 General Studies elective
Choose 2 units from Table 1; these should both be Level III if
proceeding to Year IV

Year 4
42.103 or 44.103

†† See footnote to program 0101.

Botany

4306
Botany with Zoology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
43.111
45.101, 45.201, 45.301
Choose at least 2 of:
17.012 (or 27.111)
43.101, 43.131
Choose remaining units from Table 1

Year 3
1 General Studies elective
Choose at least 7 units from Table 1 including at least 4 Level
III Botany units. Students wishing to enter the Honours program
must complete 8 Level III units.

Year 4
43.103

†† See footnote to program 0101.

4309
Botany

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B and 10.021C
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
43.111
1 General Studies elective
Choose at least 2 of:
17.012 (or 27.111)
43.101, 43.131
Choose other units from Table 1

Year 3
1 General Studies elective
Choose at least 7 units from Table 1 including at least 4 Level
III Botany units. Students wishing to enter the Honours program
must complete 8 Level III units.

Year 4
43.103

†† See footnote to program 0101.

2543
Botany & Zoology/Geology

See 2543 Geology with Botany & Zoology

2743
Science Geography/Botany

See 2743 Botany/Geography

4143
Botany/Biochemistry

See 4143 Biochemistry/Botany

4344
Botany/Microbiology

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
or
10.021B and 10.021C
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units in Table 1

Year 2
41.101
44.101, 44.121
1 General Studies elective
Choose at least 2 units from:
17.012
43.111, 43.101

Year 3
43.131, 43.102 &/or 43.132 &/or 43.192
44.102, 44.112
1 General Studies elective
Choose other Level III units in Botany to complete a total of 7
Level III units. Students wishing to enter the Honours program
must complete 8 Level III units.

Year 4
43.103 or 44.103

†† See footnote to program 0101.

4345
Botany/Zoology

Year 1
2.121 and 2.131, or 2.141
10.001, or 10.011
or
10.021B and 10.021C
17.031, and 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
43.111 and 2 of 43.101, 43.131, 17.012
45.101, 45.201, 45.301
1 General Studies elective
Choose either 41.101 or at least 2 Level II units from one of the
following Schools: Chemistry, Physics, Geography, Geology,
or Mathematics

Year 3
1 General Studies elective
Choose 8 Level III units, 4 from Botany and 4 from Zoology.
Students wishing to enter the Honours program must complete
8 Level III units.

Year 4
43.103 or 45.103

†† See footnote to program 0101.

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.

All programs in microbiology require students to take basic courses in Chemistry, Mathematics and Biology in year 1, as well as 41.101 Introductory Biochemistry in Year 2. Program 4401 includes the maximum number of units of microbiology whereas program 4404 gives a minimum program for a major in the subject with the maximum opportunity for choice of other subjects. Other single major (4402 and 4403) and double major (4144, 4244 and 4344) programs are available.

4402
Microbiology (Immunology)

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101
44.101, 44.121
70.011A
1 General Studies elective
Choose 1 unit from Table 1

Year 3
41.102A
44.102, 44.112, 44.122
1 General Studies elective
Choose one unit from Table 1 or 70.304

Year 4
44.103

†† See footnote to program 0101.

4401
Microbiology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101
44.101, 44.121
1 General Studies elective
Choose 2 units from Table 1

Year 3
41.102A
44.102, 44.112, 44.132
1 General Studies elective
Choose 1 unit from:
42.102
44.122

Year 4
44.103

†† See footnote to program 0101.

4403
Microbiology (Ecology)

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
17.012
41.101
44.101, 44.121
45.201
1 General Studies elective
Choose 1 unit from:
43.111, 43.131

Year 3
43.132, 43.142, 43.172
44.102, 44.112
45.112
1 General Studies elective

Year 4
44.103

†† See footnote to program 0101.

4404
Microbiology (General)

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
41.101
44.101, 44.121
1 General Studies elective
Choose 3 units from Table 1

Year 3
44.102, 44.112
1 General Studies elective
Choose 4 units from Table 1

Year 4
44.103

†† See footnote to program 0101.

4144
Microbiology/Biochemistry

See 4144 Biochemistry/Microbiology

4244
Microbiology/Biotechnology

See 4244 Biotechnology/Microbiology

4344
Microbiology/Botany

See 4344 Botany/Microbiology

Zoology

The study of zoology as such does not begin until the second year of the Science and Mathematics course, but is built on a foundation of the two biological units: Cell Biology and Biology of Higher Organisms supported by chemistry and mathematics. The four Level II units are Invertebrate Zoology, Vertebrate Zoology, Insect Structure and Classification, and Biometry (ie statistical methods and their application to biology).

There is a number of Zoology Level III units covering a wide range of topics: Marine Ecology, Evolutionary Theory, Animal Behaviour, Ecological Physiology, General and Reproductive Biology, Advanced Invertebrate Zoology, Vertebrate Zoogeography, Population and Community Ecology, Insect Physiology and Insects and Man.

There are many programs leading to a major in zoology in the Science and Mathematics course. The individual programs are constructed either on a broad zoological base with some degree of specialization at Level III (eg 4502 Entomology, 4508 Zoology (Population Biology), 4514 Zoology (Fisheries and Wildlife Biology), or constructed to give a useful combination of Zoology with some other discipline (eg 4509 Zoology with Mathematics, 4145 Zoology with Biochemistry, 4570 Zoology with Anatomy.

Students who are unsure of their area of specialization are advised to enrol in 4501 Zoology (General) as this is the most flexible of the Zoology programs.

In these programs, at Level II, students usually take Vertebrate Zoology and Invertebrate Zoology and those students who wish to specialize in Entomology should include Insects amongst the units which they choose. Students are also required to study Biometry and two Level II units of either Biochemistry or Chemistry, or Mathematics or Physics or Geology or Geography. Students whose interests are mainly biological are encouraged to make their choice Biochemistry. Other units are then chosen to make up a total of at least seven for the year. The areas from which these units are chosen will depend mainly on the student's interests and on the specific program being undertaken. Examples of some of the units which Zoology students often include in their programs are: General Ecology, Introductory Microbiology, Flowering Plants, Plant Physiology, Genetics, Control Mechanisms, Organic Chemistry, Analytical Chemistry, Physiology and Mathematics.

A major in zoology requires the study of at least four zoology units at Level III. Again the nature of these is determined by the program being followed. For instance, those who are interested in Physiology, would probably include Ecological Physiology, General and Reproductive Biology, Animal Behaviour and Environmental and Social Biology of Invertebrates amongst their units; those interested in Entomology would include Insect Physiology, Economic Zoology and Project (Entomology) and those interested in Ecology might include Marine Ecology, Population and Community Ecology, Evolutionary Theory and Vertebrate Zoogeography. Additional units may be chosen either from those offered by the School of Zoology or by other schools to make up the total of seven or eight units required lby the regulations of the Science and Mathematics course. The above are only a few suggestions as to the choices that might be made.

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 and a research project.

4501
Zoology (General)

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
45.101, 45.201, 45.301
1 General Studies elective
Choose 5 units from Table 1 including at least 2 Level II units from one of the following Schools:
Biochemistry, Chemistry, Physics, Geography, Geology or Mathematics

Year 3
1 General Studies elective
Choose 7 units from Table 1 including at least 4 units from:
45.112, 45.121, 45.122, 45.132, 45.142, 45.152, 45.202, 45.302, 45.422
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103

†† See footnote to program 0101.

4502
Entomology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
41.101
45.101, 45.402
45.201 *or* 45.301
1 General Studies elective
Choose 3 Level II units from: Zoology, Botany, Microbiology or Mathematics

Year 3
45.412, 45.422, 45.432
1 General Studies elective
Choose 4 Level III units from: Zoology, Botany, Microbiology, Mathematics or 79.201
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103

†† See footnote to program 0101.

4508
Zoology (Population Biology)

Year 1
2.121 & 2.131, *or* 2.141
6.611
10.001 *or* 10.011
17.031, 17.041
1 General Studies elective††
Choose 1 unit from Table 1 *

Year 2
6.621
17.012
43.101
45.301, 45.402
45.101 *or* 10.331
1 General Studies elective
Choose 2 units from:
10.031
43.111
44.101
45.201

Year 3
43.152
45.121, 45.122, 45.152, 45.302
79.201
1 General Studies elective
Choose at least 2 units from:
6.646
10.032
43.102, 43.172
45.112, 45.202
79.302
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103

†† See footnote to program 0101.
* A laboratory computing unit is preferred.

4509
Zoology with Mathematics

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
10.111A, 10.1113 & 10.1114, 10.2111 & 10.2112
45.201, 45.301
1 General Studies elective
Choose 3 units from Table 1 including at least 1 Level II Statistics unit

Year 3
1 General Studies elective
Choose 4 Level III Zoology units
Choose at least 3 Level III Mathematics units
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103

†† See footnote to program 0101.

2543
Zoology & Botany/Geology

See 2543 Geology with Botany & Zoology

4514
Zoology (Fisheries and Wildlife Biology)

Year 1
2.121 & 2.131, or 2.141
10.001 or 10.011
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
17.012
43.111
45.101, 45.201, 45.301
1 General Studies elective
Choose 3 units from Table 1, including at least 2 Level II units from one of the following Schools:
Biochemistry, Chemistry, Physics, Mathematics, Geography or Geology

Year 3
Choose at least 4 units from:
45.112, 45.121, 45.152, 45.302, 45.422
1 General Studies elective
Choose at least 2 units from:
43.152, 43.172, 45.122, 45.132, 45.402 to make a total of at least 7 Level III units
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103

†† See footnote to program 0101.

4543
Entomology and Plant Pathology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
41.101
43.101, 43.131, 43.132
44.101
45.402
45.201 or 45.301
1 General Studies elective

Year 3
45.101, 45.412, 45.422, 45.432
1 General Studies elective
Choose at least 3 Level III Zoology or Botany units
Students wishing to enter the Honours program must complete 8 Level III units

Year 4
45.103 or 43.103

†† See footnote to program 0101.

4145
Zoology/Biochemistry

See 4145 Biochemistry/Zoology

4570
Zoology/Anatomy

Year 1*
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††
Choose 2 Level I units from Table 1

Year 2
45.101, 45.301
70.011A, 70.011C
1 General Studies elective
Choose 3 units from Table 1 or Table 2 for program 4570,
including 2 units from one of the following Schools:
Biochemistry, Chemistry, Geology, Mathematics or Physics

Year 3
70.021B
1 General Studies elective
Choose 4 units from:
70.011B, 70.012C, 70.304, 70.305, 70.306, 70.307
Choose 4 Level III Zoology units from Table 1

Year 4
45.103 or
70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program
4570 is based on academic performance in Year 1.

†† See footnote to program 0101.

7345
Physiology/Zoology

See 7345 Zoology/Physiology

History and Philosophy of Science

Students may take courses within the School of History and
Philosophy of Science leading to the award of pass or honours
degrees in History and Philosophy of Science. There are also
programs leading to joint majors in HPS with Physics, Geology,
Botany, Zoology or Anatomy, and students in such programs
may proceed to honours level in either HPS or the relevant
science subject. In addition, there are programs (0162, 0262,
4162) in which students may combine courses in Science Pol-
icy Studies with science subjects.

Courses in HPS are quite different from ordinary science sub-
jects. 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. Philosophi-
cal problems engendered by science are also discussed. And
considerable attention is given to the social structure of science
and the way in which science and technology fit into modern
society, both in industrial and developing countries.

The programs where emphasis is laid on science policy issues
are intended for students wishing to qualify themselves as
science policy advisers. Training is provided therefore in both
science, 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 Studies (for example,
museum work, science journalism, tertiary teaching, govern-
ment 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 pro-
grams 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.

6200**
History and Philosophy of Science

Year 1
10.001 or 10.011
or
10.021B & 10.021C
1 General Studies elective††
Choose at least 6 Level I units from Table 1

Year 2
62.012, 62.022, 62.032
*1 General Studies elective**
Choose at least 4 units from Table 1

Year 3
*2 General Studies electives**
Choose 8 units from Table 1 including 4 units from:
History and Philosophy of Science units
52.218,
or 52.2030 and 52.2031

Year 4
62.014

* 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.
** Students wishing to undertake a co-major in History and Philosophy of Science *and* Chemistry may do so by enrolling in program 6200 and choosing appropriate Chemistry units from Table 1.

†† See footnote to program 0101.

6201
History and Philosophy of Science/ Physics

Year 1
1.001 *or* 1.011
10.001 *or* 10.011
2.121 & 2.131, *or* 2.141
*1 General Studies elective** ††
Choose 2 Level I units from:
5.010, 5.030
17.031, 17.041
25.110, 25.120

Year 2
1.002, 1.012, 1.022, 1.032
10.2111 *and* 10.2112
*1 General Studies elective**
62.012, 62.032, and 1 additional HPS unit from Table 1**

Year 3
1.0133, 1.0143, 1.023, 1.0333, 1.0343, 1.043
*1 General Studies elective**
Choose 3 HPS units from Table 1**
or
Choose 2 HPS units from Table 1 and 10.1113 and 10.1114

Year 4
Either
1.104***
or
62.014***

* 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.

†† See footnote to program 0101.

** 62.033, which is normally only available in alternate years, must be taken in *either* Year 2 *or* Year 3.

*** Students taking Honours Physics are required, as part of their program, to undertake a project under the aegis of the School of History and Philosophy of Science. Students taking Honours History and Philosophy of Science are required, as part of their program, to undertake a project under the aegis of the School of Physics.

6225
History and Philosophy of Science/ Geology

Year 1
1.001 (*or* 1.011) *or* 17.031 & 17.041
2.121 & 2.131, *or* 2.141
10.001 (*or* 10.011) *or* 10.021B & 10.021C
25.110, 25.120
1 General Studies elective

Year 2
25.211, 25.221, 25.212
62.012, 62.032, 62.103
1 General Studies elective††
Choose 2 units from Table 1

Year 3
1 General Studies elective
25.311, 25.312, 25.326
Choose *either* 4 HPS units from Table 1
or
3 HPS units from Table 1 and *one of* 25.314, 25.324 or 25.325

Year 4
62.014

†† See footnote to program 0101.

* 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.

6243
History and Philosophy of Science/ Botany

Year 1
2.121 & 2.131, *or* 2.141
10.001 (*or* 10.011) *or* 10.021B and 10.021C
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
43.101, 43.111
62.012, 62.032, 62.104 and one additional unit from Table 1
*1 General Studies elective**
Choose 2 units from Table 1

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

Year 4
Either
62.014
or 43.103

* 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.
†† See footnote to program 0101.

6245
History and Philosophy of Science/Zoology

Year 1
2.121 & 2.131, *or* 2.141
10.001 (*or* 10.011) *or* 10.021B and 10.021C
17.031, 17.041
1 General Studies elective * ††
Choose 2 Level I units from Table 1

Year 2
45.101, 45.201 (*or* 45.402), 45.301, 43.101
62.012, 62.032
62.106 *or* 62.109 *or* 62.104
1 General Studies elective *

Year 3
45.121, 45.302, 45.422
Choose 1 Level III Zoology unit from Table 1
Choose 4 HPS units from Table 1
1 General Studies elective *

Year 4
Either
62.014
or
43.103

* 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.

†† See footnote to program 0101.

0162
Science Policy Studies and Physics

See 0162 Physics and Science Policy Studies

0262
Science Policy Studies and Chemistry

See 0262 Chemistry and Science Policy Studies

4162
Science Policy Studies and Biochemistry

See 4162 Biochemistry and Science Policy Studies

6270
History and Philosophy of Science/Anatomy

Year 1*
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††
Choose 2 Level I units from Table 1

Year 2
62.012, 62.032, *and either* 62.104 *or* 62.106** *or* 62.109**
70.011A, 70.011B, 70.011C
1 General Studies elective†
Choose 1 unit from Table 1

Year 3
70.021B
1 General Studies elective†
Choose 4 History and Philosophy of Science units from Table 1
Choose 3 units from:
70.012C, 70.304, 70.305, 70.306, 70.307

Year 4
Either
62.014
or
70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 6270 is based on academic performance in Year 1.

†† See footnote to program 0101.

** 62,106 *or* 62,109 must be taken in Year 3 unless completed in Year 2.

† 26.251, 26.2506, 26.561, 26.564, 26.568, 26.817 may not be included in this program.

Board of Studies in Science and Mathematics

6801
For Anatomy Programs

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

Enrolment in Year 2 of programs 1270, 4170, 4173, 4570, 6270, 7001, 7002, 7003, 7073, 7301, 7302, 7303, 7312, 7345 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.

†† See footnote to program 0101.

6806
For Computer Science Programs

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

†† See footnote to program 0101.

** In Year 1 students must enrol in program 6806. Enrolment in Year 2 of programs 0601, 0610, 0611 and 1401 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.

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, 1.913 Marine Acoustics and Seismic Methods and 10.411A 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 25.613 Geological Oceanography, 25.612 Estuarine Geology, 25.6341 Marine Mineral Deposits, 25.6342 Exploration & Seismic methods and 25.633 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.

Mathematics/Marine Science

Mathematics/Marine Science Honours

See 6831 Marine Science (Physical Oceanography) and attached note relating to dual major with Mathematics

6831
Marine Science
(Physical Oceanography)

Year 1
1.001 or 1.011
10.001 or 10.011
1.041 or 6.611
1 General Studies elective††
Choose 2 units from two of the groups **1.**, **2.**, **3.**
1. 2.121 & 2.131, or 2.141
2. 17.031, 17.041
3. 25.110, 25.120
Choose 10.081 or one extra unit from groups **1.**, **2.** or **3.**

Year 2
68.302
10.2111 and 10.2112
10.1113 & 10.1114
1.012 or 10.411B
1 General Studies elective
Choose at least 4 units from Table 1 including the units required
from 2 of the groups **1.**, **2.** and **3.** chosen in Year 1:
1. 2002A
2. At least one unit from 17.012 or 45.152 or 43.111
3. 25.621

Year 3
68.313
10.411A or 10.421A
25.6342
10.412D* or 10.422D*
10.412A
1 General Studies elective
Choose 2 units** from 1.022, 1.032, 1.033, 1.042, 1.133
10.212A, 10.412B, 10.422A*, 10.331
45.112 or 25.631 or 25.632 or 2.043A
or 43.172 or 25.635

Year 4
63.304

* If 10.411A or 10.421A is taken in Year 2, 3 units must be chosen from this group.

* Prerequisite for Year 4 in this program.

Note: Students may fulfil requirements of a Marine Science Mathematics program by completing 10 mathematics units in the above program.

†† See footnote to program 0101.

6832
Marine Science
(Biological Oceanography)

Year 1
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††
Choose 2 units from group **1.** or **2.**
1. 1.001 or 1.011 or 1.021
2. 25.110, 25.120
or 27.801 and 27.811

Year 2
2.002A
43.111
44.101
45.201 or 41.101
68.302
1 General Studies elective
Choose at least 1 unit from:
17.012, 41.101, 44.121, 45.101, 45.201, 45.301
*Choose 1 unit from subjects related to units of groups **1.** and
2. chosen in Year 1:
1. 10.031 or 10.331 or 10.301
2. 25.622

Year 3
43.172
45.112
1 General Studies elective
*Choose at least 5 units from Table 1, at least 2 of which are
Level III which may include subjects related to units from the
groups **1.** and **2.** chosen in Year 1:
1. 68.313, 10.032
2. 25.632

Year 4
68.304

* A total of at least 23 units must be completed in Years 1–3 in this program.

†† See footnote to program 0101.

6833
Marine Science (Earth Science
Oceanography)

Year 1
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120
1 General Studies elective††
Choose 4 units from 2 of the groups **1.**, **2.** and **3.**
1. 1.001 or 1.011 or 1.021
2. 17.031, 17.041
3. 2.121 & 2.131, or 2.141

Year 2
68.302
25.621, 25.622
1 General Studies elective
Choose at least 4 units from Table 1 including the units required
from 2 of the groups **1.**, **2.** and **3.** chosen in Year 1:
1. 10.031 or 10.331 or 10.301
2. At least 1 unit from:
17.012
43.111
45.201
3. 2.002A

Year 3
25.631, 25.632, 25.6341, 25.6342, 25.635
1 General Studies elective
Choose 4 units from Table 1 which *may* include units from 2 of
the groups **1.**, **2.** and **3.** chosen in Year 1:
1. 68.313, 10.032
2. 43.172
45.112
3. 2.043A

Year 4
68.304

†† See footnote to program 0101.

6834
Marine Science (Environmental Chemistry)

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
1 General Studies elective††
Choose 4 units from 2 of the groups **1.**, **2.** and **3.**
1. 1.001 *or* 1.011
2. 17.031, 17.041
3. 25.110, 25.120
or 27.801 and 27.811

Year 2
68.302
2.002A, 2.002D
1 General Studies elective
Choose at least 4 units from Table 1 including the units required
from 2 of the groups **1.**, **2.** and **3.** chosen in Year 1:
1. 10.031 *or* 10.331
2. At least 1 unit from:
17.012
43.111
45.201
3. 25.622

Year 3
2.043A, 2.003D
1 General Studies elective
Choose 6 units including at least 2 at Level III which *may* in-
clude units required from 2 of the groups **1.**, **2.** and **3.** chosen in
Year 1:
1. 68.313, 10.032
2. 43.172
45.112
3. None

Year 4
68.304

†† See footnote to program 0101.

Genetics

The Genetics program is designed to provide students with a
firm foundation of genetical knowledge and also give them ex-
perience in pertinent related areas.
Because the subject matter of Genetics ranges from the struc-
ture of viruses to the coevolution of populations, students are
encouraged to choose between three sequences: molecular
and microbial, population and ecological, and classical and
organismal. The three groups 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, Psy-
chology, Geography, and units in the laboratory applications of
computers. Experience with laboratory computers is an asset
in many areas of genetics.
Entry into a fourth (Honours) year is available, for above-
average students, upon application to the Genetics Program
Committee.

6840
Genetics

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
17.031, 17.041
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
41.101
43.101*
44.101
1 General Studies elective
Choose 1 unit from:
43.111, 43.131, 44.121
45.201, 45.301, 45.401
Choose 1 unit from:
10.331
45.101
Choose 2 units from one of the groups **1.**, **2.** *or* **3.**
1. 2.002B
41.111
2. 6.611
17.012
79.402
3. 43.111 *or* 43.131
45.201 *or* 45.402
45.301 *or* 9.801
62.104
79.402

Year 3
1 General Studies elective
Choose 4 units from:
9.802
43.102
44.102
45.121
79.201, 79.302
Choose 4 units of the following:
6.646
6.621
9.811
41.102A
43.112
44.122
79.202, 79.403

Year 4
68.404

†† See footnote to program 0101.

* Students who complete the subject 43.101 in Year 1 of the program should choose a replacement in Year 2.

Chemical Physics

The development of modern chemistry and physics has been such that there is no clearly defined boundary between the two subjects and problems in one area frequently require a thorough knowledge of the other. To cater for this situation, a set of programs in the subject area of Chemical Physics has been included in the Science and Mathematics Course 3970. These programs enable specialization in experimental and theoretical aspects of such topics as: structure and properties of materials, atoms and molecules; quantum theory and statistical mechanics; spectroscopic techniques; lasers and their applications in physics and chemistry; physical processes at interfaces (solid/gas, liquid/gas, and solid/liquid). The programs also incorporate a solid background of mathematics to support the theoretical component of the programs.

There are three programs:
- 6851 Chemical Physics (Chemistry/Physics)
- 6852 Chemical Physics (Chemistry/Mathematics)
- 6853 Chemical Physics (Physics/Mathematics)

After a common first year, the three programs diverge in Year 2 to enable emphasis on subjects from two of the three contributing Schools (Physics, Chemistry, and Mathematics). Units 1.012, 1.022, 2.002A, 2.013A, 10.111A/10.121A, 10.2111/10.2211, and 10.2112/10.2212 form a core for all programs in Year 2. In Year 3, a core of four subjects (1.023, 2.023A, 2.063A, 68.503) is presented together with 3 or more Level III units offered by the three contributing Schools. The programs lead directly to a fourth (honours) year of study and research which may be taken in either of the Schools of Physics or Chemistry.

6851
Chemical Physics (Chemistry/Physics)

Year 1
1.001 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
1 General Studies elective††
Choose 2 Level 1 units from Table 1

Year 2
1.012, 1.022, 1.032
2.002B *or* 2.002D *or* 2.042C
2.002A, 2.013A
10.111A *or* 10.121A,
10.2111 *and* 10.2112
or
10.2211 *and* 10.2212
1 General Studies elective

Year 3
1.023
2.023A, 2.063A
68.503
1 General Studies elective
Choose at least 3 Level 3 units, offered by Schools of Physics, Chemistry and Mathematics, from Table 1 *

Year 4
68.504

†† See footnote to program 0101.

* The minimum of 7 level III units may not include 1.0133 or 2.003A. Students intending to proceed to Year 4 are required to consult with the Chemical Physics Program Committee and with the appropriate schools in order to receive approval for the units selected.

6852
Chemical Physics (Chemistry/ Mathematics)

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
1 General Studies elective††
Choose 2 Level I units from Table 1

Year 2
1.012, 1.022
2.002B or 2.002D or 2.042C,
2.013A, 2.002A
10.111A or 10.121A,
10.1113 and 10.1114,
or 10.1213 and 10.1214,
10.2111 and 10.2112,
or 10.2211 and 10.2212
1 General Studies elective

Year 3
1.023
2.023A, 2.063A
68.503
1 General Studies elective
Choose at least 3 Level III units, offered by Schools of Physics, Chemistry and Mathematics, from Table 1 *

Year 4
68.504

†† See footnote to program 0101.
* See footnote to program 6851.

6853
Chemical Physics (Physics/ Mathematics)

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011
1 General Studies elective††
Choose 2 Level I units from Table 1.

Year 2
1.012, 1.022, 1.032
2.002A, 2.013A
10.111A or 10.121A,
10.1113 and 10.1114,
or 10.1213 and 10.1214,
10.2111 and 10.2112,
or 10.2211 and 10.2212
1 General Studies elective

Year 3
1.023
2.023A, 2.063A
68.503
1 General Studies elective
Choose at least 3 Level III units, offered by Schools of Physics, Chemistry and Mathematics from Table 1 *

Year 4
68.504

* See footnote to program 6851.
†† See footnote to program 0101.

1401
Commercial Information Systems with Computer Science

Year 1*
6.611
10.001 (or 10.011)
1 General Studies elective††
5 further units from Table 1 or Table 2 excluding 14.501 for program 1401 (strongly recommended is 10.081)

Year 2
6.621
6.641
14.501
14.511
14.602
14.603
10.331 (or 10.311A)
1 General Studies elective
Further units from Table 1 or Table 2 for 1401 to make 8 in all

Year 3
14.605
14.607
14.608
14.522
1 General Studies elective
3 further units, with at least one at Level III, from Table 1 or Table 2 for program 1401, or 14.611

* In year 1 students must enrol in program 6806. Enrolment in Year 2, in program 1401 is based on academic performance in Year 1.

†† See footnote to program 0101.

Anatomy

There are 8 Anatomy programs: double major in Anatomy (7001), single majors in Anatomy (7002, 7003), and double majors with Psychology (1270), Biochemistry (4170), Zoology (4570), History and Philosophy of Science (6270) and Physiology (7073).

Entry to Anatomy programs is limited to a quota of approximately 80. Students in Year 1 should enrol in Program 6801, and apply in October for entry to Anatomy the following year. Selection is based on academic merit. Allowance is made for the relative difficulty of first year units in Mathematics and Physics. Part-time students are advised to seek advice.

Students intending to proceed to a graduate course at the Cumberland College of Health Sciences should enrol in either 7003 (for Physiotherapy) or 1270 (for Occupational Therapy). Chiropractic students should enrol in 7002, choosing options as required by the Chiropractic College.

All Anatomy units are in Table 2, and in Course 3970 are unavailable outside Anatomy programs, except for students who:
- are enrolled in programs 4402 (Immunology) or 6840 (Genetics) who may take 70.011A and either 70.304 or 70.3041; or
- obtain special permission.

Students studying paramedical subjects (eg Biochemistry, Psychology, Physiology) and who wish to take one or more Anatomy units as options should consult the Head of School.

7001
Anatomy
Double Major

Year 1*
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††
Choose 2 Level I units from Table 1

Year 2
70.011A, 70.011B, 70.011C
1 General Studies elective
Choose at least 4 units from Table 1

Year 3
70.012B, 70.012C, 70.304, 70.305, 70.306, 70.307
1 General Studies elective
Choose at least 2 units from Table 1

Year 4
70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7001 is based on academic performance in Year 1.

†† See footnote to program 0101.

7002
Anatomy
Single Major

Year 1*
10.001 or 10.011
or 10.021B & 10.021C
17.031, 17.041
1 General Studies elective††
Choose 4 Level I units from Table 1

Year 2
70.011A, 70.011C
1 General Studies elective
Choose at least 5 units, from Table 1 *and/or* Table 2†

Year 3
1 General Studies elective
Choose 8 units, including at least 4 units from:
70.011B, 70.012B, 70.012C, 70.304, 70.305, 70.306, 70.307
and the remainder from Table 1

Year 4
70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7002 is based on academic performance in Year 1.

†† See footnote to program 0101.

† Table 2 Anatomy units only.

7003
Anatomy (Kinesiology)

Year 1*
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††
Choose 2 units from 1 of the groups **1.** and **2.**
1. 1.001, 1.021
2. 12.100

Year 2
70.011A, 70.011B, 70.011C
73.121 or 73.111†
1 General Studies elective
Choose 1 unit from Table 1 (not Level I)
Choose 2 units from the appropriate group:
1. 1.001, 1.021
2. 12.100

Year 3
70.012B, 70.012C, 70.306, 70.307
1 General Studies elective
Choose at least 3 units from Level II or Level III Table 1, or 70.304, 70.305

Year 4
70.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7003 is based on academic performance in Year 1.

†† See footnote to program 0101.

† Entry to 73.111 requires the approval of the Head of the School of Physiology and Pharmacology.

1270
Anatomy/Psychology

See 1270 Psychology/Anatomy

4170
Anatomy/Biochemistry

See 4170 Biochemistry/Anatomy

4570
Anatomy/Zoology

See 4570 Zoology/Anatomy

6270
Anatomy/History and Philosophy of Science

See 6270 History and Philosophy of Science/Anatomy

7073
Anatomy/Physiology

Year 1*
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††
Choose 2 Level I units from Table 1

Year 2
41.101
41.111
70.011A, 70.011C
73.111
1 General Studies elective
Choose 70.011B, 70.012B, 70.304 or 1 unit from Table 1

Year 3
73.012
1 General Studies elective
Choose 4 units from:
70.011B, 70.012B, 70.012C, 70.304, 70.305, 70.306, 70.307

Year 4
70.013 or 73.013

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7073 is based on academic performance in Year 1.

†† See footnote to program 0101.

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 IA (the core subject for students who intend to proceed to the study of Physiology at a higher level), or Physiology IB. 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 IA students are normally required to enrol concurrently in the second year level, Session 1 subject, Biochemistry.

Physiology II 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 IA (rather than IB), and of both of the Level 2 Biochemistry subjects. Physiology II 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 3 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. 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 II, or with Level 3 Biochemistry or Chemistry subjects. Pharmacology is also a full year subject.

Physiology II 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.

7301
Physiology
Single Major

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
41.101, 41.111
73.111
1 General Studies elective
Choose 3 units from Table 1

Year 3
73.012
1 General Studies elective
Choose 3–4 units from Table 1

Year 4
73.013

†† See footnote to program 0101.

Year 2
73.111 *or* 73.121
1 General Studies elective
Choose 6 units from Table 1

Year 3
73.022
1 General Studies elective
Choose 5 *or* 6 units from Table 1, including *either*
41.102A and 41.102B *or*
2.003J and 2.033A *or*
73.012

Year 4
73.023

†† See footnote to program 0101.

7302
Physiology/Chemistry

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

Year 2
73.111
2.002A, 2.002B,
2.042C *or* 2.002D
1 General Studies elective
Choose either 41.101 & 41.111
or 2.003J & 10.2111 & 10.2112

Year 3
73.012
2.003A, 2.003B, 2.033A, 2.053A
1 General Studies elective

Year 4
73.013 *or*
2.004

†† See footnote to program 0101.

7312
Physiology/Psychology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
12.100
1 General Studies elective††

Year 2
73.111
12.200, 12.201, 12.202
41.101, 41.111
1 General Studies elective

Year 3
73.012
1 General Studies elective
Choose 4 Level III units of Psychology†

Year 4
73.013 *or*
12.403

†† See footnote to program 0101.

† Students intending to take the honours course 12.403 Psychology IV (Research) must have these four Level III units approved by the Head of the School of Psychology.

7303
Pharmacology

Year 1
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††
Choose 2 Level I units from Table 1

7345
Physiology/Zoology

Year 1
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††
Choose 2 Level I units from Table 1

Year 2
73.111
45.101, 45.201, 45.301
41.101, 41.111
1 General Studies elective

Year 3
73.012
45.142, 45.132
1 General Studies elective
Choose 2 units from:
45.202, 45.121, 45.122

Year 4
73.013 *or*
45.103

†† See footnote to program 0101.

4173
Physiology/Biochemistry

See 4173 Biochemistry/Physiology

7073
Physiology/Anatomy

See 7073 Anatomy/Physiology

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 pre-requisite 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 completeing 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 7 January 1983.

Having completed Years 1 and 2 of course 3640 students in their third year complete a specific course of study consisting of four Level 3 Science units chosen from related disciplines, the appropriate General Studies electives and no less than four other Level 2 or Level 3 units, and otherwise accord with the rules of course 3970 leading to a major in Computer Science, Mathematics or Physics.

In their fourth and fifth years 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 School. Thus students who choose to omit the General Studies elective from their Year 3 BE program on this ground must still do a full year's work: that is, they would be expected to include some 4 session-hours of other material in lieu of the General Studies elective omitted.

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 (6.621), 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

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

Physics

1 General Studies elective

1.0133, 1.0143, 1.023, 1.0333, 1.0343

Choose 5 Level II or III units from Table 1, at least one of which must be at Level III and one must be 1.992 if 1.992 was omitted from Year 2

Year 4

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

Year 5

From Electrical Engineering Course

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† Students intending to major in Computing Science or Physics should include 6.641 or 1.992 respectively in their Year 2 enrolment.

* 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.

Physical Metallurgy and Chemistry

Year 1
1.981*
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

Year 2
2.002A, 2.042C
4.402, 4.502
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
4.503
8.273, 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

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 or 1.011 Higher Physics I. On successful completion of one of these latter subjects together with 2.981 Chemistry 1CE students will be exempted from one technical elective.

** Students who have not satisfied the science prerequisite for 2.981 Chemistry 1CE (ie 2 or 4 unit Science including Physics or Chemistry at HSC Exam percentile range 31–100) are advised to apply to enrol in two acceptable alternative subjects, 2.111 Introductory Chemistry and 2.121 Chemistry 1A.

*** 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.

Geography and Environmental Chemistry

Year 1
1.981*
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

Year 2
2.002A, 2.002D, 2.042C
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 elective†

Year 4
8.2731, 8.2732, 8.2733, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
27.153, 27.1711
1 ½ electives chosen from:
27.143, 27.183, 27.133, 27.862, 27.863, 27.1712

Year 5
2 electives†
Choose 2 units from Table 1 in the Combined Sciences Hand-book 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 course.

*,**,***,†: See footnotes Physical Metallurgy and Chemistry above.

Physics with Mathematics

Year 1
1.001 *or* 1.011
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

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
Choose 1 unit from:
1.133, 1.3233, 1.0533, 1.0133, 1.0143
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

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 unit 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 Physical Metallurgy and Chemistry above.

* See footnote to program 0101.

‡ See footnote to program 0125.

Mathematics

Year 1
1.981*
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

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
2. *Choose 3 units from:*
10.411B or 10.421B,
10.411A or 10.421A,
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 II/III) 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 Physical Metallurgy and Chemistry above.

†† 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*
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

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
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 subjects from the following:
25.311, 25.312, 25.314, 25.321, 25.324, 25.325, 25.326†.

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 Physical Metallurgy and Chemistry above.

†. Students enrolling in Level III subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

Computing with some Mathematics

Year 1
1.981*
2.981**
5.0102, 5.0201, 5.0301
8.170, 8.171, 8.271, 8.360, 8.670
10.001***

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, 6.649
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

Note: All material not in italic typeface refers to the BE degree component of this combined degree course.

*,**,***,†: See footnotes Physical Metallurgy and Chemistry above.

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 8) 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 electivett

Year 2
41.101
41.111*
70.011A, 70.011C
73.111
80.014**
1 General Studies electivett

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	General Studies elective	General Studies elective
	80.014**	80.014**	80.014**
	4 Level III Anatomy unitst	41.102A	73.012
		41.102B	
	together with:	together with:	together with:
Single Major		2 Level III	2 Level III
		Anatomy unitst	Anatomy unitst
	73.012F	73.012F	
	3 Elective units	1 Elective unit	2 Elective units
Double Major	3 Level III	4 Level III	4 Level III
with Anatomy	Anatomy unitst	Anatomy unitst	Anatomy unitst
	(makes total of 7)		
Double Major	41.102A	(double major	41.102A
with Biochemistry	41.102B	not available)	41.102B
Double Major	73.012	73.012	(double major
with Physiology			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 II.

** 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 degree; 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, 10.1153, 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, 10.312A, 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		
3	58.793	1½
4**	58.794	1
5**	58.795	4
	58.799	

* Average for 28 weeks.

** Students in Years 4 and 5 in 1983 should refer to the 1982 Combined Sciences Handbook since the minor modifications made to the course in 1983 apply only to students in Years 2 and 3 in 1983.

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* 10.2211, 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
or
10.423

† 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, 17.021 (or 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. 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		58.793,	58.794
	58.795,	58.799	

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 of 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 I *and/or* 2.121 Chemistry IA 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 I for Physics programs may satisfy prerequisites by completing 10.021B *or* 10.021A and 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		
3	58.793	1½
4**	58.794	1
5**	58.795	4
	58.799	

* Average for 28 weeks.

** Students in Years 4 and 5 in 1983 should refer to the 1982 Combined Sciences Handbook since the minor modification made to the course in 1983 apply only to students in Years 2 and 3 in 1983.

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 or 1.011
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
62.042, 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 0125.

* † See footnote to program 0101.

†† 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.

5802
Physics
Single Major†

Year 1
1.001 or 1.011
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
62.042, 1.002‡
Choose 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 0102.

‡ See footnote to program 0125.

†† 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.

5803
Applied Physics

Year 1
1.001 or 1.011
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
62.042, 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 0101.
‡ See footnote to program 0125.
†† See footnote to program 5801.

5805
Theoretical Physics

Year 1
1.001 or 1.011
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
1.002‡, 1.032, 62.042
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 0101.
‡ See footnote to program 0125.

5821
Chemistry Major

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
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
62.042
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 or 1.011
2.121 & 2.131, or 2.141
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
62.042

Year 3
Choose four out of the following:
25.311, 25.321, 25.312, 25.313, 25.314, 25.324, 25.325, 25.326

Year 4
Take the remaining 4 units of Level III Geology III not taken in Year 3

Year 5
25.400
25.404 or 25.405

5832
Geology
Single Major

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
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 two out of the following:
25.311, 25.312, 25.314, 25.321, 25.313, 25.324, 25.325, 25.326
62.042
Choose 1 unit from Table 1**

Year 4
Choose 2 units of Level III Geology
Choose 2 units from Table 1**

Year 5
25.406

** See this footnote to program 5802.

5841
Biochemistry

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

Year 2
2.002B
25.110, 25.120
41.101, 41.111
Choose 1 unit from Table 1**

Year 3
41.102A
62.042
Choose 1 unit from Table 1**

Year 4
Choose either
41.102B or 41.102C & 41.102D
Choose 2 units from Table 1**

Year 5
41.103

** See this footnote to program 5802.

5842
Microbiology and Biochemistry

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

Year 2*
2.002B
25.110, 25.120
41.101
44.101, 44.121

Year 3
41.102A, 41.102B, or 41.102C & 41.102D

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 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011 or 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
62.042

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 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011 *or* 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
62.042

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 *or* 1.011
2.121 & 2.131 *or* 2.141
10.001 *or* 10.011 *or* 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
62.042
Choose 3 units from Table 1**

Year 5
44.103

** See this footnote to program 5802.

5861
Microbiology

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

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
62.042

Year 5
44.103

5866
Zoology (General)

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

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
62.042
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 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011 *or* 10.021B & 10.021C
17.031, 17.041

Year 2
17.012
25.110, 25.120
43.101, 43.111
45.201, 45.301

Year 3
45.101
62.042
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 *or* 1.011
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011 *or* 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
62.042
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.

Chemistry

Year 1
1.001 or 1.011
2.121 & 2.131, or 2.141
10.001 or 10.011 or 10.021B & 10.021C
90.112, 90.711

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

Physics

Year 1
1.001 or 1.011
10.001 or 10.011
90.112, 90.711
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

Computer Science

Year 1
6.611
10.001 or 10.011
90.112, 90.711
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 from Table 1
Choose 2 other units of appropriate levels from Table 1

Mathematics

Year 1
10.001 *or* 10.011
90.112, 90.711
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
10.021B & 10.021C
12.100
90.112, 90.711
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
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120
90.112, 90.711

Geography

Year 1
10.001 *or* 10.011
or
10.021B & 10.021C
27.111*
or
27.801* & 27.802
90.112, 90.711
Choose 2 Level I units from Table 1

Year 2
27.811*, 27.812*, 27.2813, 27.2814
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 units from:
27.133, 27.143, 27.153, 27.183, 27.862, 27.863
Choose 2 units of appropriate levels from Table 1

* Students who choose 27.111 instead of 27.801 & 27.802 in Year 1 should omit 27.801 & 27.811 from their program and complete 27.802 & 27.812 in Years 2 and 3 respectively.

Biochemistry

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
90.112, 90.711

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 & 41.102D
90.216, 90.301, 90.621
Choose 2 units of appropriate levels from Table 1

Year 2 (Geology continued)
1.001 *or* 1.011
25.211, 25.221, 25.212, 25.223
90.141, 90.161

Year 3
Choose four subjects from the following:
25.311, 25.312, 25.314, 25.321, 25.313, 25.324, 25.325, 25.326
90.216, 90.301, 90.621
Choose 2 Level II *or* Level III units from Table 1

Botany

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
90.112, 90.711

Year 2
43.101, 43.111
90.141, 90.161
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 Botany units from Table 1
Choose 2 other units of appropriate levels from Table 1

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

Microbiology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
90.112, 90.711

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
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.031B & 10.021C
17.021, 17.041
90.112, 90.711

Zoology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
90.112, 90.711

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
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011
or
10.021B & 10.021C
17.031, 17.041
90.112, 90.711

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
10.021B & 10.021C
17.031, 17.041
90.112, 90.711
Choose one of the following:
1.001 *or* 1.011
2.121 & 2.131 *or* 2.141
25.110, 25.120
27.801 & 27.811

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
10.021B & 10.021C
17.031, 17.041
90.112, 90.711
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.

Physiology and Pharmacology

Year 1
2.121 & 2.131, *or* 2.141
10.001 *or* 10.011 *or* 10.021B & 10.021C
17.031, 17.041
90.112, 90.711

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).

School of Physics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Physics Level I								
1.001	Physics I	I	2	F	6	2 unit Mathematics (at HSC Exam percentile range 71-100) *or*	10.021C, *or* 10.011, *or* 10.011	
1.011	Higher Physics I	I	2	F	6	3 unit Mathematics (at HSC Exam percentile range 21-100) *or* 4 unit Mathematics (at HSC exam percentile range 1-100) *or* (for 1.001 only) 10.021B and 2 unit Science (incl. Physics *and/or* Chem.) (at HSC Exam percentile range 31-100) 4 unit Science (incl. Physics *and/or* Chem.) (at HSC Exam percentile range 31-100)	10.001 *or* 10.011	
1.021	Introductory Physics I* (For Health and Life Scientists)	I	2	F	6		10.021A *and* 10.021B, *or* 10.021B *and* 10.021C, *or* 10.001 *or* 10.011	

* For students who enrol in and successfully complete the subjects 1.021 Introductory Physics (2 units) and 1.001 Physics I (2 units) the total unit value of the combined subjects be counted as 3 units.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
1.041	Laboratory Computers in Physical Science	I	1	S1 or S2	6	As for 10.001	10.001 and 1.021 or 1.001 or 1.011	Programs 0601, 0610, 0611
1.952	Computer Applications in Experimental Science I	I	1	S2	6	6.611	1.001 10.001 or 10.011	1.041 1.042

Physics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
1.002	Mechanics, Waves and Optics	II	1	S1	4	1.001 or 1.011 10.001 or 10.011	10.2111	
1.012	Electromagnetism and Thermal Physics	II	1	S2	4	1.001 or 1.011 10.001 or 10.011	10.2111	
1.022	Modern Physics	II	1	F	2	1.001 or 1.011 10.001 or 10.011	10.2112	1.9322
1.032	Laboratory	II	1	F	3	1.001 or 1.011 10.001		1.9222
1.042	Measurement and Measurement Control Systems	II	1	S2	5	1.001 or 1.011, 10.001		1.9422, 1.962
1.052	Methods in Mathematical Physics	II	1	S2	4	1.001 or 1.011, 10.001 or 10.011	10.2111 (or 10.2211), 10.2112 (or 10.2212), 10.1113 (or 10.1213)	
1.9222	Electronics	II	½	S1	3	1.001 or 1.011 or 1.021		1.032
1.9322	Introduction to Solids	II	½	S2	3	1.001 or 1.011 or 1.021		1.022 4.402 4.412
1.9422	Introduction to Physics of Measurement	II	½	S1	3	1.001 or 1.011		1.042

Physics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
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	S1	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	4.043
1.3133	Electrical, Optical and Thermal Properties of Materials	III	½	S2	2		1.023	

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
1.3233	Measurement and Non-destructive Testing	III	½	S1	2	1.032		
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 10.411B) 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 I	III	1	F	4	1.032		
1.773	Laser and Optical Technology Laboratory II	III	1	F	4		1.763	

School of Chemistry

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.121	Chemistry IA	I	1	S1 or S2		2.111 or 2 unit Mathematics (at HSC Exam percentile range 71-100) or 3 unit Mathematics (at 21-100) or 4 unit Mathematics (at 1-100) and 2 unit Science (Physics or Chem) at HSC Exam percentile range 31-100 or 4 unit Science (Multistrand) at 31-100 or 2 unit Science (other than Physics or Chem) at 51-100		2.141
2.131	Chemistry IB	I	1	S1 or S2	6	2.111 or 2.121		2.141

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.141	Chemistry IM‡	I	2	F	6	2 unit Mathematics (at HSC Exam percentile range 71-100) *or* 3 unit Mathematics (at 21-100) *or* 4 unit Mathematics (at 1-100) and 2 unit Science (Physics or Chem) at HSC Exam percentile range 51-100 *or* 4 unit Science (Multistrand) at 51-100 *or* 2 unit Science (other than Physics or Chem) at 51-100		
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		
2.002B	Organic Chemistry	II	1	F *or* S1 *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		
2.003J	Fundamentals of Biological and Agricultural Chemistry	II/III	1	SS	6	2.121 & 2.131 *or* 2.141		2.013L, 41.101
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 10.001 *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 *or* S2	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	S2	6	2.002B		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	
2.013L	Chemistry and Enzymology of Foods	III	1	F	3	2.002B		2.003J, 2.023L, 2.043L, 2.053L

For footnotes, see overleaf

School of Chemistry (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.023A	Quantum Theory of Atoms and Molecules	III	1	F	3	2.002A, 10.2111 & 10.2112		
2.023B	Natural Product Chemistry	III	1	S2	6	2.003B		
2.023L	Biological and Agri-cultural Chemistry	III	1	SS	6	2.002B		2.013L, 2.043L, 2.053L
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		
2.043L	Chemistry and Enzy-mology of Foods†	III	2	F	6	2.002B		2.013L, 2.023L, 2.053L
2.053A	Chemical Kinetics and Reaction Mechanisms	III	1	SS	6	2.002A		
2.053L	Biological and Agri-cultural Chemistry†	III	2	F	6	2.002B		2.013L, 2.023L, 2.043L
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.

† Only one of these double units may be chosen.

School of Metallurgy

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
4.302	Chemical and Extraction Metallurgy I	II	1	F	3		2.002A*	
4.402	Physical Metallurgy I	II	2	F	6		2.002A*, 4.502	1.932 4.412 4.422
4.412	Metallurgical Phases — Structure and Equilibrium, Part I	II	1	S1	6		2.002A, 4.302	1.932 4.402
4.422	Metallurgical Phases — Structure and Equilibrium Part II	II	1	S2	6	4.412	4.303	4.402
4.502	Mechanical Metallurgy	II	1½	F			4.402	
4.512	Mechanical Properties of Solids	II	1	S1	4		4.402	
4.522	Mechanical Metallurgy	II/III	½	S2	3	4.512		
4.602	Metallurgical Engineering I	II	1	S2	5		4.302	
4.303	Chemical and Extraction Metallurgy II	III	2	F	5	4.302, 4.602 and 4.402 or 4.412	4.422	
4.403	Physical Metallurgy II	III	3	F	9	4.402		1.313
4.613	Metallurgical Engineering IIA	III	½	S1	3	4.602		
4.703	Materials Science	III	½	S2	3		4.403	

* This unit must be taken in Session 1.

School of Mechanical and Industrial Engineering

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
5.006	Engineering E*	I	1	S1	6			
5.010	Engineering A†	I	1	S1 or S2	6	Either		
5.030	Engineering C**†	I	1	S1 or S2	6	2 unit Science (Physics) (at HSC Exam percentile range 31-100) or 4 unit Science (incl. Physics) (at HSC Exam percentile range 11-100) or 2 unit Industrial Arts (at HSC Exam percentile range 31-100) or 3 unit Industrial Arts (at HSC Exam percentile range 11-100)		
5.020	Engineering B†	I	1	S2	6	5.010		

* Note, for this subject, *Excluded: 5.010, 5.020, 5.030.*

** Students who wish to enrol in this subject can make up for the lack of the prerequisite by work taken in Physics in the first half of first year.

† Note, for this subject, *Excluded: 5.006.*

School of Electrical Engineering and Computer Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
6.611	Computing I	I	1	S1	6	HSC Maths as for 10.001	10.001 or 10.011	1.041* 6.600 6.620 6.021D
6.621	Computing IIA	II	1	S1 or S2	5	6.611** 10.001 or 10.011		6.620 6.021D
6.631	Computing IIB	II	1	S1 or S2	5	6.621** or 6.620‡** or 6.021D**		6.021E
6.641	Computing IIC	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, 0610, 0611.

** Pass conceded is not adequate for prerequisite purposes; a clear pass must be obtained.

‡ Students who have completed 6.600 at a grade of credit or better, may be enabled to undertake this subject with permission.

School of Mathematics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.001	Mathematics I	I	2	F	6	{ 2 unit Mathematics (at HSC Exam percentile range 71-100) or 3 unit Mathematics (at HSC Exam percentile range 21-100) or 4 unit Mathematics (at HSC Exam percentile range 1-100) or 10.021B		10.011 10.021A 10.021B 10.021C
10.011	Higher Mathematics I	I	2	F	6	{ 3 unit Mathematics (at HSC Exam percentile range 71-100) or 4 unit Mathematics (at HSC Exam percentile range 11-100)		10.001 10.021A 10.021B 10.021C
10.021B	General Mathematics IB	I	1	S1 or S2	6	{ 2 unit Mathematics (at HSC Exam percentile range 51-100) or 3 unit Mathematics (at HSC Exam percentile range 11-100) or 4 unit Mathematics (at HSC Exam percentile range 1-100) or 10.021A**		10.001 10.011
10.021C	General Mathematics IC	I	1	S2	6	10.021B		10.001 10.011 10.021A
10.081	Mathematics IX	I	1	S2	6	As for 10.001	10.001 or 10.011 and 6.611 or 1.041	
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	6.621, 10.111A 10.2112 (or equivalent)		

†† For any listed unit an appropriate higher unit may be substituted.

* If a unit in this column is counted the corresponding unit in the first column may not be counted.

‡ 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.

** Entry to General Mathematics IA is allowed only with permission of the Head of the School of Mathematics, and that permission will be given only to students who do not qualify to enter unit 10.021B.

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, 10.1321
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
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

For footnotes, see overleaf

School of Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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.

* If a unit in this column is counted the corresponding unit in the first column may not be counted.

† 1. Admission to Higher Pure Mathematics II normally requires completion of 10.011 Higher Mathematics I; students who gain a superior pass in 10.001 Mathematics I may, subject to the approval of the Head of the School of Mathematics, be permitted to proceed to Higher Pure Mathematics II units.

2. Students majoring in Physics who wish to take Higher Pure Mathematics II 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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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	2	10.001		10.2213
10.2115	Discrete-Time Systems	II	½	S2	2	10.001		10.2215
10.211E	Numerical Methods	II	1	F	2	10.001		

Higher Applied Mathematics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.2211	Vector Analysis	II	½	S1	2½	10.011 or 10.001 DN**		10.2111
10.2212	Mathematical Methods for Differential Equations	II	½	S2	2½	10.2211		10.2112

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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 10.001DN		10.2115

Applied Mathematics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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**, 10.1213 or 10.1113 DN**, 10.1214 or 10.1114 DN**, 1.001		1.033
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
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.
* If a unit in this column is counted the corresponding unit in the first column may not be counted.
** 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 1 ½ 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.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*

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 ½	S1‡	7	10.001 or 10.021C CR		10.321A 10.331 10.301 45.101
10.311B	Basic Inference	II/III	1 ½	S2	7	10.311A		10.321B 10.331 10.301 45.101
10.331	Statistics SS	II	1	F	2	10.001 or 10.021C CR		10.311A 10.311B 10.321A 10.321B 10.301 45.101

No.	Name	Unit Level	When Value	Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
Higher Theory of Statistics Level II								
10.321A	Probability and Random Variables	II	1½	S1	8	10.001		10.311A 10.331 10.301 45.101
10.321B	Basic Inference	II/III	1½	S2	8	10.321A		10.311B 10.331 10.301 45.101
Theory of Statistics Level III **								
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		
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	10.321A, 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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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.

* If a unit in this column is counted, the corresponding unit in the first column may not be counted.

† 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 for 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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.411A	Hydrodynamics	II/III	1	S2	4	10.001	10.411B or 1.012, 10.1114	10.421A
10.411B	Principles of Theoretical Mechanics	II	1	S1	4	10.001, 1.001 or 10.041 or 5.010	10.2111, 10.2112, 10.1113	10.421B

Higher Theoretical Mechanics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.421A	Hydrodynamics	II/III	1	S2	4	10.011 or 10.001 DN**	10.421B, 10.1114	10.411A
10.421B	Principles of Theoretical Mechanics	II	1	S1	4	10.011 or 10.001 DN** 1.001 or 10.041 or 5.010	10.2211, 10.2212 10.1113	10.411B

Theoretical Mechanics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.412A	Dynamical and Physical Oceanography	III	1	F	2	1.001, 10.2111 and 10.2112 or 10.031	‡	
10.412B	Continuum Mechanics	III	1	F	2	10.2111, 10.2112, 10.1113, 10.1114, 10.111A	10.411A 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

Higher Theoretical Mechanics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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

For footnotes, see overleaf

School of Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
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

** 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: 10.411A or 1.012 or 1.3533 and 25.6342.

* If a unit in this column is counted the corresponding unit in the first column may not be counted.

†† For any listed unit an appropriate higher unit may be substituted.

School of Psychology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Psychology Level I								
12.100	Psychology I	I	2	F	5			12.001
Psychology Level II^{See Notes}								
12.200	Research Methods II	II	1	F	3	12.001* or 12.100*		12.152
12.201	Basic Psychological Processes II	II	1	S1	4	12.001* or 12.100*		12.052
12.202	Complex Psychological Processes II	II	1	S2	4	12.001* or 12.100*		12.062
12.204	Human Relations II	II	1	S1	4	12.001* or 12.100*		12.072
12.205	Individual Differences II	II	1	S2	4	12.001* or 12.100*		12.082
Psychology Level III: Group A^{See Notes}								
12.300	Research Methods IIIA	III	1	S1	4	12.152 or 12.200		12.153
12.304	Personality and Individual Differences III	III	1	S1	4	2 Psychology Level II subjects		12.303
12.305	Learning and Behaviour III	III	1	S1 or S2	4	12.052 and 12.152, or 12.200 and 12.201		12.253
12.322	Abnormal Psychology III	III	1	S1	4	12.052 and 12.152, or 12.200 and 12.201		12.603
Psychology Level III: Group B^{See Notes}								
12.301	Research Methods IIIB	III	1	S2	4	12.152 and 12.153, or 12.200 and 12.300		12.163
12.310	Physiological Psychology III	III	1	S1	4	12.052 and 12.152, or 12.200 and 12.201		12.413
12.311	Perception III	III	1	Not offered 1983	4	12.052 and 12.152, or 12.200 and 12.201		12.473
12.312	Language and Cognition III	III	1	S1	4	12.062 and 12.152, or 12.200 and 12.202		12.453
12.314	Motivation and Emotion III	III	1	S2	4	12.052 and 12.152, or 12.200 and 12.201		12.323

School of Psychology (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
12.320	Social Psychology III	III	1	S1	4	12.062 *and* 12.152, *or* 12.200 *and* 12.202		12.503
12.321	Developmental Psychology III	III	1	S2	4	12.062 *and* 12.152, *or* 12.200 *and* 12.202		12.553
12.324	Experimental Psychopathology III	III	1	S2	4	12.322 *or* 12.603		
12.325	Social Behaviour III	III	1	S2	4	12.062 *and* 12.152, *or* 12.200 *and* 12.202		
12.330	Psychological Assessment III	III	1	S1	4	12.152 *or* 12.200, *and* 1 other Psychology Level II subject		12.042, 12.203 *and* 12.373
12.331	Counselling Psychology III	III	1	S2	4	2 Psychology Level II subjects		12.623
12.332	Behavioural Change III	III	1	Not offered 1983	4	12.052 *and* 12.152, *or* 12.200 *and* 12.201		12.713
12.333	Ergonomics III	III	1	S1	4	12.152 *or* 12.200		12.663
12.334	Behaviour in Organizations III	III	1	S2	4	2 Psychology Level II subjects		12.653
12.335	Behavioural Evaluation and Assessment III	III	1	S2	4	12.322 *or* 12.603		
12.340	Special Topic III	III	1	Not offered 1983	4	12.153 *and* 12.303, *or* 12.300 *and* 12.305	12.253 *or* 12.304	

* A Pass Conceded result is not acceptable as a prerequisite.

Notes:

1. A student may not enrol in more than three Level II Psychology units.

2. A student may not enrol in more than three Level III Psychology units unless 12.200 *or* 12.152 Research Methods II has been passed.

3. A student may not enrol in more than five Level III Psychology units unless 12.300 *or* 12.153 Research Methods IIIA has been passed.

4. A major in Psychology is 12.100 (*or* 12.001), two Psychology Level II units, including 12.200 (*or* 12.152) and four Psychology Level III units.

5. A student may not enrol in more than 3 Psychology Level III subjects selected from 12.304 Personality and Individual Differences III, 12.322 Abnormal Psychology III, 12.324 Experimental Psychopathology III, 12.331 Counselling Psychology III, and 12.335 Behavioural Evaluation and Assessment III.

Biological Sciences

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.031	Biology A	I	1	S1	6	Science 2 *or* 4 units at HSC Exam percentile range 31-100		
17.041	Biology B	I	1	S2	6	17.031		17.021
17.012	General Ecology	II	1	S2	6	17.031 *and* 17.021 (*or* 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 43.101, 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.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
25.110	Earth Materials and Processes**	I	1	S1	6	2 unit Science (any strand) (at HSC Exam percentile range 31-100) or 4 unit Science (multistrand) (at HSC Exam percentile range 31-100)		
25.120	Earth Environments and Dynamics****	I	1	S2	6	25.110		
25.211	Earth Materials I*	II	1	S1	6	25.120		
25.221	Earth Materials II‡‡	II	1	S2	6	25.211		
25.212	Earth Environments I‡	II	1	S1	6	25.120		
25.223	Earth Physics*	II	1	S2	6	—		
25.621	Marine Geology I**	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 III	III	1	S1	6	25.221	25.326	
25.321	Earth Materials IV†	III	1	S2	6	25.311		
25.312	Earth Environments II	III	1	S1	6	25.212	25.326	
25.313	Exploration and Data Processing‡	III	1	S1	6	25.223		
25.314	Mineral and Energy Resources I****	III	1	S1	6	25.221	25.311	
25.324	Mineral and Energy Resources II*	III	1	S2	6	25.312		
25.325	Engineering and Environmental Geology***	III	1	S2	6			
25.326	Geological Techniques‡‡‡	III	1	S2	6	25.212, 25.311		
25.6342	Exploration and Seismic Methods	III	½	S2	3			25.634
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 work of up to 10 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 2501, 2502, 2703, 2725, nor in Geology program of Course 4770, nor in Geology with some Mathematics program of Course 3730.

School of Geography

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
27.111	Applied Physical Geography I	I	2	F	6			27.801, 27.811
27.801	Introduction to Physical Geography*	I	1	S1	4½			
27.802	Introduction to Human Geography*	I	1	S2	4½			
27.811	Physical Geography*	II	1	S2	4½	27.801, 27.2813†,		27.111
27.812	Human Geography*	II	1	S1	4½	27.802, 27.2813†		
27.2813	Geographic Methods	II	½	S1	3	27.111 (or 27.801‡, 27.802)		
27.2814	Geographic Field Methods**	II	½	S2	2	27.111 (or 27.801 & 27.802) 27.2813		
27.153	Climatology**	II/III	1	S2	5	1.001, 27.811 (or 25.110 & 25.120) (or 17.031 and 17.021† ***) or 27.111		
27.143	Biogeography**	II/III	1	S1	5	27.811 or 27.111 (or 17.031 & 17.021***)		
27.183	Geomorphology**	II/III	1	S1	5	25.110 & 25.120 or 27.811 or 27.111		27.860
27.133	Pedology**	II/III	1	S2	5	27.111 or any 2 units from: 2.111, 2.121, 2.131, 2.141, 27.811 (or 25.012 or 25.022)		27.863
27.860	Landform Studies**	II/III	1	S1	4½	27.811 or 27.111		27.183, 27.870
27.862	Australian Environment and Natural Resources**φφ	II/III	1	S2	4½	27.111 or 27.811 or 27.812 or 25.110 and 25.120		27.872
27.863	Ecosystems and Man**φφ	II/III	1	S2	4½	27.111 or 27.811 or 27.812		27.873
27.824	Spatial Population Analysis**	II/III	1	S2	4	27.812		27.834
27.825	Urban Activity Systems**	II/III	1	S1	4	27.812		27.835
27.826	Urban and Regional Development**	II/III	1	S1	4	27.812		27.836
27.827	Environment and Behaviour**	II/III	1	S2	4	27.812		
27.834	Spatial Population Analysis (Advanced)**	III	1	S2	6	27.812 CR, 27.2813 CR		27.824
27.835	Urban Activity Systems (Advanced)**	III	1	S1	6	27.812 CR, 27.2813 CR		27.825
27.836	Urban and Regional Development (Advanced)**	III	1	S1	6	27.812 CR, 27.2813 CR		27.826
27.837	Environment and Behaviour (Advanced)**	III	1	S2	6	27.812 CR, 27.2813 CR		27.827
27.870	Landform Studies (Advanced)**	III	1	S1	6	27.111 CR or 27.811 CR, 27.2813 CR		27.860
27.872	Australian Environment and Natural Resources (Advanced)**φφ	III	1	S2	6	27.111 CR or 27.811 CR or 27.812 CR		27.862
27.873	Ecosystems and Man (Advanced)φφ	III	1	S2	6	27.111 CR or 27.811 CR or 27.2813 CR		27.863
27.880	Advanced Geographic Methods	III	1	F	3	27.2813 CR and 27.811 CR or 27.812 CR or 27.111 CR		

For footnotes, see overleaf

School of Geography (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
27.412	Coastal Geomorphologyφ**	II	½	S2	5	27.111 *or* 27.811 *or* 25.110 *and* 25.120		

* Field work of up to 2 days is a compulsory part of the subject.

‡ In special circumstances a student may apply to the Head of School for permission to take 27.801 as a co-requisite.

† This prerequisite unit may be waived for students not proceeding into a major Geography sequence.

** Field work of up to 5 days is a compulsory part of the subject.

*** From 1983: 17.041.

φOnly for students in the Marine Science program. Not offered in 1983.

φφOffered subject to availability of staff.

School of Biochemistry‡

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
41.101	Biochemistry	II	2	S1	12	17.021† *or* 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		
41.102D	Biosynthesis of Plant Metabolites	III	1	S2	6	41.101** *or* 41.111**, 2.002B	41.102C	
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.

School of 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, 17.021 *or* 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†		

* In exceptional circumstances a student may apply to the Head of School for variation of the prerequisite.

† Pass conceded (PC) not acceptable.

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School of Botany

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.012	General Ecology					See under Biological Sciences		
43.101	Introductory Genetics	II	1	S2	6	17.031 and 17.021* (or 17.041*)		
43.111	Flowering Plants	II	1	S1	6	17.031 and 17.021 (or 17.041)		
43.131	Fungi and Man	II	1	S1	6	17.031 and 17.021 (or 17.041)		
43.102	Microbial Genetics	III	1	S1	6	43.101		
43.112	Plant Taxonomy	III	1	S2§	6	43.111	43.101	
43.122	Plant Physiology†	III	1	S2	6	17.021 (or 17.041) and 17.031, 2.121 and 2.131, or 2.141		43.121
43.132	Mycology-Plant Pathology	III	1	S2	6	43.131***		
43.142	Environmental Botany	III	1	S1	6	17.031 and 17.021 (or 17.041)		
43.152	Plant Community Ecology	III	1	S2	6	43.111 & 17.012 or 27.111		
43.162	The Plant Kingdom	III	1	S1§	6	43.111		
43.172	Phycology and Marine Botany	III	1	S2	6	43.111		
43.182	Cellular and Developmental Botany	III	1	S2	6	43.111 or 43.121**		
43.192	Ultrastructure	III	1	S2	6	17.031 and 17.021 (or 17.041)		43.182

* Students with percentile range 61-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 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.

† Students intending to undertake honours work in the field of Plant Physiology should have obtained a pass in 41.101 (Biochemistry) or 45.101 (Biometry) or 2.002A (Physical Chemistry) depending on their proposed field of specialization.

*** A student may apply to the School for variation of the prerequisite.

** Not offered in 1983.

§ These units will alternate each year. 43.162 The Plant Kingdom is offered in 1983. If both units 43.112 and 43.162 are to be included in a three-year pass degree program, one should be completed in Year 2.

School of Microbiology†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
44.101	Introductory Microbiology	II	1	S1	6	17.031 and 17.021 (or 17.041)		
44.121	Microbial Growth	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 17.021 (or 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 not acceptable.

School of Zoology†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
45.101	Biometry	II	1	S2	6	17.031 *and* 17.021 (*or* 17.041)		10.311A, 10.321A, 10.331
45.201	Invertebrate Zoology	II	1	S2	6	17.031 *and* 17.021 (*or* 17.041)		
45.301	Vertebrate Zoology	II	1	S1	6	17.031 *and* 17.021 (*or* 17.041)		
45.112	Marine Ecology§	III	1	S1	6	17.021 (*or* 17.041) *and* 17.031, 45.201 *or* 25.621 *or* 2.002D		
45.121	Evolutionary Theory	III	1	S1	6	17.031 *and* 17.021 (*or* 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	General and Reproductive Physiology	III	1	S1	6	45.201 *or* 45.301		
45.152	Population and Community Ecology	II/III	1	S1	6	17.021 (*or* 17.041) *and* 10.001 *or* 10.011		
45.202	Invertebrate Neuro-biology	III	1	S1	6	45.201		
45.302	Vertebrate Zoogeo-graphy and Evolution	III	1	S2	6	45.301		
45.402	Insects§	II/III	1	S1	6	17.031 *and* 17.021 (*or* 17.041)		
45.412	Insect Physiology	III	1	S1	6	45.101‡	45.402	
45.422	Economic Zoology	III	1	S2	6	45.201 *or* 45.402		
45.432	Project	III	1	S2	6	45.412		

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, or Geology except as detailed in an approved program.

† Level III courses conducted by the School of Zoology are available only during the daytime to part-time students enrolling for the first time in 1973 or later.

§ 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.

School of 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

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No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
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
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
52.2070	Introduction to Transformational Grammar	II	½	S1	2	Any Level I Subject		52.463
52.2111	Meaning and Truth	II	½	S2	2	52.1531 or 52.2030 or 52.463 or 52.2070 or 52.153		52.473
52.218	Set Theory	II	1	S1	3	52.153 or 52.1531 or 52.2030 or 26.812 or 10.001 or 10.011 or both 10.021B and 10.021C		52.323
52.2120	Model Theory	II	½	S2	2	52.323 or 52.218 or 10.1123		52.403
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**		Not offered in 1983 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**		Not offered in 1983 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

For footnotes, see overleaf

School of Philosophy (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
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.

School of History and Philosophy of Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
62.012	The Origins of Modern Science	II/III	1	S1	3			
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			
62.033	The Development of Theories of Matter	II/III	1	S1	3			
62.052	Scientific Knowledge and Political Power	II/III	1	S1	3	A pass in *two* of 1.001 *or* 1.011		
62.062	The Social System of Science	II/III	1	S2	3	2.121 & 2.131, *or* 2.141 10.001 *or* 10.011 *or*		
62.072	Historical Origins of the American Scientific Estate	II/III	1	S1	3	10.021B *and* 10.021C 12.001 17.031 *and* 17.021 (*or* 17.041)		
62.082	Science, Technology and Developing Countries	II/III	1	S1	3	25.110 *and* 25.120 27.801 *and* 27.802		
62.093	Science and the Strategy of War and Peace*	II/III	1	S1	3			
62.103	The Discovery of Time	II/III	1	S1	3			
62.104	The Darwinian Revolution	II/III	1	S1	2			
62.106	Mind, Mechanism and Life	II/III	1	S1	3			62.043
62.107	The Freudian Revolution	II/III	1	S2	3			
62.109	The History of Medical Theory and Practice	II/III	1	S1	3			62.043 26.568, 26.2506
62.551	The Arch of Knowledge: History of the Philosophy and Methodology of Science to 1800*	II/III	1	S1	2			62.013

School of History and Philosophy (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
62.553	The Social Construction of Scientific Knowledge	II/III	1	S1	3		62.032 or 62.062 or 62.552 or 62.013	62.083
62.554	Computers, Brains and Minds: Foundations of the Cognitive Sciences	II/III	1	S2	3			
62.042	Science Education and the Dynamics of Scientific Development*	II	1	S1	3	58.632		
62.105	Research Methods in History and Philosophy of Science	III	1	F	1 ½	Completion of 3 HPS units with an average of Credit or better, or by permission of Head of School		

* Not offered in 1983.

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 or 1.011		
68.451	Biological Laboratory Computing	I	1	S2	6	As for 10.021B		1.041 and Programs 0601, 0610, 0611, 6806

School of 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		

School of Physiology and Pharmacology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
73.111	Physiology IA	II	2	F	6	2.121 & 2.131, or 2.141, 10.001 or 10.011 or 10.021B and 10.021C, 17.021 (or 17.041)	41.101	73.121
73.121	Physiology IB	II	2	F	6	2.121, or 2.141, 10.001 or 10.011 or 10.021B and 10.021C, 17.021 or 17.041	2.131 *	73.111
73.012	Physiology II	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			
73.012CD	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 2.003J and 2.033A	

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.

School of Community Medicine

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
79.201	Population Genetics	III	1	S1	5	45.101 or 10.331 or 10.311A and 10.311B or 10.321A and 10.321B		
79.202	Quantitative Methods in Human Genetics	III	1	S2	5	See * below		
79.302	Biochemical Genetics of Man	III	1	S2	6	43.101, 41.101		
79.402	Genetics of Behaviour I	II	1	S1	5	17.031		
79.403	Genetics of Behaviour II	III	1	S2	5	79.402		

* A unit of genetics and a unit of statistical methods, or theory, as approved by the Head of School.

Table 2

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Corequisites	Excluded	Specific Programs
2.111	Introductory Chemistry*	I	1	S1	6				0101, 01,03, 0105, 1201, 2743
2.013E	Advanced Nuclear and Radiation Chemistry	III	1	S2	6	2.003E			Any appropriate program *except* 0201, 0202, 0203, 0204, 0241, 0242, 0262 *and* Course 3910
4.802	Metallurgical Physics	II	½	S2	2	1.001 *or* 1.011			0401, 0402 0403
4.813	Mathematical Methods	III	1	F	3	10.001 *or* 10.011			0401, 0402, 0403
6.010	Electrical Engineering	I	1	S2	6	Electrical & magnetism section of 1.001 *or* 1.011			0102, 0105, 0162, 0601, 6806
6.021A	Basic Circuit Theory	II	½	S1 *or* S2	4	6.010, 1.001, 10.001			0102, 0601
6.021C	Electronics	II	½	S1 *or* S2	4	6.021A, 1.982 *or equiv.*			0102, 0601
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	0601, 0610, 0611
6.632	Operating Systems**	III	1	S1	5	6.631*** *or* 6.021E***, 6.641***			0601, 0610, 0611

For footnotes, see overleaf

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Corequisites	Excluded	Specific Programs
6.633	Data Bases and Networks**	III	1	S2	5	6.641***		14.608	0601, 0610, 0611
6.642	Design and Analysis of Algorithms**	III	1	S1	5	6.641***			0601, 0610, 0611
6.643	Compiling Techniques and Programming Languages**	III	1	S2	5	6.641***			0601, 0610, 0611
6.647	Business Information Systems**	III	1	S1	5	6.641*** 14.501		14.603 14.604, 14.605	0601, 0610, 0611
6.649	Computing Practice**†*****	III	1	††	5	6.641***	6.633 or 6.643 or 6.647		0601, 0610, 0611
6.851	Electronics and Instrumentation	II	½	S1	3	1.001 or 1.011			0401, 0402, 0403
7.023	Mineral Process Engineering	III	½	S1	2				0402, 0403
9.801	Genetics I	II	1	F	2S1 3S2			6840	
9.811	Biostatistics I	III	1	S1	4	45.101		6840	
9.802	Genetics II	III	1	F	4	9.801		6840	
10.021A	General Mathematics IA	I	1	S1	6				
10.022	Engineering Mathematics II	II	1	F	4	10.001			Course 3730
10.301	Statistics SA	II	1	F	2	10.001 or 10.021CR			6832, 6833
14.501	Accounting and Financial Management IA****	I	1	S1	4½				0601, 1001, 1020, 1021, 1022, 1023, 5811, 1401
14.511	Accounting and Financial Management IB	I	1	S2	4½	14.501			0601, 1001, 1020, 1021, 1022, 1023, 5811, 1401
14.522	Accounting and Financial Management IIA	II	1	S1	4½	14.511			0601, 1001, 1022, 5811, 1401
14.542	Accounting and Financial Management IIB	II	1	S2	4½	14.511			0601, 1001, 1022, 5811
14.563	Accounting and Financial Management IIIA	III	1	S1	4½	14.542			1022
14.573	Accounting and Financial Management IIIA (Honours)	III	1	S1	6	14.542			1023
14.583	Accounting and Financial Management IIIB	III	1	S2	4½	14.522			1022, 1401
14.593	Accounting and Financial Management IIIB (Honours)	III	1	S2	6	14.522			1023
14.601	Law and Society I	I	1	S2	3				1020, 1021, 1022, 1023
14.602	Computer Information Systems I	II	1	S1	3				0601, 1001, 1020, 1021, 1022, 1023, 5811, 1401
14.603	Computer Information Systems II	II	1	S2	3	14.602			0601, 1001, 1020, 1021, 1022, 1023, 5811, 1401
14.605	Information Systems Implementation	III	1	S2	3	14.603			0601, 1401

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Corequisites	Specific Programs
14.607	Distributed Computer Systems	III	1	S1	3	14.603		0601, 1022 1023, 1401
14.608	Database Systems	III	1	S2	3	14.603		0601, 1022, 1023, 1401
14.611	Information Systems Development (Honours)	III	1	S1	3	14.603 and approval from Head of Department of Information Systems		0601, 1022, 1023
14.613	Business Finance II	II	1	S2	3			0601, 1001, 1022, 1023, 5811, 1401
14.614	Business Finance IIIA	III	1	S1	3	14.613		0601, 1022, 1023
14.615	Business Finance IIIB	III	1	S2	3	14.614		0601, 1022, 1023
14.851	Current Developments in Accounting Thought — Financial	IV	1	S1	3			1023
14.852	Current Developments in Accounting Thought — Managerial	IV	1	S1	3			1023

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	HSC Exam Percentile Range Required	Specific Programs
15.001	Microeconomics I	I	1	S1 or S2	3½	2 unit A English or 2 unit English or 3 unit English	31-100 21-100 11-100	0601, 1001, 1020, 1021, 1022, 1023 1401
15.002	Microeconomics II	II	1	S1	4	15.011 plus 2 unit Mathematics or 3 unit Mathematics or 4 unit Mathematics	51-100 21-100 1-100	0601, 1001, 1020, 1023, 5811
15.003	Macroeconomics III	III	1	S1	4	15.042		0601, 1020
15.011	Macroeconomics I	I	1	S1 or S2	3½	15.001		0601, 1001, 1020, 1021, 1022, 1023, 1401
15.012	Microeconomics II (Honours)	II	1	S1	4	15.011 plus 2 unit Mathematics or 3 unit Mathematics or 4 unit Mathematics	51-100 21-100 1-100	1021
15.013	Macroeconomics III (Honours)	III	1	S1	4	15.052		1021
15.024	Advanced Macroeconomics	IV	1	S1	4	15.473, 15.013 and 15.153		1021
15.034	International Trade	IV	1	S2	2	15.024		1021
15.042	Macroeconomics II	II	1	S2	4	15.011		1001, 1020, 1022, 1023, 5811
15.052	Macroeconomics II (Honours)	II	1	S2	4	15.012		1021
15.062	Economics IID	II	1	S1 or S2	4	15.011		1023
15.063	Money Banking and the Financial System	III	1	S2	3	15.013 or 15.003 or 15.062 at CR level or better		1020, 1021
15.072	Economics IIE	II	1	S2	4	15.011		1023
15.073	Natural and Environmental Resources Economics	III	1	S1	3	15.002 or 15.072 or 15.012		1020, 1021
15.103	International Economics	II	1	S2	3	15.002 or 15.012		1020
15.113	International Economics (Honours)	II	1	S2	4	15.002 or 15.012		1020

For footnotes, see overleaf

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Corequisites	Specific Programs
15.143	Microeconomics III	III	1	S2	4	15.002 or 15.012		0601, 1001, 1020
15.153	Microeconomics III (Honours)	III	1	S2	4	15.002 or 15.012		1021
15.183	Economic Planning†	III	1	S2	3	One of 15.002, 15.012, 15.072 and one of 15.042, 15.052, 15.062		1020, 1021
15.413	Econometrics A	III	1	S1	3½	15.462 or†† 10.311B		1020, 1021
15.453	Econometrics B	III	1	S2	3½	15.413 or†† 10.312C		1020, 1021
15.440	Operations Research in Economics	III	1	S2	3½	15.442 or equivalent, or 10.311B		1020, 1021
15.434	Mathematical Economics A	III	1	S1	3	15.432		1020, 1021
15.444	Mathematical Economics B	III	1	S2	3	15.442		1020, 1021
15.416	Applied Business Statistics	III	1	S1	3	15.421 or equiv. 10.311B		1020, 1021
15.601	Economic History IA	I	1	S1 or S2	3½			1020, 1021, 1022, 1023
15.611	Economic History IB	I	1	S2	3½	15.601		1020, 1021, 1022, 1023
25.541	Mineralogy†††	II	½	F	2			0401, 0402, 0403
25.631	Marine Geology II	III	1	F	3	25.621		6833
25.632	Estuarine Geology‡	III	1	F2	3			6832, 6833
25.6341	Marine Mineral	III	½	S1	3	25.621	25.631	6833
25.635	Marine Resources	III	1	F	3	25.621	25.631	6833
25.9314	Geological Applications	III	½	S1	4	25.120		2503
25.932	Geophysical and Geological Applications	III	1	S2	6	25.120 25.223	25.326 25.6342	2503
48.023	Chemical Engineering Science I	II	2	F	6S1 5S2	1.001, 10.001		0204
48.024	Chemical Engineering Principles I	II	1	F	3S1 2S2	1.001, 10.001		1001, 5811
48.037	Chemical Engineering Science II	III	2	F	7S1 6S2	2.002A, 48.023		0204
48.038	Chemical Engineering Principles II	III	1	F	{ 4S1 252			1001, 5811
68.302	Introductory Marine Science	II	1	S1	4			6831, 6832, 6833, 6834
68.503	Science of Interfaces	III	1		5	1.012, 1.022, 2.002A		6851, 6852, 6853
70.011A	Histology I	II	1	S1	6	17.021 (or 17.041) 17.031***		
70.011B	Mammalian Embryology	III	1	S2	6	70.011A, 17.031***		1270, 4170 4402‡‡
70.011C	Introductory Anatomy	II	1	S1	6	17.021 (or 17.041) 17.031***		4570, 6270, 6840‡‡
70.012B	Visceral Anatomy	III	1	S2	6	70.011A,*** 70.011C***		7001, 7002
70.012C	Neuroanatomy I	III	1	S1	6	70.011A,*** 70.011C***		7003, 7073§§
70.304	Histology II§	III	1	S2	6	70.011A***	§§ §§	Courses 4770 (Anatomy)
70.305	Neuroanatomy II	III	1	S2	3	70.012C (CR)		3820
70.306	Functional Anatomy I	III	1	S1	6	70.011A,*** 70.011C***		
70.307	Functional Anatomy II	III	1	S2	6	70.012C,*** 70.306***		
70.3041	Histological and Histochemical Techniques§‡‡‡	III	½	S2	3	17.031, 17.021 (or 17.041) and any 1 of 41.101, 45.301 or 70.011A***		

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No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Corequisites	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		3820
80.014	Human Behaviour	II	1	F	3			3820

* Students who have passed 2.121 may not subsequently enrol in 2.111. A student meeting the 2.121 prerequisite is not permitted to enrol in 2.111 without the permission of the Head of the School of Chemistry. Once a student enrols in 2.111 he must pass 2.111 before he can proceed to 2.121 or 2.131.

** 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) in a prerequisite subject is not accepted.

**** Not available in Year 1 of programs 1001, 1020, 1021, 5811, 1401.

***** Can only be counted with at least 3 other Level III Computer Science units.

† Not offered in 1983.

†† Consult with Head of Department.

††† With the permission of the Head of the Department of Econometrics.

‡ Excluded by 25.211.

‡‡ 70.011A, 70.304 and 70.3041 only.

‡‡‡ May not be offered in 1983 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 IV (Honours)	IV	10	F	Program 0101, 0103, 0105, 0125, 0161	7
					Program 5801	6
					Program 6201	5
1.304	Applied Physics IV (Honours)	IV	10	F	Program 0101, 0103, 0105, 0125, 0161	7
					Program 5803	6
1.504	Theoretical Physics IV (Honours)	IV	10	F	Program 0101§, 0105, 0161	7
					Program 5805	6
1.604	Biophysics IV (Honours)	IV	10	F	Program 0106	6
2.004	Chemistry IV	IV	10	F	4 Level III Chemistry units	8
					Program 5821	7
4.004	Metallurgy IV	IV	10	F	Program 0401 or 0402	7-8
6.606	Computer Science IV	IV	10	F	6.613, 6.632, 6.642, 6.643	8
10.123	Pure Mathematics Honours	IV		F	Program 1003, 1013 or 1025	*
					*Program 5811 or 5812	*
10.223	Applied Mathematics Honours	IV		F	Program 1005, 1015 or 1025	*
				*	Program 5811 or 5812	7
10.233	Applied Mathematics Honours (Short Course)	IV	6	F	Program 1021 or 1023	*
10.323	Theory of Statistics Honours	IV		F	Program 1007 or 1017 or 0611	*
					*Program 5811 or 5812	7
10.423	Theoretical Mechanics Honours	IV		F	Program 1009, 1019 or 10.423	*
					*Program 5811 or 5812	7
12.403	Psychology IV (Research)	IV	10	F	Program 1201, 1270 or 7312	8
12.404	Psychology IV (Course Work)	IV	10	F	Program 1201 or 1270	8

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No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
14.851	Current Developments in Accounting Thought — Financial	IV	2	S1	See program 1023	
14.852	Current Developments in Accounting Thought — Managerial	IV	2	S1	See program 1023	
15.024	Advanced Macroeconomics	IV	2	S1	See program 1021	
15.034	International Trade	IV	2	S2	See program 1021	
25.411	Resource Geology	IV	2	S1	Program 2501	8
25.412	Mineral and Energy Resources	IV	8	F	Program 2501	8
25.413	Engineering and Environmental Resources	IV	8	F	Program 2501	8
25.414	Geology IV Honours	IV	10	F	Programs 2501, 2502, 2510, 0125, 0225 1025, 2543	8
					Program 5832	7
27.604	Geography IV	IV	10	F	Program 2701, 2703, 2725 or 2743	8
41.103	Biochemistry IV	IV	10	F	4 Level III Biochemistry units	8
					Program 5841 or 5842	7
42.103	Biotechnology IV	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	8
					Program 5854 or 5855	7
44.103	Microbiology Honours	IV	10	F	44.102, 44.112	8
					Program 5861, 5862 and 5842	7
45.103	Zoology IV	IV	10	F	4 Level III Zoology units	8
					Program 5866 or 5867	7
62.014	History and Philosophy of Science Honours	IV	10	F	Program 6200, 6201, 6225, 6243, 6245, 6270	8
62.024	Science Studies Honours	IV	10	F	Program 0162, 0262 or 4162	8
68.304	Marine Science IV	IV	10	F	Program 6832, 6833 or 6834	8
68.404	Genetics IV	IV	10	F	Program 6840	7
68.430	Combined Geology Physics Honours	IV	10	F	Program 0125	8
68.504	Chemical Physics	IV	10	F	Program 6851, 6852 or 6853	8
70.031	Anatomy IV	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 IV	IV	10	F	4 Level III Physiology units	7–8
					Program 5871	7
73.023	Pharmacology	IV	10	F	Program 7303	7–8
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, 79.403	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 0101 program should have demonstrated adequate mathematical ability.

φ Field work of up to 7 days duration is a compulsory part of the subject.

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 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 supervised practical training.

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 I or 10.021B General Mathematics IB and 10.021C General Mathematics IC 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 I
12.200   Research Methods II
12.201   Basic Psychological Processes II
12.202   Complex Psychological Processes II
12.203   Psychology IIA

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 IIIB 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,)

ar d either
12 400   Psychology IV (research—Course 3430)
or 12.401   Psychology IV (course work—Course 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 I, *or*
10.001   Mathematics I *or*
10.021B General Mathematics IB *and* 10.021C General Mathematics IC *or*
10.021A General Mathematics IA* *and* 10.021B General Mathematics IB
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 I *and* 15.011 Macroeconomics I *or*
54.1001 Political Science I *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 and three Science and Mathematics Level III units are equivalent to one Level III 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 I, 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 Statistical 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
    43.101   Introductory Genetics
    45.101   Biometry
    45.301   Vertebrate Zoology
    73.121   Physiology IB (equivalent to 2 units)
    79.402   Genetics of Behaviour I
    79.403   Genetics of Behaviour II

- 53.001 Introduction to Sociology followed by twelve credit points value of Sociology Upper Level subjects
    15.001 Microeconomics I and 15.011 Macroeconomics I followed by twelve credit points value of Economics Upper Level subjects
    54.1001 Political Science I 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 prerequisites 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.

* Entry to 10.021A General Mathematics IA is allowed only with permission of the Head of the School of Mathematics and such permission will be given only to students who do not qualify to enter units 10.021B General Mathematics IB or 10.021C General Mathematics IC.

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 I or a first-year Mathematics, one of Economics I, Sociology I, Philosophy I or Political Science I or one other Arts I 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 IV 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 IA and 2.131 Chemistry IB
Either 10.001 Mathematics I, *or* 10.021B General Mathematics IB and 10.021C General Mathematics IC, *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 IB

With Zoology or Genetics as the main supporting subject
Year 1
10.001 Mathematics I, *or* 10.021B General Mathematics IB and 10.021 General Mathematics IC
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*
43.101 Introductory Genetics, 79.402 Genetics of Behaviour I
79.403 Genetics of Behaviour II and one other unit for Genetics

With Social Sciences as the main supporting subject

Year 1

10.001 Mathematics I, or 10.021B General Mathematics IB and 10.021C General Mathematics IC, 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 Science subject, and
One other Level I or II subject

Notes: **1.** For detail 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.

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 .... Mr W. J. Dunstan
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 B. J. Orr
School of Mathematics .... Associate Professor M. N. Barber
School of Optometry .... Professor H. B. Collin
School of Physics .... Associate Professor H. G. L. Coster

Course Outlines

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 specialisation 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 taken on a part-time basis over six years for the pass degree.

A total of 23 units is required for graduation at the pass level. First years is similar to the Science and Mathematics Course and covers 8 units. Of the remaining 15 units *at least 12* must be chemistry units and must include the following:

2.002A, 2.002B, 2.002D, 2.003B, 2.003C, 2.003D, 2.003H, 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		

Level	No.	Title	Prerequisites	Co-requisites	Excluded
II/III	2.003H	Molecular Spectroscopy and Structure	2.121 & 2.131, or 2.141		
II/III	2.003J	Fundamentals of Biological and Agricultural Chemistry	2.121 & 2.131, or 2.141		2.013L, 41.101
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 or 1.011 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		2.033L
III	2.003M	Organometallic 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	2.013L	Chemistry and Enzymology of Foods	2.002B		2.003J, 2.043L, 2.023L, 2.053L
III	2.023A	Quantum Theory of Atoms and Molecules	2.002A and 10.2111 and 10.2112		
III	2.023B	Natural Product Chemistry	2.003B		

Level	No.	Title	Prerequisites	Co-requisites	Excluded
III	2.023L	Biological and Agricultural Chemistry 2.043L	2.002B		2.053L, 2.013L,
III	2.033A	Physical Chemistry of Macromolecules	2.003J or 2.002B and 1.012 or 2.002A		
III	2.043A	Environmental Chemistry	2.002A, 2.002D		
III	2.043L	Chemistry and Enzymology of Foods† (double unit)	2.002B		2.013L, 2.023L, 2.053L
III	2.053A	Chemical Kinetics and Reaction Mechanisms	2.002A		
III	2.053L	Biological and Agricultural Chemistry † (double unit)	2.002B		2.013L, 2.023L, 2.043L
III	2.063A	Advanced Molecular Spectroscopy	2.013A		

† Only one of these double units may be chosen.

3910
Pure and Applied Chemistry — Full-time Course
Bachelor of Science
BSc

Year 1			Hours per week
1.011	Higher Physics I or	}	6
1.001	Physics I		
2.121	Chemistry IA &		6
2.131	Chemistry IB or		
2.141	Chemistry IM		
10.011	Higher Mathematics I or		
10.001	Mathematics I or		6
10.021B	General Mathematics IB &		
10.021C	General Mathematics IC		
Plus one of			
5.010	Engineering A and		6
5.020	Engineering B or		
5.030	Engineering C		
	or		
17.031	Biology A and		6
17.041	Biology B		
	or		
25.110*	Earth Materials and Processes and		
25.120**	Earth Environment and Dynamics		6
27.801	Introduction to Physical Geography and		
27.802	Introduction to Human Geography		

* Field work of up to 1½ days is a compulsory part of the subject.

** Field work of up to 3½ days is a compulsory part of the subject.

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	3
		24

* 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	Mathematics II	6
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 I	3
25.221	Earth Materials II	3
25.212	Earth Environment I	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
	One General Studies Elective	1½
		25½

* 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

Part-time Course

The part-time course in Pure and Applied Chemistry is equivalent to the full-time course and extends over six part-time years, leading to the award of the degree of Bachelor of Science. Honours may be awarded on the completion of an additional year of full-time study or, in special circumstances, an additional two years of part-time study.

The part-time course has been designed for students employed in the chemical industry but employment in this industry is not obligatory for entrance to the course.

3910
Pure and Applied Chemistry —
Part-time Course
Bachelor of Science
BSc

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).

		Hours per week
1.011	Higher Physics I *or*	6
1.001	*Physics I*	
2.121	Chemistry IA &	6
2.131	Chemistry IB *or*	
2.141	Chemistry IM	
10.001	Mathematics I *or*	6
10.021B	General Mathematics IB *and*	
10.021C	*General Mathematics IC*	
Plus one of		
5.010	Engineering A *and*	6
5.020	Engineering B *or*	
5.030	Engineering C	
	or	
17.031	Biology A *and*	6
17.041	Biology B	
	or	
25.110*	Earth Materials & Processes *and*	6
25.120**	Earth Environment & Dynamics	
	or	
27.801	Introduction to Physical Geography*** *and*	6
27.802	Introduction to Human Geography***	

* Field work of up to 1½ days is a compulsory part of the subject.

** Field work of up to 3½ 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
	General Studies Electives	3
		12

Stage 5

2.003B	Organic Chemistry	3
2.003C	Inorganic Chemistry	3
2.003D	Instrumental Analysis	3
2.013A	Introductory Quantum Chemistry	3
	General Studies Elective	1½
		13½

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 IV of the full-time course. A student wishing to do honours on a part-time basis may complete the honours year over two part-time years. Students are, however, advised to make every effort to do the honours year full time.

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
1.031	Physics I (Optometry)	6
2.121	Chemistry IA &	
2.131	Chemistry IB or	6
2.141	Chemistry IM	
10.001	Mathematics I or	
10.011	Higher Mathematics I or	
10.021B	General Mathematics IB and	6
10.021C	General Mathematics IC	
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 IA may be enrolled in 2.111 Introductory Chemistry in Session 1, 2.121 Chemistry IA in Session 2 and be permitted to carry 2.131 Chemistry IB into Session 1 of Year 2.

Students who do not meet the prerequisites for admission to 10.021B Mathematics will be enrolled in 10.021A Mathematics but cannot proceed to Year 2 of the Optometry Course until all the requirements of 10.021B and 10.021C Mathematics have been satisfied.

Year 2

		Hpw
31.811	Optometry I	8
31.821	Special Anatomy and Physiology	6
73.011A	Principles of Physiology	6
	General Studies Elective	1½
		21½

Year 3

12.100	Psychology I	5
31.812	Optometry II	15
31.831	Diseases of the Eye	3
	Two General Studies Electives	3
		26

Year 4

		Hpw	
		S1	S2
Full Year			
12.741	Psychology (Optometry)	2	2
31.813	Optometry III	6	6
31.841	Clinical Optometry	15	15
	General Studies Elective	1½	1½
Session 2			
74.001	Indication for Medical Referral	0	1
		24½	25½

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 has met all requirements for a first degree which has not yet been conferred on him, and his admission under these rules shall be no bar to the subsequent award of the first degree.

Graduate Study
Conditions of the Award of Higher Degrees
Subject Descriptions

Sciences

Graduate Study

Faculty of Biological Sciences and Faculty of Science Enrolment Procedures

All students re-enrolling in 1983 or enrolling in graduate courses should obtain a copy of the free booklet *Enrolment Procedures 1983* 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 IV (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	
Session 2			
42.101	Introduction to Biotechnology		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			
42.102B	Biotechnology B		6
44.121	Microbial Growth		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 the more important areas of biotechnology such as microbial process control and enzyme technology. The course is open to graduates with a four-year degree in biotechnology or a related discipline, or who have, in the opinion of the Higher Degree Committee, acquired equivalent qualifications or experience. Intending students are referred to Conditions for the Award of Graduate Degrees set out later in this handbook.

The course consists of lectures, tutorials, practical sessions, case history studies and a supervised project. The minimum period of registration before the award of the degree is two sessions for full-time students and four sessions for part-time students.

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
Professor S. H. Lovibond
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;
and

2. 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, supervised 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 supervised 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

		S1	S2
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
12.241G	Graduate Colloquium	1	1
12.242G	Research Thesis*		
12.243G	Experimental Clinical Psychology	5	5
12.244G	Psychological and Behavioural Assessment	1	1
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		

* 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)

Year 1

		Hours per week	
		S1	S2
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	1	1
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:

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.

Chemistry

Head of School
Professor J. S. Shannon
Executive Assistant to Head of School
Mr W. J. Dunstan

8770
Master of Chemistry Graduate Course
Master of Chemistry
MChem

Three programs are available, emphasising 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. These programs are full-time, but in future may be extended to part-time students.

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 I
(2) Treatment of Analytical Data
(3) Instrumental Techniques in Food and Drug Analysis
(4) Food and Drugs II
(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. 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 I	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 II 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.

History and Philosophy of Science

Head of School
Professor J. Ronayne

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 disciplines, 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 class-work 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:

62.701G Philosophy and Methodology of Science
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 The Sociology of Scientific 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)

Selected candidates may undertake a third-year MScSoc honours degree program of advanced study which includes a dissertation based on supervised 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 supervised by a member of staff. Again with this approval a student may substitute for at most two of these courses graduate courses offered either within or outside the School of Mathematics. Students are also required to participate in relevant departmental seminars. In addition, students are required to undertake a project supervised by a staff member, 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 I	2
10.383G	Stochastic Processes	2
10.385G	Multivariate Analysis I	2
10.390G	Statistical Inference	2
10.392G	Project	2

Elective Subjects

10.382G	Experimental Design II	2
10.384G	Time Series	2
10.386G	Multivariate Analysis II	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*	
10.222M	Higher Optimal Control Theory	3

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*	
10.222L	Higher Optimization Methods	3
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 K. N. R. Taylor

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.

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 Table (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

Title	Abbreviation	Calendar/Handbook
Doctor of Philosophy	PhD	Calendar and all handbooks
Master of Applied Science	MAppSc	Applied Science
Master of Architectural Design	MArchDes	Architecture
Master of Architecture	MArch	Architecture
Master of Archives Administration	MArchivAdmin	Professional Studies
Master of Arts	MA(Hons)	Arts Military Studies
	MA	Arts
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	ME	Applied Science
Master of Engineering *without Supervision*		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	Calendar†
Master of Health Planning	MHP	Professional Studies
Master of Industrial Design	MID	Architecture
Master of Landscape Architecture	MLArch	Architecture
Master of Laws by Research	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	MSurv	Engineering
Master of Surveying without Supervision		
Master of Surveying Science	MSurvSc	Engineering
Master of Town Planning	MTP	Architecture

Graduate Diplomas

Graduate Diploma	GradDip	Applied Science
		Architecture
		Engineering
		Sciences‡
	DipFDA	Sciences*
Graduate Diploma in the Faculty of Professional Studies	DipEd	Professional Studies
	DipIM-ArchivAdmin	
	DipIM-Lib	

* Faculty of Science.
† Professorial Board.
‡ Faculty of Biological Sciences.

Doctor of Philosophy (PhD)

1. The degree of Doctor of Philosophy may be granted by the Council on the recommendation of the Professorial Board to a candidate who has made an original and significant contribution to knowledge and who has satisfied the following requirements:

Qualifications

2. A candidate for registration for the degree of Doctor of Philosophy shall:

(1) hold an honours degree from the University of New South Wales; or

(2) hold an honours degree of equivalent standing from another approved university; or

(3) if the candidate holds a degree without honours from the University of New South Wales or other approved university, have achieved by subsequent work and study a standard recognised by the higher degree committee of the appropriate faculty or board of studies (hereinafter referred to as the Committee) as equivalent to honours; or

(4) in exceptional cases, submit such other evidence of general and professional qualifications as may be approved by the Professorial Board on the recommendation of the Committee.

3. When the Committee is not satisfied with the qualifications submitted by a candidate, the Committee may require the candidate, before being permitted to register, to undergo such examination or carry out such work as the Committee may prescribe.

Registration

4. A candidate for registration for a course of study leading to the degree of Doctor of Philosophy shall apply to the Registrar on the prescribed form at least one calendar month before the commencement of the session in which registration is to begin.

5. Subsequent to registration the candidate shall pursue a program of advanced study and research for at least six academic sessions, save that:

(1) a candidate fully engaged in advanced study and research for the degree, who before registration was engaged upon research to the satisfaction of the Committee, may be exempted from not more than two academic sessions;

(2) in special circumstances the Committee may grant permission for the candidate to spend not more than one calendar year of the program in advanced study and research at another institution provided that the work can be supervised in a manner satisfactory to the Committee;

(3) in exceptional cases, the Professorial Board on the recommendation of the Committee may grant permission for a candidate to be exempted from not more than two academic sessions.

6. A candidate who is fully engaged in research for the degree shall present for examination not later than ten 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.

7. The candidate shall be fully engaged in advanced study and research, save that:

(1) the Committee may permit a candidate to undertake a limited amount of University teaching or outside work which in its judgment will not interfere with the continuous pursuit of the proposed course of advanced study and research;

(2) a member of the full-time staff of the University may be accepted as a part-time candidate for the degree, in which case the Committee shall prescribe a minimum period for the duration of the program;

(3) in special circumstances, the Committee may, with the concurrence of the Professorial Board, accept as a part-time candidate for the degree a person who is not a member of the full-time staff of the University and is engaged in an occupation which, in its opinion, leaves the candidate substantially free to pursue a program in a school* of the University. In such a case the Committee shall prescribe for the duration of the program a minimum period which, in its opinion, having regard to the proportion of the time which the candidate is able to devote to the program in the appropriate University school* is equivalent to the six sessions ordinarily required.

8. Every candidate shall pursue a program under the direction of a supervisor appointed by the Committee from the full-time members of the University staff. The work, other than field work, shall be carried out in a school* of the University save that in special cases the Committee may permit a candidate to conduct the work at other places where special facilities not possessed by the University may be available. Such permission will be granted only if the direction of the work remains wholly under the control of the supervisor.

9. Not later than two academic sessions after registration the candidate shall submit the topic of research for approval by the Committee. After the topic has been approved it may not be changed except with the permission of the Committee.

10. A candidate may be required by the Committee to attend a formal course of appropriate study.

11. On completing the course of study every candidate must submit a thesis which complies with the following requirements:

Thesis

(1) the greater proportion of the work described must have been completed subsequent to registration for the PhD degree;

(2) it must be an original and significant contribution to the knowledge of the subject;

* Or department where department is not within a school.

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(3) it must be written in English except that a candidate in the Faculty of Arts may be required by the Faculty on the recommendation of the supervisor to write the thesis in an appropriate foreign language;

(4) It must reach a satisfactory standard of expression and presentation.

12. The thesis must present the candidate's own account of the research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied on the candidate's part in the joint research.

13. Every candidate shall be required to submit with the thesis a short abstract of the thesis comprising not more than 350 words.

The abstract shall indicate:
(1) the problem investigated;
(2) the procedures followed;
(3) the general results obtained;
(4) the major conclusions reached;
but shall not contain any illustrative matter, such as tables, graphs or charts.

14. A 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.

Entry for Examination **15.** The candidate shall give in writing two months' notice of intention to submit the thesis.

16. 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 higher degree theses. The candidate may also submit any work previously published whether or not such work is related to the thesis.

17. 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.

18. There shall normally be 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.

19. At the conclusion of the examination each examiner shall submit to the Committee a concise report on the merits of the thesis and shall recommend to the Committee that:

(1) The candidate be awarded the degree without further examination; or

(2) 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

(3) 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

(4) 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

(5) the candidate be not awarded the degree and be not permitted to resubmit the thesis.

20. If the performance at the further examination recommended under Rule **19.**(3) is not to the satisfaction of the Committee the Committee may permit the candidate to re-present the same thesis and submit to a further oral, practical or written examination within a period specified by them but not exceeding eighteen months.

* See Conditions for the Award of Degrees in the Calendar.

21. The Committee shall, after consideration of the examiners' reports and the reports of any oral or written or practical examination, recommend whether or not the candidate may be admitted to the degree.

22. A candidate shall be required to pay such fees as may be determined from time to time by the Council.

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.

Master of Chemistry (MChem)

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class I or Class II honours in Chemistry.

(2) An applicant for registration with an approved degree at a standard below honours Class II may be accepted following satisfactory performance at a qualifying examination approved by the Committee.

Qualifications

(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 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 I or Class II honours in Mathematics.

(2) An applicant for registration, with an approved degree at a standard below honours Class II 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.

(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.

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

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.

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.

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.

<div style="float:right">Registration</div>

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.

<div style="float:right">Recommendation for Admission to Degree</div>

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

<div style="float:right">Fees</div>

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.

<div style="float:right">**Master of Physics (MPhysics)**</div>

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class I or Class II Honours in Physics.

<div style="float:right">Qualifications</div>

(2) An applicant for registration, with an approved degree at a standard below honours Class II 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.

<div style="float:right">Registration</div>

(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.

<div style="float:right">Recommendation for Admission to Degree</div>

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of
Psychology (MPsychol) **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.

The degree shall be awarded in two grades, namely Pass and Honours. There shall be two classes of Honours, namely Class I and Class II.

Qualifications **2.** (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class I or Class II in Psychology at a standard acceptable to the Committee.

(2) An applicant for registration, with an approved degree at a standard below Honours Class II 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.

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:
(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 **5.** Having considered the results of the candidate's work in the prescribed course of study and the
Admission to Degree 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.

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.

<div style="float:right">**Master of Science (MSc)**</div>

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 in an appropriate School or Department at a standard acceptable to the Committee.

<div style="float:right">Qualifications</div>

(2) In exceptional 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 Professorial Board on the recommendation of 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.

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.

<div style="float:right">Registration</div>

(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 shall give two months' notice in writing to the Registrar of intention to submit a thesis.

<div style="float:right">Thesis</div>

(2) A candidate for the degree shall 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 the candidate has published whether or not such work is related to the theses.

(3) 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.

(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 candidate shall pay such fees as may be determined from time to time by the Council.

Master of Science (MSc) without supervision

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:

Qualifications

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 Committee.

Registration

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 Committee not less than six months before the intended date of submission of the thesis. At any early stage it is in the graduate's interest, should there be intention to apply in this way, to 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.

(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.

Thesis

4. (1) (a) Every candidate for the degree shall be required to submit three copies of a thesis embodying the results of an original investigation or design. The thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses. 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.

5. Having considered the examiners' reports the Committee shall recommend whether or not the candidate should be admitted to the degree.

6. An approved applicant shall pay such fees as may be determined from time to time by the Council.

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.

**Master of
Science (Biotechnology)
(MSc(Biotech))**

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class I or Class II in Biological Technology or other relevant discipline.

Qualifications

(2) An applicant for registration with an approved degree at a standard below Honours Class II 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.

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 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.

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.

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))**

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Qualifications   **2.** (1) An applicant for registration shall hold the degree of Doctor of Philosophy in an approved area of Psychology acceptable to the Committee.

(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.

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 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.

Recommendation for Admission to Degree   **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.

Fees   **5.** An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Science and Society (MScSoc)   **1.** The degree of Master of Science and Society may be awarded at honours 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.

Qualifications   **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.

(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.

(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.

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.
    Recommendation for Admission to Degree

5. An approved candidate shall pay such fees as may be determined from time to time by Council.
    Fees

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.
    Master of Statistics (MStats)

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.
    Qualifications

(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.

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.
    Registration

(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.

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,

(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 School.

5. An approved applicant shall be required to pay the fee for the course in which he desires to register. Fees shall be paid in advance.

Subject Descriptions

Identification of Subjects by Numbers

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 for the particular course within which the subjects are taken. Subject descriptions are contained in the appropriate section in the handbooks.

Servicing Subjects are those taught by a School or Department outside of its own faculty, and are listed at the end Undergraduate Study or Graduate Study of the relevant subject. Their subject descriptions are published in the handbook of the faculty in which the subject is taught.

The identifying numerical prefixes for each subject authority are set out below.

For General Studies subjects see the Board of Studies in General Education Handbook, which is available free of charge.

Information Key
The following is the key to the information supplied about each subject listed below: 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 not known at time of publication); L (Lecture, followed by hours per week); T (Laboratory/Tutorial, followed by hours per week); DN (Distinction); CR (Credit); PC (Pass Conceded).

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.

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Physics

Undergraduate Study

Physics Level I Units

1.001   Physics I   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 (for 1.001 only) 10.021B*
and	
2 unit Science (incl. Physics and/or Chem.) or	*31-100*
4 unit Science (incl. Physics and/or Chem.)	*31-100*

Co-requisite: 10.021C or 10.001 or 10.011.

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.

1.001   Higher Physics I   F L3T3

Prerequisites: As for 1.001; plus permission of the Head of the School of Physics. Co-requisite: 10.001 or 10.011.

For students of all Faculties except Medicine who have a good secondary school record and who wish to do a more challenging course.

Vector algebra, kinematics, uniform circular motion, coriolis acceleration, dynamics of particles, motion in a resistive medium, work and energy, gravitation, rotational motion of rigid bodies about fixed axis, rotational motion about a fixed point, Lagrange and Hamilton equations, harmonic motions, waves in elastic media. Sound waves, physical optics, polarization and double refraction.

Electric charges, electric intensity, electric flux, Gauss' law, electric potential, capacity, dielectric materials, electric current and resistance, DC circuits, magnetic field, field due to a current, electromagnetic induction, inductance, magnetic materials, transients, AC circuits, electronics, diode, rectifier circuit, simple power supplies, electronic amplifier systems, single loop feedback systems, signal processing circuits using operational amplifiers.

1.021   Introductory Physics I
(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 science 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.

1.031   Physics I (Optometry)   F L3T3

Prerequisites: None. Co-requisites: As for 1.021.

The description of motion, dynamics, statics, conservation of momentum and energy, rotation, elasticity and vibration, wave motion, fluids, temperature and expansion, heat and heat transfer, the theory of heat, electric charge, electric field, electric energy, electric circuits, electromagnetism, applied electricity, alternating current, analog electronics, digital electronics, modern physics.

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.

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.

1.952   Computer Applications in
Experimental Science I   S2 L2T4

Prerequisites: 6.611. Co-requisite: 1.001, 10.001 or 10.011. Excluded: 1.041, 1.042.

Review of binary logical 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. Laboratory 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.

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.

Electric field strength and potential, Gauss's 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.

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.

1.042 Measurement and Measurement Control Systems S2 L2T3

Prerequisites: 1.001 or 1.011. 10.001. Excluded: 1.9422, 1.962.

Basics of instrumental measurement; errors of observation and their treatment: statistical design of experiments and analysis of data; transducers; measurement and measurement control systems; systems operating in the digital mode; encoding, actuation, display, system input/output considerations; some special purpose systems: signal averaging systems, real time spectrum analysis systems, etc.

1.052 Methods in Mathematical Physics S2 L3T1

Prerequisites: 1.001 (or 1.011); 10.001 (or 10.011). Co-requisites: 10.2111 (or 10.2211), 10.2112 (or 10.2212), 10.1113 (or 10.1213).

Application of vector analysis in electrodynamics and waves. Concepts of higher mechanics. Lagrangean, Hamiltonian. Analysis of data from experimental physics eg spectroscopy, ionospheric physics etc, using functional analytical methods, applications of Fourier analysis. Equivalence to eigenvalue problems of differential equations in physics.

Terminating Physics Level II Units

1.9222 Electronics S1 L1T2

Prerequisites: 1.001 or 1.011 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, semiconductor 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; colorimetry; 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.

Properties of nucleii, the deuteron, meson forces, liquid drop model, shell model, alpha, beta and gamma decay, nuclear reactions, fission and fusion, elementary particle properties, symmetries and quark models.

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, Einstein coefficients, non-linear 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 super-conductivity. 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

Prerequisite: 1.9222 or 1.032.

Extension of AC circuit theory. Revision of transistors, parameters. Multistage 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   S1 L1½T½

Prerequisite: 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: 4.043.

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 L2T0

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.

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 I   F L½T3½

Prerequisite: 1.032.

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 II   F T4

Co-requisite: 1.763.

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.

Servicing Subjects

1.931	Physics 1 (Building)
1.941	Physics I (Medicine)
1.951	Physics I (Mechanical Engineering)
1.961	Physics I (Electrical Engineering)
1.971	Physics I (Surveying)
1.981	Physics I (Civil Engineering)
1.962	Physics of Measurement (Surveying)
1.972	Electromagnetism (Electrical Engineering)
1.982	Solid State (Electrical Engineering)
1.992	Classical Mechanics and Thermal Physics (Electrical Engineering)

Physics Level IV Units

All Physics honours courses consist of five lecture units and honours project work. Students intending to enrol in any of these honours courses must consult with the appropriate Head of Department in order to select the appropriate combination of units.

1.104   Physics IV (Honours)

Students doing this honours course should enrol in the single subject 1.104 only. This normally comprises three units consisting of lecture material in quantum mechanics, statistical mechanics, solid state, atomic and nuclear physics as well as two projects. In addition the student selects two topics from: astronomy; advanced topics in solid state; lasers and Fourier optics; biophysics.

1.304   Applied Physics IV (Honours)

Students doing this honours course should enrol in the single subject 1.304 only. Students take at least two units of lecture material in quantum mechanics, statistical mechanics, solid state and nuclear physics as well as two projects. In addition the student selects at least two topics from: mechanical properties of materials; physical principles of instrumentation; applied acoustics applied solid state physics.

It is possible to take the fifth lecture unit from any of the Physics IV courses.

1.504   Theoretical Physics IV (Honours)

Students doing this honours course should enrol in the single subject 1.504 only. Students take at least two units of lecture material in quantum mechanics, statistical mechanics, solid state, atomic and nuclear physics as well as one full year or two half year projects. In addition the student selects at least two topics from: waves in continuous media; quantum theory of solids; plasma theory; quantum electrodynamics.

It is possible to take the fifth lecture unit from any of the Physics IV courses.

Graduate Study

Not all graduate subjects are necessarily offered in any one year.

1.118G   Methods of Theoretical Physics

For PhD, MSc and MPhysics 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, MSc and MPhysics students.

1. Signal processing and retrieval. **2.** Resonance spectroscopy techniques. **3.** Diffraction and scattering techniques. **4.** Electron microscopy.

1.801G   Energy Alternatives

For MPhysics 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 students.

A study of advanced physical instruments, data handling and control, measurement technology and materials science with special reference to physics in industry.

1.927G   Acoustic Theory   S2 L1 ½ T ½

For MSc(Acoustics) students.

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.

1.937G Acoustic Measuring Systems S1 L1T0

For MSc(Acoustics) students.

Microphones, amplifiers, loudspeakers, filters, recorders, pick-ups, noise generators. Acoustic measuring instruments.

1.947G Advanced Physical Acoustics (Elective) S1 L3T1

For MSc(Acoustics) students.

Vibrating systems; coupled oscillators, beams, membranes, plates, resonators, acoustic filters; analogs, analogue computer simulation of vibrating systems; transfer of energy from one system to another. Reflection and transmission at walls, rigid walls, flexible walls, multiple walls, impulsive excitation. Sound absorbers; porous absorbers, perforated panel absorbers, sonic and ultrasonic measurement techniques, relation to properties of materials.

1.957G Acoustic Laboratory and Analysis S1 L1T2

For MSc(Acoustics) students.

Practical experiments related to the subject matter of 1.927G Acoustic Theory.

Theory and practice of digital methods of analysis in the time and frequency domains.

1.977G Electro-Acoustics S2 L1T0

For MSc(Acoustics) students.

Sound reinforcement systems; ambiophony; assisted resonance. Special requirements for translation; language laboratories.

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.

Undergraduate Study

2.111 Introductory Chemistry† S1 L2T4

Prerequisite: None.

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, neutralisation. 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 IA† 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 and	1-100
2 unit Science (Physics or Chem.) or	31-100
4 unit Science (multistrand) or	31-100
2 unit Science (other than Physics or Chem.) or 2.111.	51-100

Stoichiometry and solution stoichiometry. Structure of matter, solids, liquids, gases. Thermochemistry. Equilibria and equilibrium constants, entropy changes, free energy changes, the relationship between equilibrium and standard free energy changes. Ideal solutions, colligative properties. Equilibrium in electrolyte solutions, acid-base equilibria, solubility equilibria and redox equilibria. The rate of a chemical change and chemical kinetics.

2.131 Chemistry IB S1 or S2 L2T4

Prerequisite: 2.111 or 2.121.

Relative stability of oxidation states. Electronic structure of atoms in terms of the quantum mechanical model. Structure of the Periodic Table and its relationship to electronic configuration. Chemical bonding, hybridization. Properties of compounds of selected elements, acid-base character of oxides and hydroxy compounds. Chemistry of carbon compounds, stereoisomerism, reactions of aliphatic and aromatic hydrocarbons, alcohols, phenols, ethers, alkyl halides, aldehydes, ketones, carboxylic acids and their derivatives, esters, acyl halides, anhydrides, amides, amines.

2.141 Chemistry IM† F L2T4

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Mathematics or	71-100
3 unit Mathematics or	21-100
4 unit Mathematics and	1-100
2 unit Science (Physics or Chem.) or	51-100
4 unit Science (multistrand) or	51-100
2 unit Science (other than Physics or Chem.) or 2.111	51-100

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.

† 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.

2.002A Physical Chemistry S1 or S2 L3T3

Prerequisites: 2.121 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 S1 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, 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 IA, IIA, 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.

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 spectrometry with particular reference to structure determination. Laboratory and tutorial work to illustrate the above, including inspection of major instruments.

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.

2.003K 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 to Quantum Chemistry S1 L2T4

Prerequisites: 1.001 or 1.011, 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; Huckel 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.

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 or S2 L2T4

Prerequisite: 2.002B.

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.

Heterocyclic Chemistry. Synthesis and reactions of the following heteroaromatic systems; pyridine, quinoline, isoquinoline. Flavones and isoflavones; pyrimidine; pyrrole, furan, thiophen. Indole, imidazole.

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 IIIA (the lanthanides and actinides), IVA, VA, VIA and VIIA. More advanced chemistry of groups IIIB, 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   S2 L2T4

Prerequisite: 2.002B. Excluded: 2.033L.

Discussion at advanced level of the chemistry of selected commercially important groups of organic materials. Mechanisms of reaction and physical properties, together with methods of examination, in overall unit approach, correlating structure with behaviour. Emphasis on breakdown to model systems.

Theory of physical techniques, refractometry, polarimetry etc. from basis of additivity. Fatty acids with emphasis on unsaturation, thermal and oxidative polymerizations, alkyl resins, analysis of mixtures. Waxes and sterols; selected natural and synthetic macromolecules; polymerization processes, including treatment of initiators, chain transfer agents, retarders. Vulcanization and sulphur-olefin reactions. Photochemical processes; electro-organic chemistry. Fine chemicals, soaps and detergents. Aspects of metal catalysis in industry.

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.

2.004   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 III (or completion of requirements for the pass degree).

2.013B   Synthetic Organic Chemistry   S2 L2T4

Prerequisite: 2.003B.

Introduction, aims, stereochemical and positional problems, recognition of sub-units. Modern functional group transformations with particular reference to positional and stereochemical control. Spectroscopic markers. Electrocyclic reactions, formation, contraction and expansion of rings, Diels-Alder and related cycloadditions, photochemistry, Woodward-Hoffman rules, protecting groups. Representative syntheses of compounds of theoretical and biological interest, eg cubane, Dewar benzene, caryophyllene, reserpine, corrins.

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.

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.

2.013L Chemistry and Enzymology of Foods F L1T2

Prerequisite: 2.002B. Excluded: 2.003J, 2.043L, 2.023L, 2.053L.

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.

2.023A 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 Natural Product Chemistry S2 L2T4

Prerequisite: 2.003B.

The isolation, structure determination, synthesis and biosynthesis, and the reactions of selected classes of organic compounds of biological significance. The chemistry of plant and animal products — terrestrial and marine. Examples from carbohydrates, terpenoids and steroids, alkaloids and other naturally-occurring heterocyclic systems. Interdisciplinary aspects of the topic.

2.023L Biological and Agricultural Chemistry SS L2T4

Prerequisite: 2.002B. Excluded: 2.053L, 2.013L, 2.043L.

Water supplies, bore water, methods of examination and assessment. Origin of plant constituents of importance to food industries. Oxygen and nitrogen heterocyclic chemistry as required for natural pigments, phenolics, tannins, methods of estimation. Photochemical processes. Toxic and nontoxic constituents, alkaloids, enzyme inhibitions, preparation, assessment and active site concepts.

Animal feeds, fodders, silage formation. Soil and plant nutrients. Fractionations of carbohydrates, proteins. Structure and glyceride fractionation of fats.

Agricultural chemicals, feed additives. Insecticides, pesticides, natural and synthetic. Fungicides, herbicides and plant growth hormones. Synthesis formulation, stability and degradation processes. Extensions in vitamin chemistry. Trace metals in plant and animal metabolites.

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; X-ray diffraction; basic structural features.

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.

2.043L Chemistry and Enzymology of Foods‡ F L2T4

Prerequisite: 2.002B. Excluded: 2.013L, 2.023L, 2.053L.

As for 2.013L but in greater detail and depth.

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* Only available to non-Chemistry majors. It may not be included in course programs 0201, 0202, 0203, 0204, 0241, 0242, 0262 and Course 3910.

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. Applications of the above concepts to inorganic and organic reaction mechanisms.

2.053L   Biological and Agricultural Chemistry‡   F L2T4

Prerequisite: 2.002B. Excluded: 2.023L, 2.013L, 2.043L.

As for 2.023L but in more detail and depth.

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.

Servicing Subjects

2.030	**Organic Chemistry**
2.951	**Chemistry IME**
2.981	**Chemistry ICE**
81.002	**Chemistry and Biochemistry for Medical Students***

Graduate Study

2.231G   Food and Drugs I and II —
**and   (Including Pharmacognosy and
2.242G   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, fluorescence 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 techniques.

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.

‡ Only one of these double units may be chosen.

* Conjointly with the School of Biochemistry.

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 I. **2.** Treatment of analytical data. **3.** Instrumental techniques in food and drug analysis. **4.** Food and drugs II. **5.** Toxicology, occupational and public health. *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.*

Metallurgy

Undergraduate Study

4.302   Chemical and Extraction Metallurgy I   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.

4.402   Physical Metallurgy I   S1 L3T3 S2 L2T4

Co-requisites: 2.002A*, 4.502. Excluded: 1.932, 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. Mechanism of phase transformations, departures from equilibrium, metastable transition phases. Heat treatment of alloys. Structure of carbon steels and cast irons. Optical metallography.

4.412   Metallurgical Phases — Structure and
Equilibrium Part I   S1 L3T3

Co-requisites: 2.002A, 4.302. Excluded: 1.932, 4.402.

The crystal structure of metallic phases. Crystal defects. Physical properties of solids. Phase equilibrium in alloy systems. The genesis of microstructure. Metallography.

4.422   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.

4.502   Mechanical Metallurgy   S1 L2T2 S2 L1T2

A combination of 4.512 and 4.522. *Co-requisite: 4.402.*

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.

4.602   Metallurgical Engineering I   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.

4.303   Chemical and Extraction
Metallurgy II   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.

4.403   Physical Metallurgy II   F L4T5

Prerequisite: 4.402. Excluded: 1.313.

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

† This material is similar to that in units 2.231G. 2.371G, 2.281G, 2.242G and 2.251G respectively, but is examined at a higher level.

* This unit is taken in Session 1.

theory of solids — application to electrical, thermal and magnetic properties and to theory of alloys. Preferred orientations in metals. Optical, X-ray and electron metallography.

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.

4.613   Metallurgical Engineering IIA   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. *Economics:* As for Chemical Engineering IIB, 48.032 Unit 4 (see Faculty of Applied Science Handbook).

4.703   Materials Science   S2 L2T1

Co-requisite: 4.403.

The application of the principles of physical metallurgy to the development of modern materials, stressing the structure property relationships that determine the design of materials. Topics include: materials used for structural purposes, high temperature applications, corrosive environments, nuclear engineering, fuel cells, magnetic applications.

4.314   Chemical and Extraction
Metallurgy IIIA   S1 L3T1½

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 IIIB   S2 L3½T1

Prerequisite: 4.303.

A selection of advanced topics in chemical and extractive metallurgy.

4.404   Physical Metallurgy III   S1 L3T4½ S2 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. Selection of advanced topics in physical metallurgy including radiation damage, martensitic transformations, neutron diffraction, internal friction, sintering, creep, superplasticity, fracture.

4.504   Mechanical and Industrial
Metallurgy   S1 L3T0 S2 L3T6

Prerequisites: 4.403, 4.503.

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.

4.024   Metallurgy Project*   S1 6 S2 3

An experimental investigation of some aspects of metallurgy.

4.054   Metallurgy Seminar   F L2T0

A course of lectures on the preparation and presentation of technical papers. Each subject is required to prepare and present a paper on a nominated subject.

Mechanical and Industrial Engineering

Undergraduate Study

5.006   Engineering E   S1 L/T6

Prerequisites:

	HSC Exam Percentile Range Required
Either	
2 unit Science (Physics)	*31-100*
or	
4 unit Science (incl. Physics)	*11-100*
or	
2 unit Industrial Arts	*31-100*
or	
3 unit Industrial Arts	*11-100*

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.

* Project includes three weeks laboratory work during the Midyear Recess.

5.010   Engineering A   S1 or S2 L4T2

Prerequisites: As for 5.006 Engineering E.

Students who wish to enrol in this subject can make up for the lack of the prerequisite by work taken in Physics in the first half of 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

Prerequisite: 5.010.

Engineering Dynamics: Kinetics of the plane motion of a particle; equations of motion, dynamic equilibrium, work and energy. Kinetics of systems of particles; impulse and momentum. Rotation of rigid bodies about a fixed axis. Belt, rope and chain drives, gear trains.

Mechanics of Solids I: 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 areas. Stress and deformation due to bending; linear and non-linear problems; use of step functions.

5.030   Engineering C   SS L/T6

Prerequisites: As for 5.006 Engineering E.

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 developments of methods for their solution. Australian standard engineering drawing practice. Applications involving detail and assembly drawings, functional dimensioning and tolerancing.

And one of options: 1, 2, 3, 4 or 5.

1. *Production Technology:* 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. (Chemical Engineering and Industrial Chemistry students must take this option) *Introduction to Chemical Industry:* 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. (Metallurgy students must take this option) *Introduction to Metallurgical Engineering:* 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. (Mining Engineering students must take this option) *Introduction to Mining Engineering:* 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. (Ceramic Engineering students must take this option) *Introduction to Ceramic Engineering:* The nature of ceramics. Classification of materials. The materials science approach. History of ceramics. The ceramic engineer and society. 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.

Electrical Engineering and Computer Science

Computer Science

Undergraduate Study

6.606   Computing Science Honours

6.611   Computing I   S1 L3T3

Prerequisite: As for 10.001. Corequisites: 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).

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, propositional logic, artificial intelligence, and the axiomatic semantics of a programming language.

6.613   Computer Organization and Design   SS L2T3

Prerequisites: 6.631* or 6.021E*, 6.021D* or 6.621* or 6.620*. 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.

* Pass Conceded (PC) result is not acceptable as a prerequisite.

6.621 Computing IIA   S1 or S2 L3T2

Prerequisites: 6.611*, 10.001 or 10.011. Excluded: 6.620, 6.021D.

For those students who intend to take further subjects in computer science. This subject expands and develops material introduced in 6.611.

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.*

6.631 Computing IIB   S1 or S2 L3T2

Prerequisites: 6.620* or 6.621* or 6.600 (CR) or 6.021D*. 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; register transfer description of a tutorial computer, switching algebra, minimization, combinational logic design, integrated circuits, registers, counters, and other medium scale integration (m.s.i.) devices, clocked sequential circuits, computer arithmetic.

6.632 Operating Systems   S1 L2T3

Prerequisites: 6.631* or 6.021E*, 6.641*.

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. Excluded: 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 IIC   S1 or S2 L3T2

Prerequisites: 6.620* or 6.600 (CR) or 6.021D* or 6.621*.

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*.

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 S2 L3T2

Prerequisite: 6.641*.

1. Language description: phase structure grammars, Chomsky classifications, context-free grammars, finite state grammars, Backus Naur Form, syntax graphs, LL(k), LR(k), LALR(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 6.621* or 6.600 (CR) or 6.021D*, 1 unit chosen from: 10.311A, 10.321A, 10.301, 10.331 or 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: descrete event simulation, the SIMULA programming language; pseudo random number generation; simple queueing theory; applications of mathematical programming; statistical calculations; critical path methods; computer graphics, artificial intelligence.

6.647 Business Information Systems S1 L3T2

Prerequisites: 6.641*, 14.501. Excluded: 14.603, 14.604, 14.605.

Introduction to accounting systems — general ledger, debtors and creditors; auditing and internal system controls; 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; file updating. The course includes an invited lecture strand presented by guests from commerce and industry. A major project, written in COBOL, is undertaken as a team exercise.

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* Pass Conceded (PC) result is not acceptable as a prerequisite.

6.649   Computing Practice†   S2 L3T2

Prerequisite: 6.641*. Co-requisites: 6.633 or 6.643 or 6.647.

Not offered in 1983.

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. Key-board entry. Verification. Word processing; report preparation; documentation. Social Implications of computing. Professional responsibilities and ethics. Project management; software engineering; psychology of computer programming.

Mathematics

Undergraduate Study††

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 I. 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 I (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 I, but in appropriate cases students who have passed in 10.021C General Mathematics IC at a satisfactory level may be given permission to enrol.

10.001   Mathematics I   F L4T2

Prerequisite:

	IHSC Exam Percentile Range Required
2 unit Mathematics	71-100
or	
3 unit Mathematics	21-100
or	
4 unit Mathematics	1-100
or	
10.021B	

Excluded: 10.011, 10.021A, 10.021B, 10.021C.

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

10.011   Higher Mathematics I   F L4T2

Prerequisite:

	HSC Exam Percentile Range Required
3 unit Mathematics	71-100
or	
4 unit Mathematics	11-100

Excluded: 10.001, 10.021A, 10.021B, 10.021C.

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

10.021A   General Mathematics IA‡   S1 L4T2

Number systems (including absolute value, inequalities, surds, etc.); coordinate geometry; polynomials, quadratics; concept of the function; trigonometric functions, logarithmic and indicial functions and their laws of operation; introduction to differentiation and integration with simple applications.

† Can only be counted with at least 3 other Level III Computer Science.

* Pass Conceded (PC) result is not acceptable as a prerequisite.

†† When a unit is listed as a prerequisite or co-requisite, the appropriate higher unit may be substituted.

‡ Entry to General Mathematics IA is allowed only with the permission of the Head of the School of Mathematics, and that permission will be given only to students who do not qualify to enter General Mathematics IB.

10.021B General Mathematics IB   S1 or S2 L4T2

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Mathematics	*51-100*
or	
3 unit Mathematics	*11-100*
or	
4 unit Mathematics	*1-100*
or	
10.021A	

Excluded: 10.011, 10.001.

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 IC   S2 L4T2

Prerequisite: 10.021B. Excluded: 10.001, 10.011, 10.021A.

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 (one Level II unit)*   F L1T1

Prerequisite: 10.001 or 10.021C (CR).

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 (one Level III unit)*   F L1T1

Prerequisite: 10.031.

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 IX   S2 L4T2

Co-requisites: 10.001 or 10.011, 6.611 or 1.041.

Elementary logic, finite structures, errors in computing, simple algorithms. Problem solving as a multi-stage process: comprising Markov processes and matrices, population dynamics, electrical currents and their differential equations (interpretation of analytic and numerical solutions), data structures and semi-numerical algorithms

10.612 Mathematical Software   F L1½T½

Prerequisites: 6.621, 10.111A, 10.2112 (or equivalent).

Review of FORTRAN 77. Linear Algebra: numerically stable methods for solving systems of linear equations, condition numbers and scaling, methods designed for matrices with special structure. 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. Optimization: Linear programming, linearization of non-linear problems, integer programming and other special problems, non-linear methods. Further examples and assignments chosen from more advanced areas of the above topics.

Pure Mathematics

10.111A Pure Mathematics II — Linear Algebra   F L1½T1

Prerequisite: 10.001. Excluded: 10.121A.

Vector spaces, linear transformations and matrices, change of basis. Eigenvalues and eigenvectors, generalised eigenvectors. Functions of matrices. Linear systems of differential equations including the use of Laplace transform. Inner products, orthogonalisation, projections. Unitary and self-adjoint transformations. Quadratic and Hermitian forms.

10.1113 Pure Mathematics II — Multivariable Calculus   S1 or S2 L1½T1

Prerequisite: 10.001. Excluded: 10.1213.

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

10.1114 Pure Mathematics II — Complex Analysis   S1 or S2 L1½T1

Prerequisite: 10.001. Excluded: 10.1214.

Analytic functions, Taylor and Laurent series, integrals. Cauchy's Theorem, residues, evaluation of certain real integrals.

10.1115 Pure Mathematics II — Finite Mathematics A   S1 L1½ T½

Prerequisite: 10.001.

Logic, truth tables, boolean algebra, switching circuits. Integer arithmetic, radix representation, Euclid's algorithm, continued fractions, congruences, Chinese remainder theorem, applications to computer arithmetic. Polynomial arithmetic, division algorithm, factorisation, partial fractions, interpolation, polynomials over a finite field.
Some of this material touches on topics covered in 10.081; this subject is recommended but not an essential prerequisite.

* These units are also available to Faculty of Science students as a sequence of two units constituting a terminating service course in mathematics. As such they are mutually exclusive to any other Level II or Level III units in Pure and/or Applied Mathematics and/or Theoretical Mechanics except that 10.412A may be taken with 10.031 and 10.032.

10.1116   Pure Mathematics II — Finite Mathematics B
                                                    S2 L1½ T½

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. Codes, error-correcting codes, cryptography, public-key cryptosystems.

10.121A   Higher Pure Mathematics II — 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 II —
Multivariable Calculus   S1 L2T½

Prerequisite: 10.011 or 10.001 (DN). Excluded: 10.1113.

As for 10.1113 but in greater depth.

10.1214   Higher Pure Mathematics II —
Complex Analysis   S2 L2T½

Prerequisite: 10.1213. Excluded: 10.1114.

As for 10.1114 but in greater depth.

10.1111   Pure Mathematics III — 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 III — 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 III —
Number Theory   SS L1½T½

*Prerequisites: ***. Excluded: 10.1421, 10.121C.*

Euclidean algorithm, congruences, sums of squares, diophantine equations.

10.1123   Pure Mathematics III —
Logic and Computability   SS L1½T½

*Prerequisites: ***.*

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

10.1124   Pure Mathematics III —
Combinatorial Topology   SS L1½T½

*Prerequisites: ***.*

Elementary combinatorial topology of surfaces.

10.1125   Pure Mathematics III —
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 III —
Partial Differential Equations   S2 L1½T½

Prerequisites: 10.1113, 10.1114. Co-requisite: 10.1125, 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 III —
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 III —
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 III —
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 III —
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.

***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.

10.1522 Pure Mathematics III — 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 III — Functional Analysis and Applications   S1 or S2 L1½ T½

Prerequisites: 10.111A, 10.2112. Excluded: 10.122B.

Geometry of Hilbert spaces, approximation problems, linear operators, filters, spectral methods for differential equations.

10.122B Higher Pure Mathematics III — Real Analysis and Functional Analysis F L1½T½

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 III — Rings and Fields   S1 L1½T½

Prerequisites: 10.121A or 10.111A (DN).

Rings; integral domains; factorisation theory. Fields; algebraic and transcendental extensions. Introduction to algebraic number theory; quadratic reciprocity.

10.1322 Higher Pure Mathematics III — Galois Theory   S2 L1½T½

Co-requisite: 10.1321.

Galois fields. Galois groups. Solution of equations by radicals. Further algebraic number theory.

10.1323 Higher Pure Mathematics III — 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 III — Integration and Fourier Analysis   S2 L1½T½

Co-requisite: 10.122B.

Lebesgue integration; measure theory. Fourier transforms.

10.1325 Higher Pure Mathematics III — 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 III — Calculus on Manifolds   S2 L1½T½

Co-requisite: 10.1325.

Manifolds; vector fields; flows. Introduction to Morse theory. Differential forms; Stokes' theorem; the Gauss-Bonnet theorem.

10.1421 Higher Pure Mathematics III — 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 III — 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 III — 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 III — 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 III — Ordinary Differential Equations   S1 L1½T½

Prerequisites: 10.121A or 10.111A (DN), 10.1213 or 10.1113 (DN). Corequisites: 10.122B (strongly recommended). Excluded: 10.1125.

Existence and uniqueness theorems. Linearisation. Qualitative theory of autonomous systems.

*** 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.

10.1426 Higher Pure Mathematics III — 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 IV

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 II — Vector Calculus   S1 or S2 L1½T1

Prerequisite: 10.001. Excluded: 10.2211.

Vector fields; divergence, gradient, curl of a vector; line, surface, and volume integrals. Gauss' and Stokes' theorems. Curvilinear coordinates.

10.2112 Applied Mathematics II — Mathematical Methods for Differential Equations   S1 or S2 L1½T1

Prerequisites: 10.001. Excluded: 10.2212.

Series solution of ordinary differential equations; numerical methods. Partial differential equations: separation of variables. Fourier series, Bessel functions.

10.2113 Applied Mathematics II — Introduction to Linear Programming   S1 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 II — 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 II — Numerical Methods   F L1T1

Prerequisite: 10.001.

Errors, their generation, propagation, estimation and avoidance. Solution of non-linear equations in one and two variables. Roots of polynomials. Lagrange interpolation. Differences and the elements of difference equations. Quadrature methods, classical and Romberg. Solution of ordinary differential equations: Taylor expansion, Runge-Kutta and predictor-corrector methods. Boundary value problems involving linear ordinary differential equations. Extensive practical work carried out either on a modern pocket calculator or on the University computer.

10.2211 Higher Applied Mathematics II — 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 II — 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 II — 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 II — 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 III — 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 III —
Optimization Methods   F L1½T½

Prerequisites: 10.1113**. Excluded: 10.222L.

Unconstrained multivariable search procedures; including steepest descent, D-F-P method, Hooke and Jeeves method. Constrained optimization; including convexity, Lagrange multipliers, Kuhn-Tucker conditions, duality, simple constrained search methods, penalty functions. Special methods; including geometric programming, separable programming, branch and bound. Applications of these methods to resource allocation, production problems, capital investment and economic models.

10.212M   Applied Mathematics III —
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 III —
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 III —
Maxwell's Equations and Special
Relativity   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), 1.001. Excluded: 1.033.

Electrostatic and quasi-static magnetic fields: mathematical formulation of basic laws, field equations, methods of solution, general theorems, polarization, energy and mechanical forces. Electromagnetic fields: Maxwell's equations, Poynting theorem, Maxwell stress tensor, electromagnetic momentum and radiation pressure, electromagnetic potentials, radiation, vector wave equation, solutions, cavity resonators, waveguides. Relativity: relativistic kinematics, dynamics and electrodynamics, radiation from moving charges, radiation damping.

10.222F   Higher Applied Mathematics III —
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.

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 III —
Optimization Methods   F L1½T½

Prerequisites: 10.1213 or 10.1113 (DN)***. Excluded: 10.212L.

As for 10.212L but in greater depth.

10.222M   Higher Applied Mathematics III —
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 IV

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 IV (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 II —
Probability and Random Variables   S1 L4T3

Prerequisite: 10.001 or 10.021C (CR). Excluded: 10.321A, 10.301, 10.331, 45.101.

An introduction to axiomatic treatment of probability. Variates (univariates, multivariates, expectations, moment generating and probability generating functions). Standard distributions. Sampling distributions.

** At least 1 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), 10.2214 *or* 10.2114 (DN).

* The evening course for 10.3111A, subject to sufficient enrolment, runs at 3½ hours per week throughout the year.

10.311B Theory of Statistics II — Basic Inference   S2 L4T3

Prerequisite: 10.311A. Excluded: 10.321B, 10.301, 10.331, 45.101.

Point estimation (moments, maximum likelihood, minimum χ^2, etc.) Confidence interval estimation, exact and approximate. Elementary Neyman-Pearson theory of tests of significance, standard significance tests. Regression (including curvilinear) on a single fixed variable. Analysis of variance. Non-parometric methods.

10.321A Higher Theory of Statistics II — Probability and Random Variables   S1 L5T3

Prerequisite: 10.001. Excluded: 10.311A, 10.301, 10.331, 45.101.

10.311A at greater depth and covering a slightly wider field.

10.321B Higher Theory of Statistics II — Basic Inference   S2 L5T3

Prerequisite: 10.321A. Excluded: 10.311B, 10.301, 10.331, 45.101.

10.311B at greater depth and covering a slightly wider field.

10.312A Theory of Statistics III — 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 III — Experimental 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 III — 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 III — 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 III — 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 III — 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 III — 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 III — Experimental Design (Applications) and Sampling   S2 L2½ T2

Prerequisites: 10.321B, 10.111A, 10.1113. Excluded: 10.312B.

As for 10.312B but in greater depth.

10.322C Higher Theory of Statistics III — Experimental Design (Theory)   S1 L2½ T2

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 III — Probability Theory   S2 L2½ T2

Prerequisites: 10.321A, 10.111A, 10.1113. Excluded: 10.312D.

As for 10.312D but in greater depth.

10.322E Higher Theory of Statistics III — Statistical Inference   S2 L2½ T2

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 IV

Specialised 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 L1½ T½

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 L1½ T½

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

10.411A Theoretical Mechanics II — Hydrodynamics   S2 L3 T1

Prerequisite: 10.001. Co-requisites: 10.411B or 1.012, 10.1114. Excluded: 10.421A.

Conservation laws and Bernoulli's equation for one-dimensional flow. Equations of continuity and Euler's equation. Kelvin's Theorem. Incompressible, irrotational flow in two and three dimensions, including applications of complex variables, methods of images, harmonic functions, and axially symmetric flow. Introduction to compressible and viscous fluids.

10.411B Theoretical Mechanics II — Principles of Theoretical Mechanics   S1 L3 T1

Prerequisites: 10.001, 1.001 or 10.041 or 5.010. Co-requisites: 10.2111, 10.2112, 10.1113. Excluded: 10.421B.

Revision of vectors, kinematics of particles and rigid bodies. Dynamics of particles including simple harmonic and projectile motion. Systems of particles: conservation principles, collisions, rocket motion, the catenary. Work and energy. Rotating frames; moments of inertia.

Elementary problems derived from continuum mechanics including conservation laws, one-dimensional fluid flow, extension and bending of beams.

10.421A Higher Theoretical Mechanics II — Hydrodynamics   S2 L3 T1

Prerequisites: 10.011 or 10.001 (DN). Co-requisites: 10.421B, 10.1114. Excluded: 10.411A.

As for 10.411A but in greater depth.

10.421B Higher Theoretical Mechanics II — Principles of Theoretical Mechanics   S1 L3 T1

Prerequisites: 10.011 or 10.001 (DN), 1.001 or 5.010 or 10.041. Co-requisites: 10.2211, 10.2212, 10.1113. Excluded: 10.411B.

As for 10.411B but in greater depth.

10.412A Theoretical Mechanics III — Dynamical and Physical Oceanography   F L1½ T½

Prerequisites: 10.2111 & 10.2112 or 10.031, 1.001. It is recommended that one of the following be taken concurrently: 10.411A or 1.012 or 1.913.

1. The physical properties of the oceans and their measurement, including: salinity, temperature, density, dynamic heights. Currents, waves and tides. **2.** Theoretical models of current and waves.

Up to seven days field/laboratory work per year.

10.412B Theoretical Mechanics III — 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 III — Mathematical Methods   F L1½T½

Prerequisites: 10.2112, 10.111A, 10.1113, 10.1114. Excluded: 10.422D.

Sturm-Liouville equation, eigenvalues, expansion in orthonormal functions. Fourier, Fourier-Bessel and Legendre series as special cases. Fourier and Laplace transforms, with application to ordinary and partial differential equations. Diffusion equation and transmission-line equation. Wave equation.

10.422A Higher Theoretical Mechanics III — 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 III — 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 but in greater depth.

10.422D Higher Theoretical Mechanics III — 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 transform and Laplace transform, with applications to differential and integral equations. Generalized functions and asymptotic estimation of Fourier integrals. Applications to solutions of partial differential equations of the first and second order.

10.423 Theoretical Mechanics IV

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

10.021A	General Mathematics IA
10.022	Engineering Mathematics II
10.033	Electrical Engineering Mathematics III
10.341	Statistics SU
10.351	Statistics SM
10.361	Statistics SE
10.381	Probability and Random Variables
10.381	Statistics SC
11.4320	Geometry

Graduate Study

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; advanced 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: 1st 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: 1st 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 randomisation; 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 randomised 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 I

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory. Multiple comparisons.

10.382G Experimental Design II

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 I

Likelihood ratio tests for means, variances and structure. Discriminant, principal component, canonical and factor analysis.

10.386G Multivariate Analysis II

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. Estimatation 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

32.012G	Biomedical Statistics
10.061G	Advanced Mathematics for Electrical Engineers
32.101G	Mathematical Modelling for Biomedical Engineers
10.181G	Advanced Analysis
10.182G	Characters and Crystals
10.183G	Geometry
10.184G	Number Theory
10.185G	Distributions
10.186G	Hilbert Space
10.187G	History of Mathematics
10.188G	Topology
10.189G	Seminar in Mathematics Education
10.190G	Graph Theory and Combinatorics
10.191G	Mathematics Education A
10.192G	Mathematics Education B
10.281G	Mathematical Methods
10.282G	Mathematics of Optimization
10.284G	Relativity and Cosmology
10.283G	Quantum Mechanics
10.361G	Statistics
10.371G	Statistics
10.481G	Essay

Psychology

Undergraduate Study

Psychology Level I Unit

12.100   Psychology I   **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 II   **F L2T1**

Prerequisite: 12.001* or 12.100*. 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 II   **S1 L2T2**

Prerequisite: 12.001* or 12.100*. Excluded: 12.052.

The basic phenomena of behaviour and experience in a biological context.

12.202   Complex Psychological Processes II   **S2 L2T2**

Prerequisite: 12.001* or 12.100*. Excluded: 12.062.

Information processing and cognitive functioning, and social bases of behaviour and personality.

12.203   Psychology IIA   **F L2T2**

Prerequisite: 12.001* or 12.100*. Co-requisite: 12.200, 12.201, 12.202. Excluded: 12.042.

Available to Course 3430 students only.

Session 1: As for 12.330 Psychological Assessment III. Session 2: Current trends and issues in psychology.

12.204   Human Relations II   **S1 L2T2**

Prerequisite: 12.001* or 12.100*. Excluded: 12.072.

The personality development of the individual from birth through to death, focusing on the influences on such development from the family of origin, school, peers, work, marriage and other social groups.

12.205   Individual Differences II   **S2 L2T2**

Prerequisite: 12.001* or 12.100*. 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 IIIA   **S1 L2T2**

Prerequisite: 12.152 or 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 III**   **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 III   **S1 or S2 L2T2**

Prerequisites: 12.052 & 12.152, or 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 III   **S1 L2T2**

Prerequisites: 12.052 & 12.152, or 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 IIIB   **S2 L2T2**

Prerequisites: 12.152 & 12.153, or 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 III   **S1 L2T2**

Prerequisites: 12.052 & 12.152, or 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.

* A Pass Conceded result is not acceptable as a prerequisite.

12.311   Perception III

Prerequisites: 12.052 & 12.152, or 12.200 & 12.201. Excluded: 12.473.

Not offered in 1983.

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 III   S1 L2T2

Prerequisites: 12.062 & 12.152, or 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 III   S2 L2T2

Prerequisites: 12.052 & 12.152, or 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 III   S1 L2T2

Prerequisites: 12.062 & 12.152, or 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 III   S2 L2T2

Prerequisites: 12.062 & 12.152, or 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 III   S2 L2T2

Prerequisite: 12.322 or 12.603.

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 III   S2 L2T2

Prerequisites: 12.062 & 12.152 or 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 III   S1 L2T2

Prerequisites: 12.152 or 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 III   S2 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 III

Prerequisites: 12.052 & 12.152, or 12.200 & 12.201. Excluded: 12.713.

Not offered in 1983.

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 III   S1 L2T2

Prerequisite: 12.152 or 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 man's capabilities.

12.334   Behaviour in Organizations III   S2 L2T2

Prerequisites: 2 Psychology Level II subjects. Excluded: 12.653.

Theories and research methods for understanding behaviour in organisations and in the environment.

12.335   Behavioural Evaluation and Assessment III
S2 L2T2

Prerequisite: 12.322 or 12.603.

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 III

Prerequisites: 12.153 & 12.303, or 12.300 & 12.305. Co-requisite: 12.253 or 12.304.

Not offered in 1983.

An occasional elective dealing with a special field of psychology.

Psychology Level IV Units

12.400   Psychology IV (Research-3430)   F

Prerequisite: All requirements for Years 1-3 of the course.

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

12.401   Psychology IV (Course Work-3430)   F

Prerequisites: All requirements for Years 1-3 of the course.

Psychology IV in the BSc in Psychology degree course. Course work and a supervised practical training to be determined in consultation with the Head of School.

12.403   Psychology IV (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, at an average level of Credit or better.*

Psychology IV in the Arts, and Science and Mathematics degree courses. A supervised research thesis and course work to be determined in consultation with the Head of School.

12.404   Psychology IV (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, at an average level of Credit or better.

Psychology IV in the Arts, and Science and Mathematics degree courses. Course work and a supervised practical training to be determined in consultation with the Head of School.

Psychology Servicing Units

12.651   Psychology (Industrial Relations)

12.741   Psychology (Optometry)   F L2T0

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 will 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.

Graduate Study

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

Supervised 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

* Students in program 7312 Physiology/Psychology take 4 Psychology Level III units approved by the Head of the School of Psychology.

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 supervised 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.

Accountancy

Undergraduate Study

| 14.501 | Accounting and Financial Management IA | S1 or S2 LT4½ |

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 taxation and auditing.

| 14.511 | Accounting and Financial Management IB | S1 or S2 LT4½ |

Prerequisite: 14.501.

Development of basic concepts introduced in 14.501 Accounting and Financial Management IA, including management accounting and operations research, corporate reporting, business finance, system design, elementary computer programming and applications.

| 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.

| 14.611 | Information Systems Development (Honours) | S1 L2T1 |

Prerequisites: 14.603 and approval by Head, Department of I.S.

A systems analysis and design case study. Information systems project management, data processing administration, on-line systems design techniques, internal controls.

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   S1 L2T1

Prerequisite: 14.603.

Advanced data communication concepts, computer networks, reference to international standards and common industry communications 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   S2 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.

15.011   Macroeconomics I   S1 or S2 L2T1½
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 betweeen the goods and money markets in equilibrium and disequilibrium situations, inflation and the balance of payments.

Graduate Study

For students enrolled in the MScSoc degree course

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.

Economics

Undergraduate Study

Department of Economics

15.001   Microeconomics I   S1 or S2 L2T1½

Prerequisite:

	HSC Exam Percentile Range Required
2 unit A English or	31-100
2 unit English or	21-100
3 unit English	11-100

Introduction to micro-economic analysis and its application to contemporary policy issues. The indifference curve approach to consumer behaviour, income and substitution effects, market demand, consumer surplus. Isoquants, cost concepts, supply curves. Perfect and imperfect product markets, agricultural intervention schemes. Partial and general equilibrium, concept of efficiency, international trade and tariffs. Productivity of factors of production, labour markets, bilateral monopoly, wage fixing in Australia. Public goods, pollution and property rights.

Biological Sciences

Undergraduate Study

17.031   Biology A   S1 L2T4

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Science (any strand)	31-100
or	
4 unit Science (any strand)	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 Orientation Week from Laboratory A, Ground Floor, Biological Sciences Building. Students must purchase this *prior to* the first practical class.

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 & 17.021 (or 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

Field tutorials are an essential part of these subjects, and are held during weekends and/or recesses. Dates and costs are available during the first week of the subject. Attendance is compulsory.

Undergraduate Study

25.110　Earth Materials and Processes　　　　S1 L2T4

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Science (any strand) or	31-100
4 unit Science (any strands)	31-100

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, neatectonics.

Field Work of up to two days is a compulsory part of the subject.

25.120　Earth Environments and Dynamics　　S2 L2T4

Prerequisite: 25.110.

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 four days is a compulsory part of the subject.

25.211　Earth Materials I　　　　　　　　　　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 plate 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.

25.221　Earth Materials II　　　　　　　　　　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 siliceous 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.

25.212 Earth Environments I
S1 L3T3

Prerequisite: 25.120.

Sedimentology: Flow regimes and bedding forms, sedimentary structures. Flume experiments. Modern and ancient sedimentary environments of deposition: alluvial, deltaic, coastal, shelf and deep sea. The facies concept.

Stratigraphy: Stratigraphic classification including the Code of Stratigraphic Nomenclature. Time in stratigraphy. An introduction to radiogenic methods of age determination: ^{14}C, K/Ar, Rb/Sr and fission track methods. The evolution of continental margins and geosynclines. Geological evolution of the New England Orogen.

Palaeontology: Morphology and stratigraphic distribution of invertebrates, including Foraminifera, Brachiopods, 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.

25.223 Earth Physics
S2 L2T4

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.

Exploration Geophysics: Physical properties of rocks and soils. An introduction to electrical, electromagnetic, seismic, gravity, magnetic 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.

Photogeology: The use of air photos for geological mapping and geomorphological evaluation of land. Techniques and principles of photointerpretation and multi-band photography. Photo-interpretation of folds, faults, joints, bedding, limestone, intrusive igneous rocks, 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.

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

25.311 Earth Materials III
S1 L2T4

Prerequisite: 25.221. Co-requisite: 25.326.

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.

25.321 Earth Materials IV
S2 L3T3

Prerequisite: 25.311. Co-requisite: 25.326.

Clay Mineralogy: The structure and properties of the clay mineral groups including the kandites, 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 as 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 II
S1 L3T3

Prerequisite: 25.212. Co-requisite: 25.326.

Stratigraphy: Biological and physical methods of correlation. Definition of international stratigraphic boundaries, stratotypes and reference points. 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. Stratigraphic and structural evolution of aulacogens.

Palaeontology: Theories of biological classification. The origin and early history of life. Processes and theories of evolution. Functional morphology. Practical applications of palaeontology.

Sedimentary Basin Analysis: Techniques of sedimentary basin analysis and data presentation: outcrop, borehole sections and logs, seismic sections. Structure, isopach and lithofacies maps. Seismic stratigraphy. Analysis of sedimentary facies and sequences in fluvial, deltaic, nearshore and deepwater environments. Interaction of sedimentation and structure in tensional, compressive and strike-slip tectonic regimes. Basin evolution.

25.313 Exploration and Data Processing
S1 L4T2

Prerequisite: 25.223.

Exploration Geophysics: The practice and theory of geophysics as a basic tool of geological exploration with applications in areas of energy, mineral and ground-water resources and engineering projects.

Mathematical Geology: An introductory course to develop proficiency in the acquisition, display and analysis of geological data utilizing digital computer processing. Elementary descriptive and inferential statistics and sampling. Fortran programming language (including hands-on computing experience). Analytical methods of mathematical geology including time series analysis, Markov Chain analysis, map analysis and multivariate identification and classification techniques. A practical approach is adopted throughout whereby the student makes extensive use of a library of programs implemented on the University's CDC multimainframe Cyber 72/171 installation for processing and interpretation of real data.

Field Work of up to five days is a compulsory part of the subject.

25.314 Mineral and Energy Resources I
S1 L3T3

Prerequisite: 25.221. Co-requisite: 25.311.

Metallic Resources: Classification and origin of 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. Orthoscopic and conoscopic, rotation, dispersion phenomena. Microhardness and reflectivity, etch tests, XRD and microprobe techniques. Ore textures and their interpretation. Phase relations and paragenesis of ore minerals. Practical work in optical properties of ore materials, 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.

25.324   Mineral and Energy Resources II   S2 L3T3

Prerequisite: 25.312.

Non-metallic Resources: 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.

Advanced Structural Geology: Analysis of structural elements at the microscopic, mesoscopic and macroscopic scales. Modern methods of petrofabric analysis. Detailed studies of the analysis of metamorphic terrains, eg Otago Schist, Cooma Complex.

Field Work one day is a compusory 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 nets. Case studies on the Great Artesian Basin and on 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: The shoreline processes. Littoral and longshore drifts and net sand movement. Coastal engineering works. The estuarine environment: sedimentation, chemical and biological processes. Investigation techniques.

Field Work of up to three days is a compulsory part of the subject.

25.326   Geological Techniques   S2 L3T3

Prerequisites: 25.212, 25.311.

Geochemistry: Modern destructive methods of rock and mineral analysis. Nondestructive methods; X-ray fluorescence spectroscopy and electron probe microanalysers.

Geological Surveying: Levels, tacheometers and theodolites. Field techniques. Precision and angular measurements. Stadia surveying. Levelling. Field computations. Closed and open traverses. Coordinates and their computation.

Sedimentology: Properties of sedimentary populations. Sampling practices. Measurement of grain size, grain shape and packing; analyses of measured data. Geological significance of sediment parameters.

Field Mapping: Geological mapping in a complicated geological terrain for up to eight days. Geological report writing and cartography.

Field Work not exceeding ten days is a compulsory part of the subject.

25.411   Resource Geology   S1

Geophysics: The planning of geophysical surveys within the context of overall exploration and engineering development programs. Geological interpretation of geophysical data and discussion of selected case studies.

Resource Economics: An 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.

Mineral Exploration: Use of geology in mineral exploration and area selection; principles of exploration geochemistry; radiometric and remote sensing methods, exploration drilling; ore reserve estimation; exploration ground tenure in New South Wales.

Engineering Geology: Rock slope stability analysis and stabilization techniques for mine developments. Groundwater control and hydrogeological principles applied to mineral and energy resource development: mine dewatering.

World Evolution: Precambrian — global distribution and concepts; the Archean and Proterozoic of Australia; crustal development and the role of plate tectonics; special conditions and mineral resources. Stratigraphic and tectonic aspects of the Phanerozoic.

Field Work of up to 10 days is a compulsory part of this subject.

25.412   Mineral and Energy Resources   F

Co-requisite: 25.411.

Students taking this option are expected to show preference for *either* mineral *or* energy resources. (Other specializations, however, are not excluded eg petrology, mineralogy etc.) Projects, lectures, tutorials and seminars are designed accordingly.

Mineral Resources: A major part is a student field-laboratory research project in some aspect of mineral resources, as a general geological project, or a specialized mineral exploration project, eg, geochemical, geophysical, mineralogical. In Session 1 additional lectures/seminars follow on from 25.411 Resource Geology, giving more detailed appreciation of various aspects of mineral resources and include exploration management, mine evaluation, exploration geochemistry, exploration geophysics and mathematical geology. The content and extent of tuition in these subjects varies from year to year according to student requirements.

Energy Resources: A major part is a field mapping project in a sedimentary terrain. Depending on students' requisites, specialized field/laboratory studies are arranged in sedimentology, macro- and micropalaeontology, palynology, mathematical geology, geophysics and well-log analysis. Where possible, projects are directly related to problems of coal and petroleum occurrence. In Session 1 attendance is expected at lectures/seminars described in *Mineral Resources* above and of common interest to the understanding of evaluation and exploitation of energy resources.

25.413 Engineering and Environmental Resources   F

Co-requisite: 25.411.

A major part is a field/laboratory research project in some aspect of engineering or environmental geology. In Session 1 additional lectures are on: foundation geology, construction materials, rock weathering and fabric analysis applications to engineering problems, site investigations, practical construction geology, soil slope stability analyses and stabilization, geomechanical principles, engineering geophysical techniques, engineering geological case histories and advanced geological surveying applied to engineering works.

25.414 Geology IV Honours

Single major.

Further details of the honours course may be obtained from the Head of the School of Geology.

25.541 Mineralogy

Crystallography, crystalline state and crystal growth of minerals. Fundamentals of the atomic structure of minerals, with examples of Bravais lattices and introduction to space lattice group theory. Physical properties of crystals; cleavage, gliding, secondary twinning, elasticity. Elements of crystal optics in polarized light. Classification, descriptive mineralogy and occurrence of primary and secondary minerals with special emphasis on economic metallic and non-metallic minerals. Introduction to petrology. Mode of formation of minerals and ores in the igneous, sedimentary and metamorphic cycles. Examples of principal types of economic mineral deposits, their mode of formation, paragenesis, texture and intergrowths. Elements of fuel geology, construction and refractory materials. *Laboratory: Crystallography:* Examination of crystals and crystal models for symmetry. Stereographic projection of crystals. *Optical Mineralogy:* Examination of minerals and rocks in transmitted and incident light using the polarizing microscope. Determination of refractive indices of crystal fragments by the immersion method. *Descriptive and Determinative Mineralogy:* Macroscopic examination of common minerals with emphasis on economic minerals. Study of texture and intergrowths of common mineral parageneses including the principal rock types in which they occur.

25.621 Marine Geology I   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: None.

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 II   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 sedimentary rocks in the deep ocean basins and on continental shelves. Changes of sea level. The Quaternary history of the oceans. Reefs and carbonate sedimentation. Deep sea consolidated sediments. Magnetism and palaeomagnetism.

Field Work not exceeding two days is a compulsory part of the subject.

25.632 Estuarine Geology   S1 L2T4

Prerequisite: None.

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   S1 L1T2

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.

25.9311 Gravity and Magnetic Methods   S1 L2T1

*Prerequisites**: 1.001 and 10.001.*

Fundamental principles. Field procedure 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.*

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.

** It is desirable that students taking this unit have a background in geology.

25.9312 Seismic Methods   S1 L2T1

Prerequisites**: 1.001 and 10.001.

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.

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 L1T3

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.

25.932 Geophysical and Geological Applications
S2 L2T4

Prerequisites: 25.120, 25.223. Excluded: 25.326, 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. *Geological Surveying*: Levels, tacheometers and theodolites. Field techniques. Precision of angular measurements, surveying, levelling, field computations. Closed and open traverses. Co-ordinates and their computation.

General Studies

Graduate Study

For students enrolled in the MScSoc degree course

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.

Geography

27.111 Applied Physical Geography I   F L2 T4

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 3 days is an integral part of the subject.

27.801 Introduction to Physical Geography   S1 L2T2½

Excluded: 27.111.

The mechanism of the physical environment, with particular exemplification within the Sydney region. Geological controls of landform development; fluvial, slope and coastal processes and landforms; cyclic and equilibrium approaches to landform studies. The global radiation budget and atmospheric circulation; weather and climate in the Sydney region. The hydrologic cycle. Processes and factors of soil formation and the soil profile. Controls of vegetation in the Sydney region. The ecosystem.

Laboratory classes include: study and use of geologic and topographic maps and air photographs; use of climatic data and the weather map; soil description. Two field tutorials, equivalent to 16 tutorial hours, are a compulsory part of the course. Students must provide basic drawing equipment and tracing paper, and will be asked to contribute towards the cost of the field tutorials.

27.802 Introduction to Human Geography   S2 L2T2½

The relationships between man and the environment, their spatial consequences and the resulting regional structures that have emerged on the earth's surface. Basic concepts and methods for studying the spatial organization of human activities, particularly as they relate to patterns of location and distribution, to the flows, movements and linkages between places and activities, and to the processes operating that give rise to variations from place to place, particularly between urban and rural areas. Australian and South-East Asian examples are used where relevant.

Laboratory classes: presentation and description of geographical data, analysis of spatial patterns, together with appropriate statistical exercises. Includes a compulsory field excursion equivalent to eight tutorial hours.

27.811 Physical Geography   S2 L2T2½

Prerequisites: 27.801, 27.2813†. Excluded: 27.111.

Emphasising inter-dependence of climate, hydrology, landforms, soils and vegetation in major zones. Classification of climates and world

** It is desirable that students taking this unit have a background in geology.

† In special circumstances a student may apply to the Head of School for permission to take 27.2813 as a co-requisite.

climatic patterns. Soil zonality and world soil patterns. World vegetation types and distribution, and their controls. Studies of selected zones with particular reference to the Australasian region.

Laboratory classes: climatic analysis and mapping, and analysis of natural landscapes, including airphoto interpretation, together with appropriate statistical exercises.

27.812   Human Geography   S1 L2T2½

Prerequisites: 27.802, 27.2813†.

The urbanization process in underdeveloped and industrialized societies. Theories, concepts and principles relating to the location, size and spacing of settlements; the economic and social structure of urban areas; city-region relationships. Geographical perspectives on contemporary urban problems are offered, particularly those associated with the concentration of people and activities between regions and within cities; emphasis on spatial variations in housing, employment and service provision.

Laboratory classes: case studies, methods of analysis and practical applications in the local region including a compulsory field excursion equivalent to sixteen tutorial hours.

27.2813   Geographic Methods   S1 L1T2

Prerequisites: 27.111 or 27.801† & 27.802.

Statistical procedures used in both human and physical geography. Includes: measures of dispersion; samples and estimates; hypothesis testing; association; correlation and regression; tests for distribution in space; data collection and analysis.

Field Work of up to 5 days is a compulsory part of the subject.

27.2814   Geographical Field Methods   S2 T2

Prerequisites: 27.111, 27.801 & 27.802, 27.2813.

Field methods as used in both human and physical geography. The subject involves a five-day field tutorial and associated laboratory work.

27.153   Climatology   S2 L2T3

Prerequisites: 1.001, 27.811 or 25.110 & 25.120 or 17.031 & 17.021 (or 17.041) or 27.111.

Physical bases for understanding microclimate. Processes of energy exchange at the earth's surface, and the physical and biological controls of the heat and mass budgets. Atmospheric diffusion. Determinants of the local and site-specific climatic environment, particularly topographic, surface cover and substrate conditions. Urban climate and the microclimates of distinctive habitats. 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 utilization of solar and wind energy sources.

27.143   Biogeography   S1 L2T3

Prerequisites: 27.811 or 17.031 & 17.021 (or 17.041) or 27.111.

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 climatic regimes.

Field work forms an integral part of the subject.

27.183   Geomorphology   S1 L2T3

Prerequisite: 25.110 & 25.120 or 27.811 or 27.111. 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 man's 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.

27.133   Pedology   S2 L2T3

Prerequisites: any two units from 2.111, 2.121, 2.131, 2.141, and 27.811 or 27.111.

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. Assessment of land hazards and land capability as related to 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.

27.824   Spatial Population Analysis   S2 L2T2

Prerequisite: 27.812.

Population growth and structure in an urban and regional context, stressing 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: 27.812 Excluded: 27.835.

Interaction in time and space within cities and between regions, stressing relationships between transportation, mobility and the environment structure of groups and individuals, as well as problems of accessibility to a wide range of activities, including services and employment. Patterns of flow, transaction and linkage between economic activities. Topics include: the journey-to-work, shopping and travel behaviour, contact networks, and the optimal location of facilities.

† In special circumstances a student may apply to the Head of School for permission to take 27.2813 as a co-requisite.

27.826 Urban and Regional Development   S1 L2T2

Prerequisite: 27.812. Excluded: 27.836.

Processes of change in the distribution of settlement and economic activity at the regional and metropolitan scales, with special attention to urban and regional development in Australia. Topics include: regional balance and polarization, industrial concentration and linkages; dispersal and relocation of manufacturing and services; growth centres and regional multipliers; changes in the inner city and the urban fringe; problems of resource allocation and equity, and regional policies and strategies for urban and regional development; approaches to urban and regional analysis and definition of regional indicators.

27.827 Environment and Behaviour   S2 L2T2

Prerequisite: 27.812. Excluded: 27.837.

For subject description, see School of Geography.

27.860 Landform Studies   S1 L2T2½

Prerequisite: 27.811 or 27.111. Excluded: 27.183, 27.870.

The study of landforms, with particular reference to Australian examples. Geomorphic regions. Planation surfaces and processes and associated weathering features. The evolutionary and dynamic approaches to landforms, with particular reference to fluvial landforms. Coastal processes and forms. Desert landforms. Landforms as evidence of climatic change.

27.862 Australian Environment and Natural Resources*   S2 L2T2½

Prerequisite: 27.111 or 27.811 or 27.812.

Regional patterns of natural land and water resources of Australia. Climatic, geomorphic, soil and biotic factors affecting past, present and potential modes of land use and stability of primary production. Conditions of the physical environment which favour or impede productive utilization and further development of land, marine, freshwater and energy resources under a changing technology. Problems of avoiding degradation of land quality and natural ecosystems. Case studies from distinctive environmental settings in Australia.

Laboratory/workshop sessions include the study of maps and air photographs of typical environments: local environmental problems are investigated in the field.

27.863 Ecosystems and Man*   S2 L2T2½

Prerequisite: 27.111 or 27.811 or 27.812.

Soils as an expression of endogenic and external factors and of physical and biological controls, and as a bridge between the physical environment and man's use of the land. Materials and properties of soils. Soils in the ecosystem; interrelationships between soil and climatic, biotic and geomorphic features of the environment. Constraints imposed by soil properties on land use, in both rural and urban settings. Man's effect on the soil, and its consequences, eg soil pollution, disturbance of soil-moisture and nutrient cycles, soil depletion and erosion.

These themes will be co-ordinated in the study of regional examples in Australia and South-East Asia. There are laboratory workshops, field excursions and group projects.

27.834 Spatial Population Analysis (Advanced)   S2 L3T3

Prerequisites: Graded passes in 27.812, 27.2813. Excluded: 27.824.

Additional and more advanced work relating to the content of 27.824.

27.835 Urban Activity Systems (Advanced)   S1 L3T3

Prerequisites: Graded passes in 27.812, 27.2813. Excluded: 27.825.

Additional and more advanced work relating to the content of 27.825.

27.836 Urban and Regional Development (Advanced)   S1 L3T3

Prerequisites: Graded passes in 27.812, 27.2813. Excluded: 27.826.

Additional and more advanced work relating to the content of 27.826.

27.837 Environment and Behaviour (Advanced)   S2 L3T3

Prerequisites: Graded passes in 27.813, 27.2813. Excluded: 27.827.

27.870 Landform Studies (Advanced)   S1 L3T3

Prerequisites: Graded passes in 27.111 or 27.811, 27.2813. Excluded: 27.860.

As for 27.860 with additional and more advanced work, including selected studies of geomorphic processes and of man's influence on those processes.

27.872 Australian Environment and Natural Resources (Advanced)*   S2 L3T3

Prerequisites: Graded Passes in 27.111 or 27.811 or 27.812. Excluded: 27.862.

As for 27.862 plus further study based on additional seminars and reading. Additional topics include **1.** environmental bases for reserving land and water resources for forestry, water supply, wildlife protection, and recreation; **2.** conflicting demands in regional resource development.

27.873 Ecosystems and Man (Advanced)*   S2 L3T3

Prerequisites: Graded Passes in 27.111 or 27.811 or 27.812. Excluded: 27.863.

As for 27.863, with additional and more advanced work.

27.880 Advanced Geographic Methods   F L1T2

Prerequisites: Graded Passes in 27.111 or 27.811 or 27.812 and 27.2813.

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

* Subject to availability of staff.

27.412　Coastal Geomorphology‡　　　　　S2 L2T3

Prerequisite: 27.111 or 27.811 or 25.011.

Advanced work in selected areas of coastal geomorphology. The characteristics of waves in deep and shallow water. Beach morphology and sediments. Coastal barrier systems. Lagoons and estuaries. Rock platforms. Quaternary sea-level changes. A field project is undertaken as part of this course. Laboratory time is devoted to sedimentary analysis and statistical exercises using data collected from maps, air photos and in the field.

27.604　Geography IV (Honours)　　　　　　F

Prerequisite: 27.880.

Honours students in their final year are required to prepare a thesis of not more than 20,000 words and to attend a series of seminars on their thesis and supporting topics. The thesis topic must be approved by the Head of the School during the second half of the year *preceding* entry into the final year, while the thesis must be submitted before the examination period in November of the final year. It is expected that research work for the thesis is undertaken during the summer vacation preceding the final year. In addition, students are required to undertake advanced studies in a branch of geography appropriate to the area of research chosen for the thesis.

Organizational Behaviour

Graduate Study

For students enrolled in the MScSoc degree course

30.960G　Technology and Organizations　　　S2 L3

The relationship between technological change, employment and organizations. Students specialize in particular areas of interest within this focus. eg the origins, nature, rate, industrial distribution and prevailing ideologies of technological innovation, adaptation and diffusion may be examined, and consideration given to their relationship to **1.** major organizational variables such as organizational size and structure; centralization and decentralization of control and power; employment, underemployment and unemployment, and the design of work. **2.** the interests of key groups such as technical specialists (eg engineers), management, general employees, industrial tribunals, unions, and disadvantaged groups such as immigrants, women, youth and aged. and **3.** factors affecting the quality of working life such as alternative patterns of work, industrial accidents and occupational health, work satisfaction, formal and informal learning and recurrent education.

Optometry

Undergraduate Study

31.811　Optometry I　　　　　　　　　　F L4T4

Prerequisites: 1.011 or 1.001 or 1.021 or 1.031, 10.001 or 10.021B & 10.021C or 10.011. Co-requisite: 31.821.

Geometrical and Physical Optics — Extension of Physics I content on the nature of light, reflection, refraction, thin lenses, optical instruments, dispersion and colour.

Lens systems and thick lenses, Interference, Diffraction, Polarisation, Photometry.

Mechanical Optics and Optical Dispensing — The manufacture and properties of spectacle lens materials. The optical properties of spherical, cylindrical, sphero-cylindrical, and prismatic spectacle lenses. Bifocal and multifocal lenses. Protective lenses. Frame measurements. Optical dispensing. Magnifying spectacles, and magnifying glasses. Lens aberrations and spectacle lens design. Lens measuring and lens testing instruments.

Physiological Optics — Optical systems of the eye; the retinal image, visual acuity. Refraction of the eye; hyperopia, myopia, astigmatism, aphakia. Presbyopia. Anisometropia. The schematic eye. Theory of subjective refraction. Aberrations of the eye. Entopic phenomena. Accommodation and convergence. Binocular vision, stereoscopy.

31.812　Optometry II　　　　　　　　　　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 of 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 III　　　　　　　　　　F L6T0

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:*

‡ *Only students enrolled in the Marine Science program.*

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 Special Anatomy and Physiology   F L3T3

Prerequisites: 17.031, 17.021 (or 17.041). Co-requisite: 73.011A.

Histology, Anatomy, and Embryology of the Eye and Associated Structures: Anatomy and histology of the eyeball, ocular adnexae, bony orbit, visual nervous pathways and visual cortex. The blood vessels, muscles, and nerves of the orbit and associated structures. The motor and sensory pathways associated with the visual apparatus. Elementary embryology and the detailed development of the eye and adnexae. Developmental defects of the eye and adnexae. *Physiology of the Eye and Vision:* Physiology of the eyelids and lacrimal apparatus, cornea, aqueous humour and intra-ocular pressure, iris and pupil, lens and accommodation, retina and photo-chemistry of vision. Sensory responses to ocular stimulation, luminosity curve, flicker, afterimages, and contrast phenomena. Visual acuity. Light- and dark-adaptation, photopic and scotopic vision. Colour vision and colour blindness. Eye movements, binocular vision, and stereopsis. Theories of vision, visual perception.

31.831 Diseases of the Eye   F L2T1

Prerequisites: 31.811, 31.821, 73.011A. Co-requisite: 31.812.

Introductory Bacteriology and Pathology: Pathogenic organisms, infection, immunity, allergic manifestations. Antiseptics and germicides, antibiotics. Pathological tissue changes; cysts, neoplasms. Diseases of the blood, arteries, veins, heart, lungs, and kidneys. Venereal diseases. Diseases of the nervous system. *The Aetiology, Pathology, Diagnosis and Prognosis of Diseases of the Eye and Adnexae:* Diseases of the eyelids, lacrimal apparatus, orbit, conjunctiva, cornea, sclera, uveal tract, lens, vitreous, retina, and optic nerve. Glaucoma. Ocular injuries. Sympathetic ophthalmia. Disease resulting from blood-borne infection. Disturbances of vision of central origin. Disturbances of ocular motility. Developmental abnormalities. *The Ocular Manifestation of Systemic Diseases:* Ocular manifestations of: tuberculosis, syphilis, disorders of metabolism, dental sepsis, diseases of the kidneys, cardiovascular system, blood, endocrine system, central nervous system, phakomatoses and hereditary syndromes.

31.841 Clinical Optometry   F L1T14

Prerequisites: 31.812, 31.831.

Each student examines and prescribes for about fifteen patients per week. Special emphasis is placed on perimetry, aniseikonia studies, orthoptic diagnosis and treatment, reading deficiency diagnosis and treatment, and other advanced optometrical techniques. Each student keeps a detailed case book of all patients examined and treated, and conducts a number of visual surveys and visual job analyses; experience is also gained in the fitting of contact and corneal lenses on selected patients.

Graduate Study

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 man-machine systems. Information theory, channel capacity. Visual aspects of man-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 infrared), photofluorography, speedlight techniques, fundus photography. Dark-room techniques, portable dark-rooms. Quantitative photographic data analysis.

31.799G Project

Biochemistry

Undergraduate Study

41.101   Biochemistry   S1 L4T8

Prerequisites: 17.021 (or 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 lecture course.

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 lecture course.

41.102A Biochemistry of Macromolecules   S1 L3T9

Prerequisites: 41.101* or 41.111*, 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 lecture course and to provide experience in modern biochemical techniques.

41.102B Physiological Biochemistry   S2 L3T9

Prerequisites: 41.101* or 41.111*, 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 lecture course and to provide experience in modern biochemical techniques.

41.102C Plant Biochemistry   S2 L2T4

Prerequisites: 41.101* or 41.111*, 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 course utilizes radioactive isotopes and a number of newer techniques.

41.102D Biosynthesis of Plant Metabolites   S2 L2T4

Prerequisites: 41.101* or 41.111*, 2.002B. Co-requisite: 41.102C.

This unit complements 41.102C and is taken with it.

Topics: cell wall formation and the synthesis and mobilization of reserve materials; biosynthesis of amino acids, its regulation, and their conversion into non-protein materials, eg alkaloids and cyanogenetic glycosides; aromatic ring formation and the isoprene pathway as a source of rubber, steroids, carotenes and essential oils. Flower pigments and phytoalexins.

A combined practical with unit 41.102C illustrates and amplifies the course and includes a wide range of the latest 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 characterization of eukaryotic genes plus current ideas on the overall organization 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

81.002   Chemistry and Biochemistry for Medical Students
80.112   Human Structure and Function II

In conjunction with School of Anatomy and School of Physiology and Pharmacology.

* Students must obtain a clear pass (PS) in either 41.101 or 41.111.

Biotechnology

Undergraduate Study

42.101   Introduction to Biotechnology   S2 L2T4

Prerequisites: 2.121 & 2.131, or 2.141, 17.021 (or 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, principles of equipment design and biochemical engineering for construction of production plants. 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 (PC 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 microorganisms, laboratory-scale fermenter operation, microbial enzyme isolation, visits to industrial fermentation plants and industrial seminars.

42.102B   Biotechnology B   S2 L2T4

Prerequisite: 42.102A (PC 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.

42.103   Biological Technology (Honours)

Advanced formal training in selected areas of biotechnology and participation in one of the school's research projects.

42.114   Fermentation Processes

(Component topic of 22.114 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.

Graduate Study

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, β-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 microorganisms involved in other industrial processes (for example, mineral leaching, single cell protein production, detoxification and waste disposal).

Laboratory component will include current techniques of microorganism 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 L0T2

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 L0T7

An experimental or technical investigation or design project in the general field of biotechnology with supporting seminars.

42.999G Alternative Higher Degree Qualifying Program

Training similar in content and standard to 42.103 Biological Technology (Honours), but designed specifically for students who cannot regularly attend the University.

Botany

Undergraduate Study

43.101   Introductory Genetics   S2 L2T4

Prerequisites: 17.031 & 17.021* (or 17.041*).

Various aspects of molecular, organismal and population genetics, including: mechanisms of recombination and mapping in higher organisms; recombination and mapping in microorganisms; mutagens, structural and gene mutations, molecular structure of the gene, biochemical genetics, control of gene expression, genetic interaction, gene pools and gene frequencies, genetics and disease, genetic engineering.

* Students with percentile range 61-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 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 of Higher Organisms for all units.

Students should consult lecturers before purchasing textbooks.

43.102   Microbial Genetics   S1 L2T4

Prerequisite: 43.101.

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; tne 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.

43.111   Flowering Plants   S1 L2T4

Prerequisites: 17.031 & 17.021 (or 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 weekend field excursion is part of the subject.

43.131   Fungi and Man   S1 L2T4

Prerequisites: 17.031 & 17.021 (or 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   Plant Taxonomy*†   S2 L2T4

Prerequisite: 43.111. Co-requisite: 43.101.

The assessment, analysis and presentation of data for classifying plants both at the specific and supra-specific level; the emphasis is on vascular plants. Field work is part of the course.

43.122   Plant Physiology†   S2 L2T4

Prerequisites: 17.021 (or 17.041), 17.031, 2.121 and 2.131, or 2.141.

The study of how plants work at all levels from the cell to the whole plant.

Includes: photosynthesis, respiration, transport, inorganic nutrition, plant growth substances, germination, growth, development, and flowering. Important practical applications of plant physiology are also considered.

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 & 17.021 (or 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. Students are required to attend one week-day field excursion as part of the practical course.

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 will be an integral part of this course.

43.162   The Plant Kingdom*†   S2 L2T4

Prerequisite: 43.111.

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 will be part of the course.

43.172   Phycology and Marine Botany†   S2 L2T4

Prerequisite: 43.111.

The biology of freshwater, marine and soil algae with particular emphasis on the marine flora of S.E. Australia. Field work is part of the course.

43.192   Ultrastructure†   S2 L2T4

Prerequisites: 17.021 (or 17.041), 17.031. Excluded: 43.182.

The impact of the study of ultrastructure in biological research and teaches techniques currently used in ultrastructural research. While covering the ultrastructure of prokaryotes and of eukaryote cells and organelles, emphasis also on areas where ultrastructural research is at present making an important contribution to understanding 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.

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* This unit alternates each year with 43.162 The Plant Kingdom. 43.162 is given in 1983. If both units are to be included in three-year pass degree program, one should be completed in second year.

† These units may be taken in either second or third year of the Science and Mathematics Course provided that prerequisites have been completed.

Servicing Subjects

43.202   Plant Structure and Function

Microbiology

Undergraduate Study

Level II Units

44.101   Introductory Microbiology   **S1 L2T4**

Prerequisites: 17.031 & 17.021 (or 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 algae, "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   Microbial Growth   **S2 L2T4**

Prerequisites: 44.101 & 41.101 or 2.003J.

Measurement, models and theory of microbial growth. Bacterial nutrition and biosynthetic pathways. Environmental controls of microbial growth. Microbial survival. Comparative aspects of microbial growth. Growth and control in natural situations. Introduction to the design and analysis of microbiological experiments.

Level III Units

44.102   General Microbiology   **S1 L4T8**

Prerequisites: 44.101, 44.121, 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 man); their industrial applications including manufacture, preservation and spoilage of food and dairy products. The nature of bacterial and fungal diseases of man, their cultural and serological diagnosis, epidemiology, treatment and prevention will be discussed in some detail.

44.122   Immunology   **S2 L2T4**

Prerequisites: 17.031 & 17.021 (or 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 areas 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

44.143   Microbiology AS

80.311   Paraclinical Science

In conjunction with School of Pathology and School of Physiology and Pharmacology.

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Graduate Study

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.

* Pass conceded not acceptable.

Zoology†

Undergraduate Study

45.101　Biometry　　　　　　　　S2 L2T4

Prerequisites: 17.031 & 17.021 (or 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 & 17.021 (or 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, for the February field trip by 14 January.

45.121　Evolutionary Theory　　　S1 L3T3

Prerequisites: 17.031 & 17.021 (or 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 L1T4

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.

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　General and Reproductive Physiology　　　　　　　　S1 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: 17.021 (or 17.041) & 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 and 17.021 (or 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.

45.202　Invertebrate Neurobiology　　S1 L2T4

Prerequisite: 45.201.

A comparative study of environmental and sensory physiology of invertebrates, with special emphasis on orientation behaviour, reproductive behaviour, social organization, pheromones, bioluminescence and rhythms. Practical work includes the observation of behaviour followed by the application of electrophysiological and neuroanatomical techniques in the study of sensory organs and single neurons.

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 man. Field excursions as arranged.

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† Students are not 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.

45.402 Insects S1 L2T4

Prerequisites: 17.031 & 17.021 (or 17.041).

A comparative study of the internal anatomy and external morphology of insects. Classification and bionomics of major groups and families. A collection of insects is to be made. Practical work to include dissections, a study of mouthparts, wing venations, segmentation. Field excursions as arranged.

Students intending to enrol in this unit should register with the School of Zoology, for the February field trip, by 14 January.

45.412 Insect Physiology S1 L2T4

Prerequisite: 45.101. Co-requisite: 45.402.

The functions of the various organ systems and of the whole insect. Various aspects of reproduction, growth and metabolism. Experimental work to illustrate the lecture course.

45.422 Economic Zoology S2 L2T4

Prerequisite: 45.201 or 45.402.

A study of the biology, ecology and control of vertebrate and invertebrate animals which harm man and his 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: 45.412.

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.

Graduate Study

For students enrolled in the MAppSc in Arid Lands Management degree course.

45.900G Ecological Studies in Arid Lands Management S2 L2T4

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

Undergraduate Study

48.023 Chemical Engineering Science I S1 L3T2 S2 L2½ T2½

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 I
A review of the fundamentals of FORTRAN, with extension to formating, dimensioned variables and sub-routines. Application to the solution of selected problems involving heat and mass balances, fluid flow and pumping.

48.024 Chemical Engineering Principles I S1 L2T1 S2 L1T1

Prerequisites: 1.001, 10.001.

The following topics, from 48.023: Flow of Fluids, Heat Transfer I, Dimensions.

48.037 Chemical Engineering Science II S1 L5T2 S2 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 II (Theory)
An extension of the work covered in Heat Transfer I, 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 seives. 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 II
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 II   S1 L3T1 S2 L1T1

Prerequisite: 48.024.

The following topics, from 48.037; Mass Transfer (Theory), Heat Transfer II (Theory), Fluid-particle Systems, Surface Separation Processes.

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.

Undergraduate Study

52.103   Introductory Philosophy A   S1 L3T1

The material bears on the general topic of Persons. Topics: 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.

52.104   Introductory Philosophy B   S2 L3T1

Topics include: the rise of modern scepticism and problems about the source of our knowledge; the nature of moral problems; deduction in modern formal logic and related problems of the ambiguity of natural languages.

52.2010 Reasoning Skills   S1 or S2 L2T0

Prerequisite: Any Level I unit. Excluded: 52.233.

Reasoning skills: examination of practical arguments in classroom exercises. Lectures on practical argument in the courtroom, politics and everyday life as compared with arguments in mathematics and theoretical science.

52.2020 Descartes   S1 L2T0

Prerequisite: Level II 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 and his account of freedom.

52.2021 Spinoza and Leibniz   S2 L2T0

Prerequisite: 52.163 or 52.2020. Excluded: 52.303.

The main issues raised in the philosophy of the two great seventeenth century rationalists, with emphasis on the development of their metaphysical systems in response to unresolved problems in the philosophy of Descartes and to contemporary scientific thinking. Their ethical views.

52.2030 Predicate Logic A   S1 L2T0

Prerequisite: Any Level I unit. Excluded: 52.1531, 52.153, 52.162.

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.

52.2031 Predicate Logic B   S2 L2T0

Prerequisite: 52.1531 or 52.2030. Excluded: 52.153 or 52.162 or 52.1532.

A continuation of Predicate Logic A, including the theories of identity and of definite descriptions.

52.2040 Greek Philosophy: Thales to Plato   S1 L0T2

Prerequisite: Level II status in Philosophy.* Excluded: 52.183.

The leading ideas of the Greek philosophers from Thales to Plato, with special reference to Pre-Socrates.

52.2050 Classical Political Philosophy   S1 L2T0

Prerequisite: Level II status in Philosophy.* Excluded: 52.182, 52.203.

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.

52.2060 Sartre   S1 L2T0

Prerequisite: Level II status in Philosophy.* Excluded: 52.213.

Sartre's account of freedom, relations between persons and his social theory.

52.2070 Introduction to Transformational Grammar   S1 L2T0

Prerequisite: Any Level I unit. Excluded: 52.463.

Transformational grammar from the beginning: its history, goals, theory, and practice, emphasizing understanding and constructing arguments for one transformational system over another.

52.2111 Meaning and Truth   S2 L2T0

Prerequisite: 52.1531 or 52.2030 or 52.463 or 52.2070 or 52.153. Excluded: 52.473.

An introductory survey of issues in philosophical and linguistic semantics; truth, meaning, and presupposition in natural language; meaning as conventional; meaning and intention; compositional semantics and Tarski's definition of truth.

52.218 Set Theory   S1 L3T0

Prerequisite: 52.153 or 52.1531 or 52.2030 or 26.812 or 10.001 or 10.011 or both 10.021B and 10.021C. Excluded: 52.323.

An axiomatic development of Zermelo-Fraenkel set theory, including a construction of the natural numbers, equinumerosity, ordinal and cardinal numbers, the axiom of choice and some of its consequences.

52.2120 Model Theory   S2 L2T0

Prerequisite: 52.323 or 52.218 or 10.1123. Excluded: 52.403.

An introduction to the metamathematics of the predicate calculus from the point of view of model theory. Topics include: the deduction theorem, consistency, completeness, theories with equality, prenex normal forms, categoricity and second order theories.

52.2130 British Empiricism   S2 L2T0

Prerequisite: Level II status in Philosophy.* Excluded: 52.173.

The empiricist tradition with special concentration on Locke and Berkeley.

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* 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.

52.2140　Scientific Method　　　　　　　　　S1 L2T0

Prerequisite: Level II status in Philosophy. Excluded: 52.193.*

The nature of empirical knowledge as exemplified in the physical and social sciences and in history, with emphasis on the concept of explanation, the nature of induction and scientific laws, counterfactual statements, and the paradoxes of confirmation.

52.2150　Philosophy of Law　　　　　　　　　S2 L2T0

Prerequisite: Level II status in Philosophy. Excluded: 52.105.*

Selected conceptual and normative issues in the philosophy of law, centreing 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.

52.219　Philosophical Foundations of
　　　　　Marx's Thought　　　　　　　　　　S1 L3T0

Prerequisite: Level II status in Philosophy. Excluded: 52.373.*

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

52.2170　Hume　　　　　　　　　　　　　　S1 L2T0

Prerequisite: Level II status in Philosophy. Excluded: 52.152, 52.563.*

A study of Hume's epistemology, his discussion of arguments for the existence of God, free will and the basis of morals.

52.2220　Classical Greek Ethics　　　　　　　S1 L2T0

Prerequisite: Level II Status in Philosophy. Excluded: 52.5231.*

A systematic investigation of the moral theories of Plato and Aristotle. The immoral and subsequent amoral position of Thrasymachus and his question in Book 1 or *The Republic*, 'Why should I be just?'; investigation of the ways in which Plato and Aristotle each sets out the problems of the nature of morality and why a person should be moral, their approaches to the solution to these problems, and their positive moral theories.

52.2230　Theories in Moral Philosophy　　　　S2 L2T0

Prerequisite: Level II Status in Philosophy. Excluded: 52.5232.*

An examination of 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. Examination of each moral theory in itself and in comparison with the other two theories.

52.2240　Philosophical Study of Woman　　　　S2 L2T0

Prere lisite: Level II status in Philosophy. Excluded: 52.283.*

Crucial structures involved in woman's situation.

52.2250　Plato's Theory of Forms　　　　　　　S2 L2T0

Prerequisite: Level II status of Philosophy. Excluded: 52.483.*

Some dialogues of Plato, with special attention to Socratic definition and Plato's Theory of Forms.

52.2260　Aesthetics　　　　　　　　　　　　　S2 L2T0

Prerequisite: Level II status in Philosophy. Excluded: 52.273.*

The central concepts, types of judgment and theories occurring in the fields of aesthetics, art criticism and literary criticism.

52.2270　Social and Political Philosophy　　　　S2 L2T0

Prerequisites: Level II Status in Philosophy. Excluded: 52.513.*

Not offered in 1983.

Largely through contemporary writings, including a number of journal articles, investigation of such topics as rights, freedom, law and legislation, responsibility, liability, coercion, punishment and justice.

52.2330　Psychoanalysis — Freud and Lacan　　S2 L2T0

Prerequisite: Level II 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.

52.2360　Theories, Values and Education　　　　S1 L2T0

Prerequisite: Level II status in Philosophy. Excluded: 52.583.*

Not offered in 1983.

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.

52.2371　Plato's Later Dialogues　　　　　　　S2 L2T0

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.

52.2411　History of Logic　　　　　　　　　　　S1 L2T0

Prerequisite 52.1531 or 52.2030. Excluded: 52.593.

A survey of the history of logic, with concentration on the work of Aristotle, William of Sherwood and Frege.

* 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.

52.2980   Seminar A

S2 L0T2

Admission by permission, based on a student's performance in Level II units. Excluded: 52.423.

Topics vary from year to year and are influenced by student requests. Topics may include: Contemporary Ethics; Contemporary Moral Issues; Logical Atomism; Wittgenstein; Theories of the Emotions; Issues in Social and Political Philosophy.

52.2990   Reading Option A

S1 or S2

Admission by permission, to suitable students with good passes in at least two half-units at Level II. Excluded: 52.413.

Individually supervised reading and assignments on an approved topic not otherwise offered.

52.3010   Seminar B

Excluded: 52.433.

As for 52.2980 Seminar A.

52.3020   Seminar C

Excluded: 52.443.

As for 52.2980 Seminar A.

52.3030   Reading Option B

Excluded: 52.433.

As for 52.2990 Reading Option A.

Sociology

Graduate Study

For students enrolled in the MScSoc degree course

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.

Education

Undergraduate Study

58.702   Theory of Education I

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 II

S1 L2½ S2 L2

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 activities 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 III

S1 L1½ S2 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 I

10 days

A gradual introduction to teaching in the school situation.

58.713   Teaching Practice II

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 III   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 I   S1 L2 T1 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 II   S1 T4 S2 L1T4

Prerequisites: 17.021 (or 17.041), 17.031; 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 III   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 I   S1 L3 S2 L1

Prerequisite: 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 chidren), language in learning, discipline and class control.

58.743   Mathematics Curriculum and
Instruction II   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 II. 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 III   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 III, 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, standardised tests, marking and reporting, essay-type tests, scaling of test scores, uses and effects of assessment.

58.793   Advanced Education I   S1 L2 S2 L1

Philosophy of Education segment: Some connected issues in social and political philosophy, 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 II   FL1 or S1 L2 or S2 L2

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 III   FL4

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

History and Philosophy of Science

Undergraduate Study*

Level II/III

62.012 The Origins of Modern Science   S1 L2T1

Prerequisite: A pass in four Level I units from Table I.

An introductory subject dealing with the Scientific Revolution of the seventeenth century, the philosophical issues being discussed in their historical context. It surveys the major achievements of science during the period, particularly the Copernican Revolution, the construction of dynamics from Galileo to Newton, and Harvey's physiology. The cultural and intellectual background of these achievements and their effects on European thought will be discussed.

62.022 Materials Machines and Men: The Social History of Technology in the Eighteenth and Nineteenth Centuries   S2 L2T1

Prerequisite: As for 62.012. Excluded: 26.564, 26.251.

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, Europe and the USA, and the Second Industrial Revolution. Emphasis on social and economic effects of the interactions of technology and society.

62.032 The Scientific Theory   S2 L2T1

Prerequisite: As for 62.012.

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. Includes: the principles of theory construction; perception and observation; the structure of scientific revolutions; scientific apologetics; the structure of theories; 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.

62.042 Scientific Education and the Dynamics of Scientific Development   S1 L2T1

Prerequisite: 58.632.

Not offered in 1983.

The role of science education within the economy of scientific activity and development. *Topics:* Education in relation to the scientific community as a whole; theories of scientific development and change, with special reference to the critique of Thomas Kuhn's *The Structure of Scientific Revolutions;* science education in relation to the life-cycles of scientific paradigms; the structures and functions of the different classes of scientific publications, with special reference to textbooks; the uses and 'misuses' of the history of science in the teaching of science; the relationships of syllabuses and teaching techniques to research methodology and the dynamics of scientific development; science education considered as a factor in the determination of scientific 'style' and philosophies of science; the effects of moral, political and other values on science and science education. The topics are discussed with special reference to suitable examples selected from the histories of science and of science education.

62.052 Scientific Knowledge and Political Power   S1 L2T1

Prerequisite: As for 62.012.

An introduction to the political dimensions of twentieth century science. Covers: growth of expenditure on science in the twentieth 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.

62.062 The Social System of Science   S2 L2T1

Prerequisite: As for 62.012.

An introduction to the social dimension of the practice of science. The production and application of scientific knowledge is examined as an activity in constant interaction with its socio-economic, political and cultural environments. Aims to highlight 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.

62.033 Development of Theories of Matter   S1 L0T2

Prerequisite: As for 62.012.

The development of man's ideas about the nature of matter: 'the oldest conceptual tool in the Western speculative tradition'. A broad coverage of this many-sided topic is offered, from antiquity to the mid-twentieth century, though the emphasis is placed largely on ideas in the nineteenth and twentieth centuries. The main areas of study are: Greek matter theory; the 'organic' theories of the Renaissance; the 'mechanical philosophy'; Newton, Leibniz and Boscovich; eighteenth-century chemistry; Dalton's atomic theory and the 'atomic debates'; the establishment of the atomic weight scale; nineteenth-century theories of bonding and structure; Faraday, Maxwell and Hertz and the origins of field theory; radioactivity; Thomson and Rutherford; the Bohr theory of the atom; the wave/particle model, the uncertainty principle, and associated controversies; anti-matter; electronic theories of valency.

A set of notes is distributed each week and the subject is conducted entirely by seminars.

* Students undertaking subjects in History and Philosophy of Science are required to supplement the class contact hours by study in the Library.

62.072 Historical Origins of the American Scientific Estate S1 L2T1

Prerequisite: As for 62.012.

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 off global dominance in terms of research resources. 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 include 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 military.

62.082 Science, Technology and Developing Countries S1 L2T1

Prerequisite: As for 62.012.

The disparities between the scientific and technical capabilities of industrialized and developing societies; the reasons for these disparities and their economic and social consequences. Includes: 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.

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; the process of diffusion of science from the centre to the periphery and the evolution of national scientific communities and institutions addressed through case studies.

62.093 Science and the Strategy of War and Peace S1 L2T1

Prerequisite: As for 62.012.

Not offered in 1983.

Aims to give historical perspective to the impact of science and technology on the art of war and to contemporary problems of nuclear disarmament and the arms race. Emphasis on the intellectual challenges, social consequences and moral dilemmas posed by twentieth century developments in propaganda, the mechanization of warfare, communications, surveillance and physical, chemical, nuclear and biological weaponry; the early history of the atomic scientists and the nuclear age; Einstein and Russell and the anti-war movements; the role of the military industrial complex; the dynamics of the arms race and its limitation; the technological elaboration of armaments in the 1960s; the opportunity cost of military expenditure and limits to growth.

62.103 The Discovery of Time S1 L2T1

Prerequisite: As for 62.012.

The evolution of ideas concerning time and history, including the age and history of the earth, devoting particular attention to the period from the seventeenth 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.

62.104 The Darwinian Revolution S1 L0T2

Prerequisite: As for 62.012.

The 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 eighteenth and early nineteenth centuries. Darwin's life and work. The work of Mendel and the establishment of the 'synthetic' theory of evolution. Major portion of subject is devoted to an examination of 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. The subject is conducted entirely by seminars.

62.106 Mind, Mechanism and Life S1 L2T1

Prerequisite: As for 62.012. Excluded: 62.043.

The development of scientific ideas concerning the nature of life, mind and behaviour. 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 sixteenth century to the advent of the general purpose computer. Topics include: the Galenic heritage; 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 eighteenth to the early twentieth century; the mechanist-vitalist disputes; Wundt, Fechner and the rise of experimental psychology; Pavlov and the conditioned reflex; behaviorism and its critics; mind, brain, life and the computer.

62.107 The Freudian Revolution S2 L2T1

Prerequisite: As for 62.012.

Brief survey of nineteenth-century conceptions of psychology and psychiatry; the founding and development of psychoanalysis by Sigmund Freud and his associates. The reception of psychoanalytic theory, with particular attention to: the status of psychoanalysis as a science and its relation to other sciences; the development of alternative depth psychologies; and the application of psychoanalytic concepts in fields such as anthropology, history, literary criticism, and social and political theory.

62.109 The History of Medical Theory and Practice S1 L2T1

Prerequisite: As for 62.012. Excluded: 26.568, 26.2506, 62.043.

Development of theory and practice in Western Medicine from the time of Hippocrates to the introduction of the CAT Scanner. Topics: **1.** 'bedside' medicine from antiquity to the French Revolution; **2.** 'hospital' medicine in the early nineteenth century; **3.** 'laboratory' medicine in the late nineteenth century; and **4.** 'technological' medicine in the twentieth century, with particular emphasis on the social role of modern medicine.

62.551 The Arch of Knowledge: History of the Philosophy and Methodology of Science to 1800 S1 L0T2

Prerequisite: As for 62.012. Excluded: 62.013.

Not offered in 1983.

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 Lockean empiricist epistemology: Leibniz, Berkeley and Hume; French empiricism and philosophy of language: Condillac; Kant's Copernican Revolution and principles of Kantian philosophy.

A set of notes is distributed weekly and the subject is conducted by seminars.

62.552 Modern History of the Philosophy and Methodology of Science: 1800 to the Present S2 L0T2

Prerequisite: 62.551 or by permission of the Head of School. Excluded: 62.013.

Not offered in 1983.

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 nineteenth-century positivism; Pierce, 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 programmes'; Feyerabend and methodological anarchism; sociologists of knowledge.

A set of notes is distributed weekly and the subject is conducted by seminars.

62.553 The Social Construction of Scientific Knowledge S1 L2T1

Prerequisite: As for 62.012. Co-requisite: 62.032 or 62.062 or 62.552 or 62.013. Excluded: 62.083.

An analysis of the nature and extent of the influence that social conditions have upon the formation and acceptance of scientific knowledge. Topics include: Marxist theories of science and ideology; the 'strong program' for the sociology of scientific knowledge; 'field' theories and the analysis of 'disciplinary power' in science; and epistemological problems raised by commercial and governmental direction of science.

62.554 Computers, Brains and Minds: Foundations of the Cognitive Sciences S2 L2T1

Prerequisite: As for 62.012.

Introduction to contemporary discussions of the mind, thought, intelligence, and consciousness. Specifically, this involves looking at the issues which arise in connection with the various facets of the so-called 'cognitive sciences' — the disciplines which include such fields as computer science, the various neuro-sciences, cognitive psychology, linguistics and the philosophy of mind. Particular attention given to the recent revolutionary developments in the computer simulation of thought or 'artificial intelligence', and to linguistics, since both these areas shed new light on traditional questions concerning the mind. Among the fundamental questions to be asked are: 'Can computers think?' and 'Is the brain a machine?' Through looking at such questions, an exploration of the theories, methods and philosophical issues which arise from the 'computational' or 'information processing approach' to the mind.

Level III

62.105 Research Methods in History and Philosophy of Science F L0T1½

Prerequisite: Completion of three HPS units with an average grade of Credit or better, or by permission of the Head of School.

A series of methodological studies designed to prepare students and to carry out honours level research in HPS. The historiography of science, and its relations to philosophical and social studies of science, analyzed through discussion of texts representing predominant approaches to HPS during the last 30–40 years. Bibliographical, editorial, and other research exercises.

Level IV Honours Programs

62.014 History and Philosophy of Science Honours

Candidates are required to present a thesis and to complete, as determined by the Head of the School, EITHER four one session Honours Seminar units OR at least two one session Honours Seminar units together with additional approved work, provided that the total coursework component is at least equivalent to four Honours Seminar units.

62.024 Science Studies Honours

Candidate are required to present a thesis and to complete a two session Honours Seminar unit together with additional coursework, of equivalent weight, to be determined by the Head of the School of History and Philosophy of Science.

Graduate Study

For students enrolled in the MScSoc degree course

62.701G Philosophy and Methodology of Science S2 L2

An introduction to some current and fundamental problems in the philosophy of science and society; the nature of scientific debates and forms of argument; the function of 'scientific' images in the exploration and conquest of man and nature; scientific understanding and explanations in terms of models, analogies and laws of nature; problems of creativity and logic in the construction, establishment, acceptance and rejection of theories; the dynamics of scientific development and change; the concept of scientific revolutions.

62.709G The Scientific Community S2 L2

The sociological analysis of the pure science community, which establishes the characteristics of this subgroup of society by examining its internal and external social relations. The *internal* relations refer to

cognitive and behavioural factors within the community itself that promote or retard the advancement of science. The *external* relations refer to the political, ideological, economic and bureaucratic forces in society that shape and control the scientific community and the knowledge it produces.

62.710G   Science, Philosophy, and Social Values   S2 L2

Exposition and appraisal of some of the classical ethical theories. Examination of the claims of science to be able to provide a basis for moral judgments. Attempted establishment of an ethical framework which may serve as a basis for decision making when problems of an ethical nature arise in science. Selected case studies, in which decisions as to the most appropriate form of action are evaluated in the light of the ethical framework previously established.

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.

62.714G   Knowledge, Power and Public Policy   S2 L2

The growth of government interest in science during the 20th century, issues, institutions and policies. The nature and consequences of government support for research. The debate over the 'planning' of science. The arguments in favour of 'science policy'.

Science policy placed against the general background of the growth of government intervention in economic and social life during the last 100 years. The impacts of two world wars and the 'cold war'. Differences between countries in scientific organization and science policy.

62.715G   Cause, Belief and Progress in
the History of Science   S1 L2

An historical perspective on general ideas relating to scientific knowledge in the modern period, including: the Idea of Progress from Bacon to Social Darwinism; the relations between religion, theology and science; historiographical interpretations of revolutionary episodes in the history of science; ideas relating to contemporary issues in science.

62.716G   Science and Society in the
Twentieth Century   FL2

An introduction to the key issues raised by the interaction between science and society in the twentieth century. The unit consists of six topic modules drawn from the following list, each presented over a period of four weeks.

1. *The Social and Economic Relations of Technology:* An introduction to fundamental concepts concerning: the imperatives of technology; the techno-structure; the political dimensions of technological change; technological determinism; the technological fix; the ideology of industrialization; alternative technology. **2.** *Theories of Social Change:* A comparative analysis of leading theories of social change, including Marxism and theories of industrial and post-industrial society, with emphasis on the role of science and technology. **3.** *Technology and Social Change:* A case study of the social impact of (a) energy technologies on Australia and/or the developing world; or (b) the microelectronic revolution on commerce and industry. **4.** *Historical Dimensions of Scientific Change:* A case study of a major conceptual advance in twentieth-century science (eg, the development of relativistic physics or of genetics and molecular biology) as an introduction to problems of (a) scientific change and 'progress', (b) scientific community relations, and (c) science, ideology and responsibility. **5.** *The Philosophy*

of Science: Contemporary issues in the philosophical analysis of science, with emphasis on (a) the dynamics of conceptual change, and (b), scientific reasoning and 'method'. **6.** *Science as a Social Enterprise:* Scientific institutions; patterns of communication; norms and values; social determinants of conformity and innovation; the internal and external politics of science. **7.** *Social Responsibility in Science:* A history of the 'Social Responsibility Movement'; ethical and political dimensions of the problem of responsibility in science.

62.718G   Science in National Culture:
Comparative Historical
Perspectives   S2L2

Historical and contemporary aspects of the comparative development of scientific institutions and research styles in different national contexts. The modes of interaction and mutual perceptions of scientific communities in Western industrializing nations from the nineteenth century; the question of convergence in systems of scientific organization in East and West; the implications of science 'transfer' to developing natiions.

62.720G   The Sociology of Scientific Knowledge   S2 L2

An analysis of recent sociological theories concerning the nature and extent of the influence that social conditions have upon the formation and acceptance of scientific knowledge. Topics covered include: neomarxist theories of science and ideology; the 'strong program' for the sociology of knowledge; 'field' theories and the analysis of 'disciplinary power' in science; and epistemological problems raised by commercial and governmental direction of scientific research. This unit builds upon the material covered in 62.709G The Scientific Community, although it may be taken independently of that unit, and it provides a suitable background for 62.701G Philosophy and Methodology of Science.

Board of Studies in
Science and Mathematics

Undergraduate Study

68.302   Introductory Marine Science   S1 L3T1

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 or 1.011.

The physical properties of the oceans, and their measurement. Oceanographic instrumentation. The design of small and large scale ocean experiments. Laboratory and field work.

68.410　Biological Laboratory Computing　　S2 L2T4

Prerequisites: As for 10.021B. Excluded: 1.041, Programs 0601, 0610, 0611 & 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.

68.503　Science of Interfaces　　L2T3

Prerequisites: 2.002A, 1.012, 1.022.

Elementary theory of terminated lattice and surface states; the solid-gas interface; general theory of absorption; corrosion; catalysis; liquid gas interface; ocean/atmosphere interactions; lung/air interactions; solid-liquid interactions and electrochemistry.

68.504　Chemical Physics Honours　　F

Research project work in the Schools of Physics and/or Chemistry and several lecture units offered by the Schools of Physics, Chemistry and/or Mathematics. Students intending to enrol in this honours unit should in the first instance contact the Chairman of the Chemical Physics Program Committee. An appropriate course of study will be formulated in consultation with the Heads of the contributing Schools.

Anatomy

Undergraduate Study

Prerequisites: Pass Conceded (PC) in a prerequisite subject is not acceptable. Students who have obtained only Pass Conceded in a prerequisite subject should consult the Head of the School of Anatomy.

70.011A　Histology I　　S1 L2T4

Prerequisite: 17.021 (or 17.041), 17.031.

Cell form and tissue structure. Cell structure and function. Cell function and evolution. Epithelial cells and tissue. Connective tissues and connective cells. Muscle cells and muscle tissue. Nerve cell and nervous tissue. Cellular interrelations. Structure of organs and organ systems. Skin and derivatives. Development and structure of teeth. Circulatory system. Oral cavity. Alimentary canal and associated glands. Respiratory system. Urinary system. Eye, ear. Reproductive system.

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 foetus. Characteristics of external form. Teratology. Human organology. Comparative mammalian development. Biochemistry and embryogenesis.

70.011C　Introductory Anatomy　　S1 L2T4

Prerequisite: 17.021 (or 17.041), 17.031.

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 (childhood, adolescence, maturity, senescence).

70.012B　Visceral Anatomy　　S2 L2T4

Prerequisites: 70.011A, 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 I　　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 IV　　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 II　　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: 17.021 (or 17.041), 17.031, and any one of 41.101, 45.301, 70.011A. Excluded: 70.304.

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

70.305   Neuroanatomy II   S2 L1T2

Prerequisite: Credit or better in 70.021C.

Topics: 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 I   S1 L2T4

Prerequisites: 70.011A, 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 II   S2 L2T4

Prerequisites: 70.012C, 70.306.

A continuation of 70.306. Includes: a detailed study of the musculo skeletal components of trunk and lower limb, functional morphology of locomotion, including comparative and evolutionary aspects of bipedal locomotion, development of musculoskeletal system and locomotion.

Pathology

Undergraduate Study

72.301   Basic and Applied Pathology   F L2T1

Prerequisites: 70.011A, 70.011C, 73.111.

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. Aberrations of cell growth including study of atrophy, hypertrophy, hyperplasia and metaplasia, 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. Coverage of the processes of healing and regeneration with specific reference to healing of skin wounds and the healing of fractures.

Graduate Study

72.402G Principles of Disease
Processes   S1 L3 C3

Prerequisite: 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

Undergraduate Study

73.111   Physiology IA   F L2T4

Prerequisites: 17.021 (or 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 form 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 IB   F L2T4

73.011A Principles of Physiology (Optometry)   F L2T4

Prerequisites: As for Physiology IA except that 2.131 may be accepted as a co-requisite. Excluded: 73.111.

Covers the same general areas of physiology as Physiology IA but in less detail and with less intensive practical courses. Physiology IB may be taken by students not intending to study physiology in Level III. Principles of Physiology is taken only by students in the BOptom degree course.

73.012   Physiology II   F L4T8

Prerequisites: 73.111, 41.101, 41.111. Students enrolled in the Program 7302 (Physiology/Chemistry) may choose 2.003J and 10.2111 and 10.2112 in place of 41.101 and 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 the regulation of cardiorespiratory activity.

73.012C   Organ Physiology   S2 L4T8

Prerequisites: for 73.012A, B, CD: 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. The cardiovascular and respiratory systems, the endocrine systems, and the kidneys are usually studied in depth, and important aspects of gastro-intestinal and fetal physiology are also treated. Concentrates on the functions of the individual organs within these systems, on the operation of the systems as wholes, and on the mechanisms (including neural mechanisms) controlling the systems. 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 L0T3

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 II. The subject is intended to supplement the level II, Physiology 1A course in order to provide an adequate grounding in applied or clinical aspects of physiology before they enter year three 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; gastro-intestinal physiology.

73.022   Pharmacology   F L2T4

Prerequisites: 73.111 or 73.121. Co-requisites: 73.102 or 41.102A & 41.102B or 2.003J and 2.033A.

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 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 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 or PhD degree may also be undertaken by selected students.

Community Medicine

Undergraduate Study

79.201   Population Genetics   S1 L2T3

Prerequisites: 45.101, or 10.311A and 10.311B, or 10.321A and 10.321B, or 10.331.

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   S2 L2T4

Prerequisite: 41.101.

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.

79.402 Genetics of Behaviour I   S1 L2T3

Prerequisite: 17.031.

Behavioural traits in invertebrates and mammals, including man, in which genetic factors can be identified.

Principal subject areas: Models for behaviour genetics in invertebrates and mammals, with discussion of and practice in research methodologies; mathematical treatment of data; genetic factors in human intelligence; genetics of mental retardation and psychological illness in man, with appropriate clinical contact and discussion.

79.403 Genetics of Behaviour II   S2 L2T3

Prerequisite: 79.402.

An advanced subject in the area of behaviour genetics in man and animals, including more complex aspects of statistical analysis of data, and options for in depth studies and practical experience in specific aspects of human and animal behaviour genetics.

Graduate Study

79.501G Occupational Disease   S2 L2T1

Prerequisite: Acceptance in Master of Safety Science or Graduate Diploma in Safety Science. Co-requisite: 73.001, (Exemption for Medical Graduates).

Physical environment and disease: musculoskeletal system, physical trauma; heat and cold, burns, electric shock; radiation; pressure, vibration, noise. *Chemical environment and disease:* metallic poisons, toxic compounds, gaseous poisons, carcinogens, allergens. *Microbial environment and disease. Systems approach:* gastrointestinal tract; renal system; central and peripheral nervous system; visual system, respiratory system, airborne particulates; skin.

79.502G Occupational Health Control   S1L3

Prerequisites: 73.001 (exemption for Medical graduates), 79.501G (provisional exemption for Medical graduates).

Introduction; dose response; risk, codes of safe practice; protection of the worker; design of safe workplace; protective equipment; occupational health surveillance; epidemiology; occupational safety program; emergency arrangements; environmental health; non-occupational safety; safety services.

Faculty of Medicine

Undergraduate Study

For Students Enrolled in Course 3820

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.

Financial Assistance
to Students

The scholarships and prizes listed below are available to students whose courses appear in this handbook. Each faculty handbook contains in its Financial Assistance to Students 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

As well as the assistance mentioned earlier in this handbook (see General Information: Financial Assistance to Students), there are a number of scholarships available to students. What follows is an outline only. 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*	$150 pa	Minimum period of approved degree/ combined degree course	Merit in HSC and total family income not exceeding $4000

* Apply to The Secretary, Bursary Endowment Board, Box 460, PO, North Sydney 2060 immediately after sitting for HSC.

Undergraduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions

General (continued)

Donor	Value	Year/s of Tenure	Conditions
Sam Cracknell Memorial	Up to $3000 pa payable in fort-nightly 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
Girl 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 enrolling in any year of a full-time undergraduate course on the basis of academic merit and financial need

Science

Chemistry

Donor	Value	Year/s of Tenure	Conditions
John Ragnar Anderson Memorial Bequest	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progress	Permanent residence in Australia and eligibility for admission to the full-time degree course in Chemistry

Mathematics

Donor	Value	Year/s of Tenure	Conditions
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
George Szekeres Award	$200 pa	1 year	Open to students entering the final year of the honours degree course in Pure Mathematics

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*.

Where possible, the scholarships are listed in order of schools within the Faculty of Biological Sciences and the Faculty of Science.

* Available for reference in the University Library.

Donor	Value	Year/s of Tenure	Conditions

General

Donor	Value	Year/s of Tenure	Conditions
University of New South Wales Postgraduate Scholarships		1-2 years for a Masters and 3-4 years for a PhD degree	Applicants must be honours graduates (or equivalent). Applications to Registrar by 31 October (30 November in special circumstances)
Commonwealth Postgraduate Research Awards	Living allowance of $4620 pa. Other allowances may also be paid.	As above	Applicants must be honours graduates (or equivalent) who will graduate with honours in current academic year, and who are domiciled in Australia
Commonwealth Postgraduate Course Awards		1-2 years; minimum duration of course	Preference is given to applicants with employment experience. Applicants must be graduates or scholars who will graduate in current academic year and who are permanent residents of Australia, and who have not previously held a Commonwealth Postgraduate Award. Applications to Registrar by 30 September (in special circumstances applications will be accepted 30 November).
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 of the Year	$16000 over 2 years further studies in USA, UK, Northern Europe or in special cases Australia. There are no special allowances for travel or accommodation for married graduates.	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.

* Application forms are available from: The Secretary, Department of Education, AAEF Travel Grants, PO Box 826, Woden, ACT 2606.

Donor	Value	Year/s of Tenure	Conditions

General (continued)

Donor	Value	Year/s of Tenure	Conditions
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 Commonwealth citizens or British Protected Persons, and who are not older than 35 years of age. Applications close with Registrar by 30 September.
Sam Cracknell Memorial	Up to $3000 pa		See above under Undergraduate Scholarships, General
The English-Speaking Union (NSW Branch)	$5000		Applicants must be residents of NSW or ACT. Awarded to young graduates to further their studies outside Australia.
Gowrie Graduate Research	$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 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 either: 1. Members of the Australian or a State Public Service or semi-government Authority. 2. 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 early August.
Frank Knox Memorial Fellowships at Harvard University	Stipend of $4000 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
The Rhodes Scholarship†	Approximately £4000 stg pa	2 years, may be extended for a third year	Unmarried male and female Australian citizens between the ages of 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§	$14000 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.

* Application forms must be obtained from the Australian representative of the Fund, Mr L. T. Hinde, Reserve Bank of Australia, Box 3947, GPO, Sydney, NSW 2001. These must be submitted to the Registrar by 24 July.

† Applications to Mr H. McCredie, Secretary of the NSW Committee, University of Sydney, NSW 2006.

§ Applications to The Secretary, Rothmans University Endowment Fund, University of Sydney, NSW 2006.

Donor	Value	Year/s of Tenure	Conditions

Biological Sciences

Donor	Value	Year/s of Tenure	Conditions
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 on-going problems of the community, particularly the behaviour of the 'whole person' in a social milieu.

Science

Donor	Value	Year/s of Tenure	Conditions
American Optical Corporation Scholarship	$1000 pa	1 year renewable	To enable a graduate in optometry to undertake study for the award of the degree of Master of Optometry. Inquiries to Dr B. Holden, School of Optometry.
Contavue Laboratories Contact Lens Graduate Research Scholarship			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. Inquiries to Dr B. Holden, School of Optometry.
Hydron Laboratories Contact Lens Research Scholarship			
Contact Lens Society of Australia			
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 worth £2250 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

Donor	Value	Year/s of Tenure	Conditions

Science (Continued)

Donor	Value	Year/s of Tenure	Conditions
Science Research Scholarship of the Royal Commission for the Exhibition of 1851	£2900 stg pa	2 years. Renewal for further year possible.	To enable graduates, usually not more than 26 years of age, to undertake research in some branch of pure or applied science at an overseas university. Applicants must be British Commonwealth citizens or citizens of the Republic of Ireland, Pakistan, or South Africa, who have done at least 3 years of a university science course.
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 undertake 2 years' graduate study towards the award of a higher degree at a British university.

Prizes

Undergraduate University Prizes

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

Donor/Name of Prize	Value $	Awarded for
Sydney Technical College Union Award	50.00 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

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for

School of Accountancy

Donor/Name of Prize	Value $	Awarded for
Australian Society of Accountants	75.00 75.00	14.501 Accounting and Financial Management IA 14.522 Accounting and Financial Management IIA or 14.532 Accounting and Financial Management IIA (Honours)
Chamber of Manufacturers of New South Wales	15.00	14.703 Advanced Auditing
Coopers and Lybrand	200.00	14.542 Accounting and Financial Management IIB
Corporate Affairs Commission	100.00	14.542 Accounting and Financial Management IIB
Datec Pty Ltd	200.00	14.605 Information Systems IIIB
Esso Aust Ltd	500.00	Overall achievement by a student majoring in Accountancy in the subjects 14.501 Accounting and Financial Management 1A, 14.511 Accounting and Financial Management 1B, 14.522 Accounting and Financial Management 11A, Accounting and Financial Management IIB.
Hungerford Hancock & Offner	50.00	14.511 Accounting and Financial Management IB
	50.00	14.593 Accounting and Financial Management IIIB (Honours)
Law Book Co Ltd	50.00 Books	14.511 Accounting and Financial Management IB
Schroder Darling & Company Limited	200.00	14.613 Business Finance II
E. S. Wolfenden Memorial	75.00	14.563 Accounting and Financial Management IIIA
Arthur Young & Co	60.00	14.613 Business Finance II

School of Anatomy

Donor/Name of Prize	Value $	Awarded for
The Winifred Dickes Rost	50.00	Outstanding merit in Anatomy in Final Year of the Science and Mathematics Course
Jane Skillen	40.00	Outstanding merit in all branches of Anatomy

School of Biotechnology

Donor/Name of Prize	Value $	Awarded for
Mauri Brothers & Thomson (Aust) Pty Ltd	150.00 ●	Best result in the Level II Biotechnology subject
	150.00	Best result in one of the Level III Biotechnology subjects
	150.00	Best result in the Biotechnology honours program

Donor/Name of Prize	Value $	Awarded for

School of Chemical Engineering and Industrial Chemistry

The Australian Gas Light Company's in Chemical Engineering	50.00	Subject selected by Head of School
Australian Paper Manufacturers Ltd	100.00	Best result in 48.163 Instrumentation and Process Control in Industrial Chemistry
Australian Paper Manufacturers Ltd	100.00 ⎫	
	⎬	Subject selected by Head of School
Stauffer Australia Limited	50.00 ⎭	

School of Chemistry

Advanced Analytical Chemistry	100.00	2.013D Advanced Analytical Chemistry
Australian Consolidated Industries Ltd	60.00 ⎫	
Chamber of Manufactures of New South Wales	15.00 ⎬	Subject selected by Head of School
CSR Chemicals Ltd	200.00	Chemistry Honours
Inglis Hudson Bequest	Advised annually	2.002B Organic Chemistry I
Jeffery Bequest	40.00	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	
Tooth & Co Ltd	50.00 ⎫	
UNSW Chemical Society Parke-Pope	50.00 ⎬	Subject selected by head of school
UNSW Chemical Society George Wright	50.00 ⎭	

School of Economics

Brinds Ltd	100.00	15.013 Economics IIIA (Honours) and 15.033 Economics IIIB (Honours)

School of Electrical Engineering and Computer Science

Chamber of Manufactures of New South Wales	45.00	Subject selected by Head of School
J. Douglas Maclurcan	40.00 Book order	Control Systems

Donor/Name of Prize	Value $	Awarded for

School of Mathematics

Donor/Name of Prize	Value $	Awarded for
ICI Theory of Statistics IV	100.00	Theory of Statistics IV
School of Mathematics	30.00	Excellence in 10.011 Higher Mathematics I
	30.00	Excellence in basic second year Higher Mathematics subjects (10.121A, 10.1213, 10.1214, 10.2211, 10.2212)
	30.00	Excellence in 5 or more Level II Mathematics subjects (Arts: 20 credit points or more)
Head of School's	50.00	Excellence in 5 or more Level II Mathematics subjects (Arts: 20 credit points or more)
The Pure Mathematics	50.00	Excellence in Level III Pure Mathematics subjects
The Applied Mathematics	50.00	Excellence in Level III Applied Mathematics subjects
The Theoretical Mechanics	50.00	Excellence in Level III Theoretical Mechanics subjects
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
W. D. & H. O. Wills (Aust) Ltd Theory of Statistics III	50.00	Higher Theory of Statistics III

School of Metallurgy

Donor/Name of Prize	Value $	Awarded for
Alcan Australia Ltd	100.00	
Austral Crane	150.00	
Australian Institute of Metals	50.00	
Australian Welding Institute	30.00 Book order	
Chamber of Manufactures of New South Wales	15.00	Subject selected by Head of School
The Broken Hill Proprietary Co Ltd	100.00	
Eagle & Globe Steel Ltd	100.00	
The Electrolytic Refining and Smelting Co of Australia Ltd	20.00	
Zinc Corp Ltd	70.00	

Donor/Name of Prize	Value $	Awarded for

School of Optometry

Donor/Name of Prize	Value $	Awarded for
Australian Optometrical Association	50.00 ⎫	
Chamber of Manufactures of New South Wales	15.00 ⎬	Subject selected by Head of School
International Optics	25.00 ⎭	
Bausch & Lomb Soflens	Diagnostic set of contact lenses	31.841 Clinical Optometry
Contavue	Trial fitting set of contact lenses	Best essay or project on contact lenses
L. G. Darcey Memorial	30.00	31.811 Optometry I
Filmer Sceats Memorial	30.00	31.812 Optometry II
Hoya Australia Pty Ltd	250.00	Highest academic records in the Optometry degree course
Hydron (Australia) Pty Ltd	25.00	31.813 Optometry III
	25.00	Optometry Year IV
Theo Kannis	250.00	31.841 Clinical Optometry
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
G. Nissel & Co Aust Pty Ltd	Trial fitting set of contact lenses	31.813 Optometry III and 31.841 Clinical Optometry — Contact Lenses sections
Optical Products Pty Ltd	100.00 ⎫	
Optometrists' Association of NSW	40.00 ⎭	Subject selected by Head of School
The Optometric Vision Research Foundation	100.00	Research project
Optyl (Australia) Pty Ltd	100.00	31.812 Optometry II
Bryan Powell	100.00	Colour vision section of 31.841 Clinical Optometry
The Keith Woodland Memorial	75.00	Binocular vision component of 31.813 Optometry III and 31.841 Clinical Optometry

School of Physics

Donor/Name of Prize	Value $	Awarded for
Institute of Physics	50.00	Highest aggregate marks in three of the Units 1.013, 1.023, 1.033 and 1.043
Head of School's in Physics	30.00	Most creditable Year 4 honours thesis
Physics Staff for Applied Physics	30.00	Highest aggregate marks three units of the following subjects: 1.133, 1.3033, 1.3133, 1.3233, 1.3333

Donor/Name of Prize	Value $	Awarded for

School of Physics (continued)

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Physics Staff for Physics I	50.00	Highest mark in 1.011
Physics Staff for Physics II	50.00	Highest mark in 1.012, 1.022 and 1.032
Physics Staff for Physics IV Honours	50.00	Highest mark in 1.104, 1.304 or 1.504
Physics Staff for Theoretical Physics	30.00	Highest marks in 1.513 and 1.523

School of Psychology

Donor/Name of Prize	Value $	Awarded for
Australian Psychological Society	100.00	A Year 4 Psychology subject selected by Head of School
Psychology Staff	80.00	Best Psychology Year 2

W. S. and L. B. Robinson University College

Donor/Name of Prize	Value $	Awarded for
Broken Hill Women's Auxiliary of the Australasian Institute of Mining and Metallurgy	30.00	Performance by a student who achieves second place in a complete stage of a degree course
Mining Managers Association Broken Hill	70.00	Best overall performance in a complete course
Mining Managers Association	40.00	Three prizes: one for each best pass in any complete stage of the degree courses in, respectively, Mechanical Engineering, Mining Engineering, Science
Mining Managers Association	30.00	Seven prizes to be awarded in individual subjects selected by the Director
Western Mining Corporation Limited	150.00	Four prizes to be awarded for best performance in 7.314R Mineral Process Technology 7.313R Mineral Processing 7.214R Mine Economics and Planning 7.224R Operational Management

Graduate University Prizes

Donor/Name of Prize	Value $	Awarded for
School of Biotechnology		
Mauri Brothers & Thomson (Aust) Pty Limited	150.00	Best overall performance in the Master of Science (Biotechnology) degree course
School of Chemistry		
Smith, Kline and French	50.00	Best performance in the Graduate Diploma in Food and Drug Analysis course
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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James Bartram Douglas, MA BSc DipEd *Melb.*

Associate Professor
Clyde Arnold McGilchrist, BSc BEd *Qld.*, MSc PhD *N.S.W.*

Senior Lecturers
Peter John Cooke, MSc *N.E.*, MS PhD *Stan.*
John Anthony Eccleston, BSc *Syd.*, MSc *Manc.*, PhD *C'nell.*
Anthony Gilbert Lewis Elliott, BSc *W.Aust.*
Manohar Khanderao Vagholkar, MSc *Bom.*, DIC PhD *Lond.*

Lecturer
Ronald Bruce Davis, BSc *Syd.*, MSc *N.S.W.*, DipEd *N.E.*

Senior Tutor
Lynette Anne Perry, BSc MStats *N.S.W.*

Professional Officer
Rhonda Gock, BSc MStats *N.S.W.*

Honorary Associate
Geoffrey Kennedy Eagleson, BSc PhD *Syd.*

Department of Theoretical and Applied Mechanics

Senior Lecturers
Michael Leslie Banner, BE MEngSc *Syd.*, PhD *Johns H.*
John Desmond Fenton, BE MEngSc *Melb.*, PhD *Camb.*
William Dennis McKee, BSc *Adel.*, MSc *Flin.*, PhD *Camb.*

Lecturers
Peter James Blennerhassett, BE *W.Aust.*, PhD *Lond.*
David Charles Guiney, BSc *Adel.*
Douglas Edward Mackenzie, BSc *Tas.*, FIMA, MACE
David Allan Mustard, BSc *Syd.*, MSc *N.S.W.*
Richard Wyndham O'Brien, BE *N.S.W.*, PhD *Camb.*

Senior Tutor
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Honorary Associates
Bruce Valton Hamon, BSc BE *Syd.*, MAIP
Captain Daniel James McKeegan, BSc *Syd.*, MSc PhD *N.S.W.*, RAN
Simon Jacques Prokhovnik, BA MSc *Melb.*

School of Optometry

Professor of Optometry and Head of School
Hermann Barry Collin, BSc MAppSc PhD *Melb.*, LOSc *V.C.O.*, FAAO

Senior Lecturers
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Stephen John Dain, BSc PhD *City*, FBCO, MIESAust
Brien Anthony Holden, BAppSc *Melb.*, PhD *City*, LOSc *V.C.O.*, FAAO

Lecturers
Philip James Anderton, BOptom BSc *N.S.W.*, MScOptom *Melb.*
Graham Leslie Dick, MSc *N.S.W.*, ASTC, FIO
Daniel James O'Leary, MSc PhD *Wales*, FBOA, FSMC
Elijah Udovitch, MOptom *N.S.W.*

Professional Officer
Angela Kathleen McCarthy, MSc *N.S.W.*, ASTC, FIO

Tutors
Shoba Ayyar, BOptom *N.S.W.*
Michael Edward Kotow, MOptom *N.S.W.*

Instructor
Ian William Robinson

School of Physics

Professor of Experimental Physics and Head of School
Kenneth Norman Robert Taylor, BSc PhD *Birm.*, FInstP, FAIP

Professor of Experimental Physics and Head of Department of Applied Physics
Hiroshi Julian Goldsmid, BSc PhD DSc *Lond.*, FInstP, FAIP

Professor of Theoretical Physics and Head of Department of Theoretical Physics
Heinrich Hora, DiplPhys *Halle*, DrRerNat *Jena*, DSc *N.S.W.*, FInstP, FAIP

Associate Professors
Graham James Bowden, BSc DipAdvStudSc PhD *Manc.*
Hans Gerard Leonard Coster, MSc PhD *Syd.*, MInstP, MAIP

Dan Haneman, DSc *Syd.*, PhD *R'dg.*, FAIP
John Charles Kelly, BSc *Syd.*, PhD *R'dg.*, DSc *N.S.W.*, FInstP, MAIP, MAmPS

Executive Assistant to Head of School
Dr J. R. Hanscomb

Director of First Year Studies
Dr G. J. Russell

Administrative Officer
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Lecturers
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David John Miller, BSc PhD *N.S.W.*, DipEd *Syd.*, MAIP, MAmPS, MAAPT
John William Vanstan Storey, BSc *La T.*, PhD *Monash*
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Joseph Albert Wolfe, BSc *Qld.*, PhD *A.N.U.*

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Tutors
Terence Patrick Beven, BSc PhD *Tas.*, MAIP
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Paul McNamara, BSc *N.S.W.*
Michael Ramsey, BSc *N'cle.(N.S.W.)*
Marlene Noella Read, BSc PhD *N.S.W.*, MACS, MAIP, MAmPS
Sophia Sakellis, DipPhysics *Patras*, MSc *N.S.W.*
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Gabriel Viera, BSc *N.S.W.*

Teaching Fellow
Roberta Anne Vaile, BSc *N'cle.(N.S.W.)*

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Honorary Associates
John Stuart Dryden, MSc *Melb.*, DIC PhD *Lond.*, FAIP
John Lloyd Symonds, BSc *Adel.*, PhD *Birm.*, FInstP, FAIP

Department of Applied Physics

Associate Professor
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Victor Raymond Howes, BSc PhD *Lond.*

Lecturer
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Department of Theoretical Physics

Associate Professor
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Senior Lecturer
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John Richard Shepanski, MSc *Syd.*, MAIP

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Physics

Senior Lecturer
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The University of New South Wales Kensington Campus 1983

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
Applied Science   F10
Architecture   H14
Arts (Morven Brown)   C20
Banks   F22
Barker Street Gatehouse   N11
Basser College   C18
Biological Sciences   D26
Central Store   B13
Chancellery   C22
Chemistry
Dalton   F12
Robert Heffron   E12
Civil Engineering   H20
Commerce (John Goodsell)   F20
Dalton (Chemistry)   F12
Electrical Engineering   G17
Geography and Surveying   K17
Goldstein College   D16
Golf House   A27
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
Basser   C18
Goldstein   D16
Philip Baxter   D14
Main Building   K15
Maintenance Workshop   B13

Mathews   F23
Mechanical and
Industrial Engineering   J17
Medicine (Administration)   B27
Menzies Library   E21
Metallurgy   E8
Morven Brown (Arts)   C20
New College (Anglican)   L6
Newton   J12
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
Unisearch House   L5
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

General

Academic Staff Office   C22
Accountancy   F20
Admissions   C22
Adviser for Prospective Students   C22
Alumni and Ceremonials   C22
Anatomy   C27
Applied Geology   F10
Applied Science (Faculty Office)   F10
Architecture
(including Faculty Office)   H14
Arts (Faculty Office)   C20
Australian Graduate
School of Management   G27
Biochemistry   D26
Biological Sciences (Faculty Office)   D26
Biomedical Library   F23
Biotechnology   D26
Bookshop   G17
Botany   D26

Building   H14
Careers and Employment   C22
Cashier's Office   C22
Centre for Biomedical Engineering   A28
Centre for Medical Education
Research and Development   C27
Centre for Remote Sensing   K17
Chaplains   E15a
Chemical Engineering and
Industrial Chemistry   F10
Chemistry   E12
Child Care Centres   N8, O14
Civil Engineering   H20
Closed Circuit Television Centre   F20
Commerce (Faculty Office)   F20
Committee in Postgraduate Medical
Education   B27
Community Medicine   D26
Computing Services Unit   E21
Drama   B10
Economics   F20
Education   G2
Electrical Engineering and
Computer Science   G17
Energy Research, Development and
Information Centre   B8b
Engineering (Faculty Office)   K17
English   C20
Examinations   C22
Fees Office   C22
Food Technology   F10
French   C20
General Staff Office   C22
General Studies   C20
Geography   K17
German Studies   C20
Graduate School of the Built
Environment   H14
Health Administration   C22
History   C20
History and Philosophy of Science   C20
Industrial Arts   C1
Industrial Engineering   J17
Institute of Languages   G14
Institute of Rural Technology   B8b
Japanese Economic and Management
Studies Centre   G14
Kanga's House   O14
Kindergarten (House at Pooh Corner)   N8
Landscape Architecture   H14
Law (Faculty Office)   E21
Law Library   E21

Librarianship   F23
Library   E21
Lost Property   F20
Marketing   F20
Mathematics   F23
Mechanical Engineering   J17
Medicine (Faculty Office)   B27
Metallurgy   E8
Microbiology   D26
Mining Engineering   K15
Music   B11b
National Institute of Dramatic Art   C15
Nuclear Engineering   G17
Off-campus Housing   C22
Optometry   J12
Organizational Behaviour   F20
Pathology   C27
Patrol and Cleaning Services   F20
Philosophy   C20
Physics   K15
Physical Education and
Recreation Centre (PERC)   B5
Physiology and Pharmacology   C27
Political Science   C20
Postgraduate Extension Studies (Closed
Circuit Television)   F20
Postgraduate Extension Studies (Radio
Station and Administration)   F23
Psychology   F23
Public Affairs Unit   C22
Regional Teacher Training Centre   C27
Russian   C20
Science and Mathematics Course
Office   F23
Social Work   G2
Sociology   C20
Spanish and Latin American Studies   C20
Sport and Recreation   E4
Student Counselling and Research   E15c
Student Health·   E15b
Student Records   C22
Students' Union   E4
Surveying   K17
Teachers' College Liaison Office   F15b
Tertiary Education Research Centre   E15
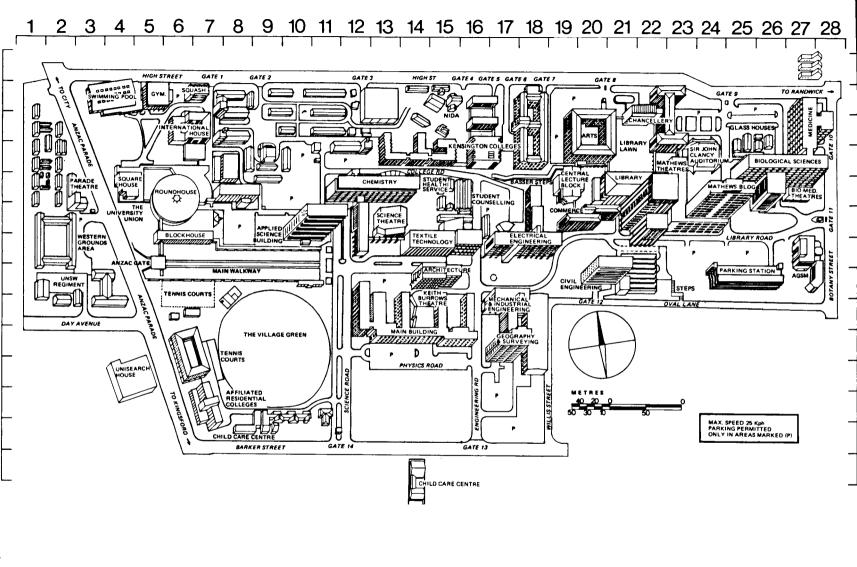Textile Technology   G14
Town Planning   K15
University Archives   C22
University Press   A28
University Union (Blockhouse)   G6
Wool and Pastoral Sciences   B8a
Zoology   D26

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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.

The Calendar and Handbooks also contain a summary list of higher degrees as well as the conditions for their award applicable to each volume.

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